



**AUTOMATED GATE REMPLACEMENT  
KUUJJUAQ AIRPORT  
KUUJJUAQ, QUEBEC**

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PWGSC Project : R.116435.600  
TC : 24QG

**TECHNICAL SPECIFICATIONS ISSUED FOR BIDDING/CONSTRUCTION**

November 2022



Travaux publics et  
Services gouvernementaux  
Canada

Public Works and  
Government  
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Canada

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Canada

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**END OF SECTION**

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**END OF SECTION**

**Part 1            General**

**1.1                DESCRIPTION OF WORK**

- .1        In general and not limited to, the scope of work for this RFP includes in summary :
- .1        Transportation and delivery of materials and equipment to Kuujuuaq;
  - .2        The organization of the work site;
  - .3        Dismantling of the existing automatic barrier and its accessories;
  - .4        Removal of the existing fence to be replaced;
  - .5        Removal of existing paving and site preparation;
  - .6        Installation of temporary fencing and control of access to the site during the work period;
  - .7        Provision and installation of a temporary guard house;
  - .8        Temporary site security measures;
  - .9        Perform installation of permanent fence and automatic gate, including accessories and hardware;
  - .10       Power supply to generator, including power cables, excavation, backfill and repair of trench and paving;
  - .11       Concrete bases to support equipment, materials and protective bollards;
  - .12       Commissioning and validation of all functionalities;
  - .13       Training of airport personnel;
  - .14       Delivery of technical operation and maintenance documents and spare parts.

The schedule for completion of the work is :

Delivery of materials and equipment to Kuujuuaq (1 <sup>st</sup> boat) :	Mid-July 2023
Site organization and safety :	July 1-15 2023
Beginning of works :	July 15 2023
End of works :	September 15 2023

**1.2                WORK COVERED BY THE CONTRACT DOCUMENTS**

- .1        Dismantling works :
- .1        Removal of automatic pivot gate and electrical panels, conduits, wiring;
  - .2        Removal of existing pedestal;
  - .3        Demolition of fencing to be replaced;
  - .4        Removal of asphalt at the existing barrier site;
  - .5        Removal of asphalt where the electrical trench crosses the paved road;
  - .6        All demolition and dismantling work necessary to complete the project;
  - .7        Remove existing electrical power cables.

- .2 Temporary works :
  - .1 Installation of perimeter fencing for work and storage areas;
  - .2 Installation of a temporary security guard shelter;
  - .3 Provision of a security guard;
  - .4 Temporary facilities for site organization;
  - .5 All temporary works necessary for the realization of the project.
- .3 Permanent works :
  - .1 Installation of an automatic gate including hardware, electrical connections, detection loops, pedestal, boxes, controls, safety elements, etc.;
  - .2 Installation of new fencing;
  - .3 Installation of a manual gate for temporary access;
  - .4 Electrical connection to the generator including wires, conductors, conduits, trenches;
  - .5 Repair of the traffic lane where the electrical trench crosses it;
  - .6 All work and materials necessary to complete the project;
  - .7 Supply of remote controls, spare parts and required documents;
  - .8 Commissioning, documentation and spare parts.

### **1.3 CONTINUATION OF AIRPORT OPERATIONS**

- .1 The contractor shall perform the work without affecting airport operations, aircraft movement and maintenance operations.
- .2 The work shall adhere to the precautions and limitations that will be outlined in the ECP :
  - .1 This is essentially the respect of safety rules, access, aircraft movements and coordination of work specific to the Kuujjuaq airport and the operations underway during the work period.

### **1.4 WORK SEQUENCE**

- .1 Construct Work in stages to accommodate the Departmental Representative's use of premises during construction.
- .2 Co-ordinate Progress Schedule according to the occupation.
- .3 Required stages :
  - .1 The contractor must submit a timetable for completion and phasing of work to the Departmental Representative.
- .4 Perform the Work in a staged manner to prohibit use of the site by the public.
- .5 Carry out the work in stages in such a way as to prohibit access to the airside to unauthorized persons and to the contractor's employees by surrounding the work area with a temporary fence without barriers.
- .6 Maintain access for firefighting or medical evacuation.

## **1.5 CONTRACTOR USE OF PREMISES**

- .1 Unrestricted use of site until Substantial Performance of Work as directed by the Departmental Representative. The work, located airside, will be carried out in accordance with the instructions that will be issued by the Departmental Representative and according to Section 01 35 13.13 – Special Project Procedures for Airport Facilities.
- .2 Limit use of premises for Work, to allow :
  - .1 The Departmental Representative occupancy;
  - .2 Maintaining airport operations;
  - .3 Prohibition of access to the air side by the public and unauthorized employees of the contractor.
- .3 Co-ordinate use of premises under direction of Departmental Representative.
- .4 A storage area required for the performance of the Work under this contract will be made available to the Contractor.
- .5 Remove or modify existing work to avoid damaging parts to remain in place.
- .6 Repair or replace, as directed by the Departmental Representative, for the purpose of connection to or harmonization with the existing Work or an adjacent Work, those portions of the existing Work that have been altered during construction.
- .7 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

## **1.6 OCCUPANCY BY THE DEPARTMENTAL REPRESENTATIVE**

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

## **1.7 PARTIAL OCCUPANCY BY THE DEPARTMENTAL REPRESENTATIVE**

- .1 Schedule and substantially complete designated portions of Work for the Departmental Representative's occupancy prior to Substantial Performance of entire Work.
- .2 The Department Representative will occupy designated areas only as necessary for airport or operational purposes.
- .3 Execute Certificate of Substantial Performance for each designated portion of Work prior to the occupancy by the Departmental Representative. Contractor shall allow :
  - .1 Access for the Departmental Representative personnel.
- .4 Execute Partial Interim Certificate of Completion for each designated portion of Work prior to the Departmental Representative occupancy. Contractor shall allow :
  - .1 Access for the Departmental Representative personnel.

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

- .1 Execute work with least possible interference or disturbance to airport operations, occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.
- .2 For moving workers and materials :
  - .1 Accept liability for damage, safety of equipment and overloading of existing equipment.

**1.9 EXISTING UTILITY 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 airport tenants.
- .3 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.
- .4 Submit schedule to and obtain approval from 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 according to Departmental Representative's directives to maintain critical building and tenant systems.
- .6 Install construction walkways for trench crossings to maintain normal traffic flow. Where this is not possible, proceed in phases to allow passage of people, vehicles and aircraft at all times.
- .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 AIRPORT IN OPERATION**

- .1 Conform to section 01 35 13.13 - Special Project Procedures for Airport Facilities and to the particular conditions detailed in the present section.

**1.11 REGULATED AREA**

- .1 Work of this contract is partly within the regulated area. It is the responsibility of the Contractor to know the airport security requirements.
- .2 Except for power supply work, Contractor's employees shall not be permitted to occupy the airside area, a temporary fence shall enclose the Contractor's occupancy area with no barriers.

**1.12 WORKSITE ACCESS**

- .1 Access to the airport will be in accordance with the instructions of the escort personnel, as described in Section 01 35 13.13 - Special Project Procedures for Airport Facilities.
- .2 At all times it is forbidden to drive on the areas of movement or near aircrafts.

**1.13 PARTICULAR CONDITIONS**

- .1 During Work, runway will stay in operation.
- .2 The Contractor to investigate option of barricading construction area to remain on the city side. In this way, construction activities will not affect the airport operations.
- .3 The Contractor shall, however, note and consider that some airside work will have to be performed. They must be coordinated with the personnel responsible for the operation of the airport and if possible outside the periods of operation.
- .4 The duration of an operation period extends between 15 minutes before each arrival and 15 minutes after each departure. In preparation for a period of operation.
- .5 Upon request, in preparation for a period of operation, the Contractor shall move his equipment and personnel to a distance and at a location determined by the Airport personnel.
- .6 During periods of operation, no piles of embankments or cuttings will be permitted within the leveled area. The trenches must have been backfilled and the backfill material compacted before each period of operation.
- .7 Perform the work in stages and progressing in the manner provided for in the contract, so as to allow the day-to-day operations of the airport on schedule.

**1.14 REQUIRED DOCUMENTS**

- .1 Maintain at job site, one copy 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 Plan Construction Operation (PCO);
- .12 Other documents as specified.

#### **1.15 FABRICATION OF SPECIALIZED MATERIALS AND EQUIPMENT**

- .1 Due to the lead time for fabrication of specialized materials and equipment, the contractor shall proceed with the ordering of materials and equipment upon receipt of the Designer's approved shop drawings.
- .2 The contractor shall submit proof of purchase order from the manufacturer or supplier to the departmental representative.
- .3 The following materials and equipment must be manufactured on a priority basis to ensure their delivery before the deadline for maritime shipping to Kuujjuaq :
  - .1 Temporary chain link fencing including all accessories such as posts, gates, reinforcing rod, bollards, reinforcing bars, corner posts, tubular framing, hardware (hinge and latch, etc.) and all accessories as described in the plans and specifications;
  - .2 Permanent fencing including chain link fence, posts, sliding gate, accessories (rollers, brackets, fasteners, etc.), bollards, reinforcing bars, barbed wire and supports, tubular framing, posts to support boxes, information panels to be attached to the fence;
  - .3 Electrical operator for opening and closing the sliding gate;
  - .4 Electrical box and electrical power panel including controls, heating, etc.;
  - .5 Magnetic card access controller and readers and pedestal;
  - .6 Detection loops;
  - .7 Protective bollards;
  - .8 Other equipment for proper operation of the system, all as indicated on the plans and specifications.
- .4 Storage of materials described below shall be the responsibility of the contractor. The Contractor shall be responsible for ensuring proper storage conditions, particularly for electrical and control components to prevent damage.
- .5 The contractor shall be responsible for the safekeeping of the materials and equipment and shall be responsible for all costs related to security, all risk insurance (fire, theft, etc.) until delivery and installation at the Kuujjuaq airport.

SPAC : R116435.600  
Kuujuaq Airport  
Automated gate replacement  
TC : 24QG

Section 01 11 01  
WORK RELATED GENERAL INFORMATION  
Page 7

<b>Part 2</b>	<b>Product</b>
<b>2.1</b>	<b>NOT USED</b>
<b>Part 3</b>	<b>Execution</b>
<b>3.1</b>	<b>NOT USED</b>

**END OF SECTION**

**Part 1            General**

**1.1                ADMINISTRATIVE**

- .1    Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2    The site meetings will be held by the Departmental representative.
- .3    Provide physical space and make arrangements for meetings.
- .4    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 five (5) days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2    Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3    Establish time and location of meeting and notify parties concerned minimum three (3) 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 16.16 - Construction Progress Schedules - 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    Construction Operation Plan (COP) requirements related to safety, maintenance of airport traffic and other aspects of airport operations.
  - .6    Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
  - .7    Owner provided products.
  - .8    Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
  - .9    Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
  - .10   Take-over procedures, acceptance, warranties in accordance with Section 01 78 00- Closeout Submittals.
  - .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 The Departmental representative will establish a schedule of meetings to be held during the course of the work.
- .2 Contractor, major Subcontractors involved in Work Departmental Representative are to be in attendance.
- .3 Notify parties at least three (3) days in advance.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within five (5) days.
- .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 by Departmental Representative to enable monitoring of project work in relation to established milestones.

### **1.2               REQUIREMENTS**

- .1     Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2     Plan to complete Work in accordance with prescribed milestones and time frame.
- .3     Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.
- .4     Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

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

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Submit Project Schedule to Departmental Representative within five (5) working days of receipt of acceptance of Master Plan.

### **1.4 PROJECT MILESTONES**

- .1 Project milestones form interim targets for Project Schedule.
  - .1 The submission of the required documents (workshop drawings, etc.) shall be completed no later than one (1) week after the start-up meeting.
  - .2 The equipment ordering must be carried out no later than one (1) week after the approval of the workshop drawings.
  - .3 The training of operating and maintenance personnel shall be carried out after full commissioning and prior to final acceptance.
  - .4 All work provided for in the contract including interim and final acceptance visits of the Departmental Representative shall be completed no later than xx month 201x.
  - .5 Demobilization shall be carried out within two (2) weeks of the final acceptance of the work.

### **1.5 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 five (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.

### **1.6 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 Workshop Drawings, Samples.
  - .3 Supplied equipment long delivery items.
  - .4 Mobilization;
  - .5 Fence, slab on ground, bollards and other concrete works;
  - .6 Setting up the temporary gate;
  - .7 Setting up the automated gate;
  - .8 Replacement of fences;
  - .9 Installation of underground conduits and cables;

- .10 Electricity : connections to the generator;
- .11 Command and access control;
- .12 Testing and Commissioning;
- .13 Training;
- .14 Interim and final acceptance visits by the Departmental Representative.
- .15 Delivery of contractual documents;
- .16 Demobilization.

## **1.7 PROJECT SCHEDULE REPORTING**

- .1 Update Project Schedule on 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.

## **1.8 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 Quebec, Canada.
- .3     Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4     Allow Departmental Representative to review of each batch of submitted documents.

- .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 an 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 three (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 one (1) electronic copy of Manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit one (1) electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Submit one (1) electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.
- .20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, 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 Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.
  - .1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

- .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

**1.3 CERTIFICATES AND TRANSCRIPTS**

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

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **ANNEX A**

### **Workshop drawing identification sheet**



## **ANNEX B**

# Verification Tests

Gate, Opened :	Verify that the limit switch forces the barrier to stop and that the mechanical parts and structure are not subject to unnecessary stress or contact.
Gate, Closed :	Verify that the limit switch forces the barrier to stop and that the mechanical parts and structure are not subject to unnecessary stress or contact.
Gate, in motion :	Verify that the safety cushion gives a signal when the gate comes into contact with an object. The gate should stop and change direction.  Verify that the motor overload device shuts down the motor when gate movement is excessively impeded.
Access :	Verify that the barrier opens upon detection of a vehicle on the air side.  Verify that the gate opens upon activation of a valid access card when a vehicle is present on the detection loop.  Verify that the gate remains closed when there is no vehicle on the detection loop near the pedestal even if a valid access card is used.
Detection loop :	Verify that the barrier closes even if there is still a vehicle detected on one or more detection loops.  Verify that the barrier close signal is given as soon as the barrier is 100% open via the limit switch.  Verify the gate closing delay timer at: 0 seconds, 15 seconds, 30 seconds, 45 seconds and at 60 seconds.
Manual selector :	Verify that the protection devices are functional during operations in manual mode (limit switch, protection cushion, motor overload).  Verify the opening movement of the barrier in "Opening" mode.  Verify the closing movement in "Close" mode.  Verify that the "Stop" mode of the manual selector has priority over the other control devices of the barrier (detection loops, remote controls, card reader).  Verify that everything is functional in "Automatic" mode.
Remotes :	Verify that the barrier opens when the "Open" button is pressed.  Verify that the gate closes when the "Close" button is pressed.  Verify that the gate stops in its position when the " Stop" button is pressed and that it remains in this position as long as the Open" or Close " button of this remote control is not pressed. The instructions from the detection loops, card reader or other remote controls must not be functional.  Verify that the manual selector has priority over the remote control commands.
Manual operation :	Check that the gate can be operated manually by the clutch system.

## **Part 1           General**

### **1.1               DEFINITION**

- .1     Restricted Area: Any area of an airport whose access is prohibited by a poster or controlled in any way constitutes a restricted area.
- .2     Aircraft Movement Area: the part of an airport used for the movement of aircraft, including manoeuvring areas (runway and taxiway) and traffic areas (apron).

### **1.2               LIABILITY OF THE GENERAL CONTRACTOR**

- .1     Review the airport traffic regulations and educate its staff and subcontractors.
- .2     This regulation can be found at the following address:
- .3     <http://www.tc.gc.ca/eng/acts-regulations/menu.htm>
- .4     Be responsible for its personnel and construction vehicles as well as its subcontractors involved in the project and to enter these regulated areas.

### **1.3               SECURITY MEASURES**

- .1     Do not obstruct the operations of the airport without authorization from the Departmental Representative.
- .2     Take the temporary security measures necessary for the transport of the public, personnel, pedestrians and moving vehicles.
- .3     Place fences indicated by the Departmental Representative.
- .4     If required, place red lights on top of piles of materials, as indicated by the Departmental Representative.

### **1.4               MOVEMENT OF EQUIPMENT AND PERSONNEL**

- .1     In areas of airport not closed to aircraft traffic:
  - .1     Obtain Departmental Representative's approval on scheduling of Work.
  - .2     Control movements of equipment and personnel as directed by Departmental Representative.
  - .3     Immediately obey signals from airport traffic control tower.

### **1.5               UNSERVICEABLE AREAS**

- .1     Open flames and flammable fuels are not permitted.
- .2     Park equipment that is not used outside of the apron. Stack the materials so that their tops remain below the height of the adjacent buildings.

### **1.6               TRENCHING**

- .1     Obtain Departmental Representative's written permission to undertake trenching on pavements. All trenching must be backfilled and sealed within one (1) working day.

## **1.7 AIRPORT FACILITIES**

- .1 Departmental Representative will stake or indicate location of underground facilities such as cables, pipes, ducts and other services and utilities.
- .2 A request shall be made to the communication or power companies or building owners or (if available) Info-Excavation to locate buried cables.
- .3 Notify Departmental Representative of work areas 48 hours minimum in advance of operations to allow sufficient time for underground facilities and service to be located.

## **1.8 OPERATIONAL RESTRICTIONS**

- .1 Comply with operational safety, security and other requirements applicable during construction and when working near runways and taxiways in operation, including but not limited to, the following:
  - .1 The integrity of all electronic and visual navigation aids associated with aviation activities occurring at the same time must be maintained for aircraft operations, thereby taking precedence over construction work. All decommissioning operations for electrical work must be performed by the Contractor.  
  
Underground power, transmission and control cables and other underground equipment and services located near the work area shall be identified and protected;  
  
The travel capacity of Emergency services must be maintained at all times. Service roads must be reviewed by the Departmental Representative on a Bi-weekly basis to ensure access is maintained at all times. Alternative routes, to be approved, must be provided if it is anticipated that the new work may be detrimental to these accesses.

## **1.9 GENERAL PROVISIONS FOR AIRPORT ACTIVITIES**

- .1 Refer to the drawings for details to the work to be done at the airport.
- .2 Construction equipment and material storage will be confined to construction areas or designated areas.
- .3 The Contractor shall be able to communicate by personal radio to all persons on the site, in order to facilitate, in a fast and effective response, the instructions for movement of construction areas.
- .4 Mobilization for the work will need to be closely coordinated with the Departmental Representative to ensure that all airport safety precautions are properly implemented. Instructions will be provided at the start-up meeting.
- .5 All airside areas (runway, taxiway, apron, etc.) are considered non-smoking. The "Superintendent of the Safety Contractor" will be responsible for ensuring that all construction workers are informed and adhere to this restriction.
- .6 Provide a temporary access at the location indicated on the plans. This temporary access shall consist of two lockable manual gates and a heated guard house. The exact location of the temporary access shall be coordinated with the Departmental Representative on site.

- .7 The security guard shall be on site 10 hours per day from the day the existing automatic gate is taken out of service until the new automatic gate is operational. Outside of the hours that the security guard is not present, the contractor shall provide the operator with the means to open the temporary gate (key or code to a padlock, lock or other manual temporary gate locking device).

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **Partie 1      General**

**GENERAL NOTE:** in this section the term “site” includes all the facilities located at the site where the work is taking place (construction site, buildings, access, infrastructure, parkings, bays, etc.).

### **1.1      REFERENCES**

- .1 Province of Québec
  - .1 Loi sur la santé et la sécurité du travail L.R.Q., c. S-2.1 (Act respecting occupational health and safety).
  - .2 Code de sécurité pour les travaux de construction L.R.Q., c. S-2.1, r.4 (Safety code for the construction industry)
  - .3 Association canadienne de normalisation (CSA).
  - .4 Workplace Hazardous Materials Information System (WHMIS). Health Canada.
  - .5 Material Safety Data Sheets (MSDSs)
  - .6 Code de sécurité pour les travaux de construction, S-2.1, r.6

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

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative the site-specific prevention program, as outlined in the article “GENERAL REQUIREMENTS”, at least 10 days prior to the start of work.
- .3 Departmental Representative will review Contractor’s site-specific prevention program and provide comments to Contractor within 10 days after receipt of the document. Revise plan as appropriate and resubmit to Departmental Representative within 5 days after receipt of comments from Departmental Representative. Departmental Representative reserves the right not to authorize the start of work on the construction site as long as the content of the prevention program is not satisfactory. The Contractor shall then update his prevention program and resubmit it to the Departmental Representative if the scope of work changes or if the working methods of the Contractor differ from his initial plans or for any other applicable new condition.
- .4 Departmental Representative’s review of Contractor’s site-specific prevention program should not be construed as approval of the program and does not reduce the Contractor’s overall responsibility for construction Health and Safety during the work.
- .5 Submit copies of Contractor’s authorized Representative’s construction site health and safety inspection reports to Departmental Representative, at least once a week.
- .6 Submit to Departmental Representative within 24 hours a copy of any inspection report, correction notice or recommendation issued by Federal, Provincial and Territorial health and safety inspectors.
- .7 Submit to Departmental Representative within 24 hours an investigation report for any accident involving injury and any incident exposing a potential hazard.

The investigation report shall contain at least the following:

1. Date, time and place of accident;
  2. Name of sub-contractor involved in the accident;
  3. Number of persons involved and condition of wounded;
  4. Witness identification;
  5. Detailed description of tasks performed at the time of the accident;
  6. Equipment being used to accomplish the tasks performed at the time of the accident;
  7. Corrective measures taken immediately after the accident;
  8. Causes of the accident;
  9. Preventive measures that have been put in place to prevent a similar accident.
- .8 Submit to Departmental Representative WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittals. Contractor must also keep one copy of these documents on the construction site.
- .9 Medical Surveillance: where prescribed by legislation, regulation or prevention program, submit certification of medical surveillance for construction site personnel prior to commencement of Work, and submit additional certifications for any new construction site personnel to Departmental Representative.
- .10 Submit to Departmental Representative an on-site Emergency Response Plan at the same time as the prevention program. The Emergency Response plan must contain the elements listed in the article "GENERAL REQUIREMENTS" of this section.
- .11 Upon request, submit to Departmental Representative copies of all training certificates required for the application of the prevention program, in particular (if applicable) for the following:
- .1 First aid in the workplace and cardiopulmonary resuscitation;
  - .2 Work in confined spaces (mandatory for all work in confined spaces);
  - .3 Lockout-tagout procedures (mandatory for all work requiring lockout);
  - .4 Safely operating forklift trucks (mandatory for all forklift usage);
  - .5 Safely operating elevating work platforms (mandatory for the use of all elevating platforms);
  - .6 Any other requirement of Regulations or the safety program.

In addition, the certifications of the *Cours de santé et sécurité générale pour les chantiers de construction* (General Health and Safety Training for Construction Sites) shall be available on demand on the construction site.

- .12 Engineer's plans and certificates of compliance: Contractor must submit to the Departmental Representative and to the *Commission des normes, de l'équité, de la santé et de la sécurité du travail* (CNESST) a copy signed and sealed by engineer of all plans and certificates of compliance required pursuant to the *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the construction industry) or by any other legislation or regulation or by any other clause in the specifications or in the contract. The Contractor must also submit a certificate of conformity signed by an engineer once the facility for which these plans were prepared has been completed and before a person uses the facility. A copy of these documents must be available on site at all times.

### **1.3 FILING OF NOTICE OF CONSTRUCTION SITE OPENING**

- .1 Notice of construction site opening shall be submitted to the CNESST before work begins. A copy of such notice and acknowledgment of receipt from the CNESST shall be submitted to Departmental Representative.

At the completion of all the work, a notice of construction site closing shall be submitted to the CNESST, with a copy to Departmental Representative.

- .2 The Contractor shall assume the role of being the Principal Contractor in the limits of the construction site and elsewhere where he must execute work within the framework of this project. The Contractor shall recognize the responsibility of being the Principal Contractor of the project and identify himself as such in the notice of the construction site opening he provides to the CNESST.
- .3 The Contractor shall accept to divide and identify the construction site adequately in order to define time and space at all times throughout the course of the project.

### **1.4 HAZARD ASSESSMENT**

- .1 The contractor must perform construction site specific safety hazard assessment related to project.

### **1.5 MEETINGS**

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
- .2 Contractor's Representative with decision power must attend any meetings at which construction site safety and health issues are to be discussed.
- .3 If it is anticipated that there will be 25 workers or more on the construction site at any given time, the Contractor shall set up a worksite committee and hold meetings as required by the *Code de sécurité pour les travaux de construction* (S-2.1, r. 4) (Safety code for the construction industry). A copy of the minutes of the meetings of the committee shall be provided to the Departmental Representative no later than 5 days after the committee meeting.

### **1.6 REGULATORY REQUIREMENTS**

- .1 Comply with all legislation, regulations and standards applicable to the construction site and its related activities.

- .2 Comply with specified standards and regulations to ensure safe operations on a site containing hazardous or toxic materials.
- .3 Always use the most recent version of the standards specified in the *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the construction industry), notwithstanding the date indicated in that *Code*.

## **1.7 COMPLIANCE REQUIREMENTS**

- .1 Comply with the *Loi sur la santé et la sécurité du travail* (L.R.Q., c. S-2.1) (Act Respecting Occupational Health and Safety) and the *Code de sécurité pour les travaux de construction* (S-2.1, r. 4.) (Safety code for the construction industry) in addition to respecting all the requirements of this specification manual.

## **1.8 RESPONSIBILITIES**

- .1 The Contractor must acknowledge and assume all the tasks and obligations which customarily devolve upon a principal Contractor under the terms of the *Loi sur la santé et la sécurité du travail* (L.R.Q., ch. S-2.1) (Act Respecting Occupational Health and Safety) and the *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the construction industry).
- .2 The Contractor must be responsible for health and safety of persons on construction site, safety of property on construction site and for the protection of persons adjacent to construction site and the environment to the extent that they may be affected by conduct of the work.
- .3 No matter the size or location of the construction site, the Contractor must clearly define the limits of the construction site by physical means and respect all specific regulation requirements applicable in this regard. The means chosen to define the limits of the construction site must be submitted to the Departmental Representative.
- .4 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific prevention Plan.

## **1.9 WORK PERFORMED BY EXTERNAL CONTRACTORS**

- .1 The Contractor must take the necessary steps to protect the health and safety of external contractors that have no contractual link with the Contractor but have been mandated by the Departmental Representative to perform certain work. In return, these external contractors are obligated to submit to the authority of the Contractor (Principal Contractor). A subordination agreement must be signed by the Contractor and by each external contractor to this effect and submitted to the Departmental Representative prior to the start of the work of each contractor (see the wording in the article HEALTH AND SAFETY SUBORDINATION AGREEMENT)

## 1.10 GENERAL REQUIREMENTS

- .1 Before undertaking the work, prepare a site-specific prevention program based on the hazards identified according to the article "HAZARD ASSESSMENT" and the article "RISKS INHERENT TO THE WORKSITE" in this section. Apply this program in its totality from the start of the project until demobilization of all personnel from the construction site. The prevention program shall take into consideration the specific characteristics of the project and cover all the work to be executed on the construction site.

The safety program must include at least the following:

- .1 Company safety and health policy;
  - .2 Description of the stages of the work;
  - .3 Total costs, schedule and projected workforce curves;
  - .4 Flow chart of safety and health responsibilities;
  - .5 Physical and material layout of the construction site;
  - .6 Risk assessment for each stage of the work, including preventive measures and the procedures for applying them;
  - .7 Identification of the preventive measures relative to the specific risks inherent to the worksite indicated in the article "RISKS INHERENT TO THE WORKSITE";
  - .8 Identification of preventive measures for health and safety of employees and / or public works site as indicated in the article "SPECIFIC REQUIREMENTS FOR THE HEALTH AND SAFETY OF OCCUPANTS AND PUBLIC";
  - .9 Training requirements;
  - .10 Procedures in case of accident/injury;
  - .11 Written commitment from all parties to comply with the safety program;
  - .12 Construction site inspection checklist based on the preventive measures;
  - .13 Emergency response plan which shall contain at least the following:
    - .1 Construction site evacuation procedures;
    - .2 Identification of resources (police, firefighters, ambulance services, etc.);
    - .3 Identification of persons in charge of the construction site;
    - .4 Identification of the first-aid attendants;
    - .5 Communication organizational chart (including the person responsible for the site and the Departmental Representative);
    - .6 Training required for those responsible for applying the plan;
    - .7 Any other information needed, in the light of the construction site's characteristics.
- If available the Departmental Representative will provide the evacuation procedures to the Contractor who shall then coordinate the construction site procedure with that of the site and submit it to the Departmental Representative.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted in the prevention program and may request resubmission with correction of deficiencies or concerns.

- .3 In addition to the prevention program, during the course of the work the Contractor shall elaborate and submit to the Departmental Representative specific written procedures for any work having a high risk factor of accident (for example: demolition procedures, specific installation procedures, hoisting plan, procedures for entering a confined space, procedures for interrupting electric power, etc.) or at the request of the Departmental Representative.
- .4 The Contractor shall plan and organize work so as to eliminate the danger at source or ensure collective protection, thereby minimizing the use of personal protective equipment.
- .5 Equipment, tools and protective gear which cannot be installed, fitted or used without compromising the health or safety of workers or the public shall be deemed inadequate for the work to be executed.
- .6 All mechanical equipment (for example, but not limited to: hoisting devices for persons or materials, excavators, concrete pumps, concrete saws) shall be inspected before delivery to the construction site. Before using any mechanical equipment, the Contractor shall obtain a certificate of compliance signed by a qualified mechanic dated less than a week prior to the arrival of each piece of equipment on the construction site; the certificate shall remain on the construction site and transmitted to the Departmental Representative on demand.
- .7 Ensure all inspections (daily, periodic, annual, etc.) for the hoisting devices for persons or materials required by the current standards are carried out and be able to provide a copy of the inspection certificates to the Departmental Representative on demand.
- .8 The Departmental Representative can at all times, if he suspects a malfunction or the risk of an accident, order the immediate stop of any piece of equipment and require an inspection by a specialist of his choice.
- .9 The Departmental Representative must be consulted for the location of storing gas cylinders and tanks on the construction site.

#### **1.11 RISKS INHERENT TO THE WORKSITE**

- .1 In addition to the risks related to the tasks to be carried out, personnel responsible for the execution of the work on the construction site will be exposed to the following risks, inherent to the area where the work will be executed.

At the worksite there is in particular the presence of the following:

- .1 Underground services (electric, communication, etc.);
- .2 Landscaping to conserve and protect;
- .3 Fencing of barbed wire;
- .4 Emergency vehicle, aircraft and maintenance.

The Contractor shall process to a risk assessment of the site to validate this information and see if other risks are present on the site. He must include in its prevention program all risks that have been identified.

**1.12 SPECIFIC REQUIREMENTS FOR THE HEALTH AND SAFETY OF OCCUPANTS AND PUBLIC**

- .1 The worksite is occupied by employees and/or the public during airport operations. The Contractor shall consider the specific requirements for the protection of employees and / or the public

These requirements must be included in the Contractor's site-specific safety plan as well as any other measures provided by the Contractor to protect the health and safety of employees and / or the public on the site.

**1.13 UNFORESEEN HAZARDS**

- .1 Whenever a source of danger not defined in the specifications or identified in the preliminary construction site inspection arises as a result of or in the course of the work, the Contractor must immediately suspend work, notify the person responsible for health and safety on the construction site, take appropriate temporary measures to protect the workers and the public and notify Departmental Representative, both verbally and in writing. Then the Contractor must do the necessary modifications to the prevention program or apply the security measures required in order to resume work.

**1.14 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on construction site in accordance with Acts and Regulations of the Province, and in consultation with Departmental Representative.
- .2 At a minimum, the following information and documents must be posted in a location readily accessible to all workers:
  - .1 Notice of construction site opening;
  - .2 Identification of Principal Contractor;
  - .3 Company OSH policy;
  - .4 Site-specific prevention program;
  - .5 Emergency plan;
  - .6 Minutes of worksite committee meetings;
  - .7 Names of worksite committee Representatives;
  - .8 Names of the first-aid attendants;
  - .9 Action reports and correction notices issued by the CNESST.

**1.15 INSPECTION OF THE CONSTRUCTION SITE AND CORRECTION OF NON-COMPLIANCES**

- .1 Inspect the construction site and complete the construction site inspection checklist and submit it to the Departmental Representative in accordance with the article "ACTION AND INFORMATIONAL SUBMITTALS" in this section.
- .2 Immediately take all necessary measures to correct any situations deemed non-compliant during the inspections mentioned in the previous paragraph or noticed by the authorities having jurisdiction or the Departmental Representative or his agent.

- .3 Submit to Departmental Representative written confirmation of all measures taken to correct the situation in case of non-compliance in matters pertaining to health and safety.
- .4 The Contractor shall give to the person assigned to safety and health responsibilities, full authority to order cessation and resuming of work as and when deemed necessary or desirable in the interests of safety and health. This person should always act so that the safety and health of the public and construction site workers and environmental protection take precedence over cost and scheduling considerations.
- .5 The Departmental Representative or his agent may order cessation of work if the Contractor does not make the corrections needed to conditions deemed non-compliant in matters pertaining to health and safety. Without limiting the scope of the preceding articles, the Departmental Representative may order cessation of work if, in his view, there is any hazard or threat to the safety or health of construction site personnel or the public or to the environment.

#### **1.16 PREVENTION OF VIOLENCE**

- .1 Health and safety management of Public Works and Government Services Canada construction sites includes the implementation of measures designed to protect the psychological health of all persons who access the construction site where the work is taking place. Consequently, in addition to physical violence, verbal abuse, intimidation and harassment are not tolerated on the construction site. Any person who demonstrates such actions or behaviors will receive a warning and/or could be definitely expelled from the construction site by the Departmental Representative.

#### **1.17 BLASTING**

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

#### **1.18 POWDER ACTUATED DEVICE**

- .1 Use powder actuated devices only after receipt of written permission from Departmental Representative.
- .2 Every person who uses a nail gun shall hold a training certificate and meet all the requirements of Section 7 of the Safety Code for the Construction Industry (S-2.1, r.4).
- .3 All other cartridge devices must be used as specified by the manufacturer and in accordance with applicable standards and regulations.

#### **1.19 USE OF PUBLIC ROADS**

- .1 Where it is necessary to encroach on a public road for operational reasons or to ensure the security of the workers, the occupants or the public (for example: the use of scaffolding, cranes, excavation work, etc.), the Contractor shall obtain at his own expense any authorizations and permits required by the competent authority.
- .2 The Contractor shall install at his own expense any signage, barricades or other devices needed to ensure the safety and security of the public and the Contractor's own facilities.

## 1.20 LOCKOUT-TAGOUT

- .1 For all work on electrically or otherwise energized equipment, the Contractor shall draw up and implement a general lockout-tagout procedure and submit it to the Departmental Representative.
- .2 Supervisors and all workers concerned by work requiring lockout-tagout must have received training on lockout-tagout procedures by a recognized organization; Contractor shall submit training certificates to the Departmental Representative.
- .3 Before starting the lockout-tagout procedure of a piece of equipment on an occupied site, Contractor must coordinate his work with the Representative of the site if the interruption of the power sources can have an impact on the operations of the site or on its occupants.
- .4 Contractor must designate a qualified person as responsible for the lockout-tagout and must make sure that that person prepares a lockout-tagout data sheet for each piece of equipment involved. The lockout-tagout data sheet must be submitted to the Departmental Representative at least 48 hours before the beginning of the work. The Departmental Representative will review the data sheet with the Representative of the site if the work takes place in an existing building. The data sheets for lockout-tagout must contain at least the following information:
  - .1 Description of work to carry out;
  - .2 Identification, description and location of the circuit and/or ~~piece of~~ equipment to lockout-tagout;
  - .3 Identification of energy sources that feeds the ~~piece of~~ equipment;
  - .4 Identification of each cutout point;
  - .5 Sequence of lockout-tagout and the release of residual energy as well as the sequence of unlocking;
  - .6 List of material needed for the lockout-tagout;
  - .7 Method of verification of zero energy implementation;
  - .8 Name and signature of the person who prepared the data sheet.

When required by the Departmental Representative, Contractor must record all this information on the site's Representative form.

- .5 At the time of lockout-tagout, the person responsible must date the data sheet and ensure that each worker involved in the work on the circuit/~~piece of~~ equipment to lockout-tagout puts his name on the data sheet and signs it.

## 1.21 ELECTRICAL WORK

- .1 Contractor shall ensure that all electrical work is executed by qualified employees in accordance with the provincial regulation respecting vocational training and qualification.
- .2 Contractor shall respect all requirements of standard CSA Z462 *Workplace Electrical Safety Standard*.
- .3 No repairs or alterations shall be carried out on any live equipment except where complete disconnection of the equipment is not feasible.

- .4 Contractor shall respect all requirements prescribed in paragraph “LOCKOUT-TAGOUT” in this section.
- .5 Contractor shall advise in writing the Departmental Representative of all the work that cannot be done with de-energized equipment and obtain his authorization. Contractor shall demonstrate to the Departmental Representative that it is impossible to do the work with de-energized equipment and provide all the information necessary to request and obtain an energized electrical work permit (indicate working procedures, arc flash hazard analysis, protective perimeter, protective equipment, etc.) before the beginning of the work, excluding for the exceptions indicated in standard CSA Z462 Workplace electrical safety.
- .6 The energized electrical work permit on must contain at least the following elements:
  - a. Description of the circuit and equipment and its location;
  - b. Justification for having to do the work in an energized condition;
  - c. Description of safe work practices to apply;
  - d. Results of the shock hazard analysis;
  - e. Limit of the protective perimeter against electric shocks;
  - f. Results of the arc flash hazard analysis;
  - g. Description of the arc flash protection boundary;
  - h. Description of the personal protective equipment required;
  - i. Description of the means to limit access to unqualified persons;
  - j. Proof that an information session has been carried out;
  - k. Approval signature of the energized electrical work (by a person in authority or by the owner).
- .7 If for the operational requirements of the occupants of the site the Representative of the site requires that the Contractor performs work in an energized condition, the Contractor shall obtain all the information required to request and obtain obtain an energized electrical work permit (indicate working procedures, arc flash hazard analysis, protective perimeter, protective equipment, etc.) and have it signed by the Representative of the site assigned by the Departmental Representative before the beginning of the work.

## **1.22 EXPOSURE TO ASBESTOS**

It is not intended that the work covered by this specification involves the handling of materials containing asbestos; however, if the Contractor or the Departmental Representative or his agent find materials that may contain asbestos, the Contractor shall immediately stop the work and notify the Departmental Representative. If it is subsequently demonstrated that these materials contain asbestos, the Contractor must comply with the following requirements.

Before the start of any work likely to emit asbestos dust, the Contractor must:

1. Provide a written work procedure identifying the level of risk of the work (low, moderate, high), as defined in section 3.23 of the Safety Code for Construction S-2.1, r-4, and which account of all the requirements of this same section.
2. Transmit certificates showing that all workers involved in the work have received asbestos-related training and the procedure required in the previous paragraph.
3. Demonstrate that he has all the equipment and equipment necessary for the proper procedure and safe execution of the work.

### **1.23 FUNGAL CONTAMINATION**

Work covered by this specification is not expected to involve the handling of materials contaminated with mold; however, if the Contractor or the Departmental Representative or his agent finds materials that are likely to be contaminated with mold, the Contractor must immediately stop the work and notify the Departmental Representative. If it is subsequently demonstrated that these materials contain mold, the Contractor must comply with the following requirements.

Prior to the commencement of any work for which workers are likely to come in contact with mold contaminated materials, the Contractor shall:

1. Provide a written working procedure that meets the requirements of the Safety Code for the Construction Industry, S-2.1, r.4 and the requirements outlined in the document "Mold Guidelines for the Canadian Food Industry". construction published by the Canadian Construction Association  
  
(<http://www.cca-acc.com/documents/electronic/cca82/acc82.pdf>).
2. Demonstrate that he has at his disposal all the equipment and materials required for the proper procedure and safe execution of the work.

### **1.24 EXPOSURE TO SILICA**

For any interior or exterior work generating silica, the Contractor must respect the following requirements, in addition to those in the *Code de sécurité pour les travaux de construction* S-2.1, r.4 (Safety code for the construction industry).

1. Work in wet environment or use tools with the inflow of water in order to reduce dustiness, if not, collect dust at the source and retain it with a high-efficiency filters not to propagate dust in the environment.
2. Clean surfaces and tools with water, never with compressed air.
3. Sandblast and etch surfaces using an abrasive containing less than 1% silica (also called amorphous silica);
4. Install screens or partitions to prevent the migration of dust outside the work area and thus protect other workers and the public;
5. Wear individual respiratory and ocular protection equipment during all the operations that could generate silica dust in accordance with the requirements of the *Code de sécurité pour les travaux de construction, S-2.1, r.4* (Safety code for the construction industry).
6. Wear coveralls to prevent contamination outside the construction site.
7. Do not eat, drink, or smoke in a dusty environment.
8. Wash the hands and the face before drinking, eating or smoking.

### **1.25 RESPIRATORY PROTECTION**

1. Contractor must ensure that all workers who must wear a respirator as part of their duties have received training for that purpose as well as fit testing of their respirator, in accordance with CSA Standard Z94.4 Selection, use and care of respirators. Submit the certificates of the fit testings to the Departmental Representative on demand.

### **1.26 FALL PROTECTION**

1. Plan and organize work so as to eliminate the risk of fall at the source or ensure collective protection, thereby minimizing the use of personal protective equipment. When personal fall protection is required, workers must use a safety harness that complies with CSA standard CAN/CSA Z-259.10 M90. A safety belt must not be used as fall protection.
2. Every person using an elevating platform (scissors, telescopic mast, articulated mast, rotative mast, etc.) must have a training regarding this equipment.
3. The use of a safety harness is mandatory for all elevating platforms with telescopic, articulate or rotative mast.
4. Define the limits of the danger zone around each elevating platform.
5. All openings in a floor or roof must be surrounded by a guardrail or provided with a cover fixed to the floor able to withstand the loads to which it could be exposed, regardless of the size of the opening and the height of the fall it represents.
6. Everyone who works within two (2) meters from a fall hazard of three (3) meters or more must use a safety harness in accordance with the requirements of the regulation, unless there is a guardrail or another device offering an equivalent safety.
7. Despite the requirements of the regulation, the Departmental Representative may require the installation of a guardrail or the use of a safety harness for specific situations presenting a risk of fall less than three (3) meters.

### **1.27 SCAFFOLDINGS**

In addition to the requirements of the *Code de sécurité pour les travaux de construction* (Safety code for the construction industry), the Contractor who uses scaffoldings must respect the following requirements:

#### **Foundation**

1. Scaffoldings shall be installed on a solid foundation so that it does not slip or rock.
2. Contractors wishing to install scaffoldings on a roof, overhang, canopy or awning shall submit their calculations and loads, as well as plans signed and sealed by an engineer to the Departmental Representative and obtain his authorization before beginning installation.

### **Assembly, bracing and mooring**

1. All scaffoldings shall be assembled, braced and moored in accordance with the manufacturer's instructions and the provisions of the *Code de sécurité pour les travaux de construction* (Safety code for the construction industry).
2. Where a situation requires the removal of part of the scaffoldings (e.g., crosspieces), the Contractor shall submit to the Departmental Representative an assembly procedure signed and sealed by an engineer certifying that the scaffolding assembled in that manner will allow the work to be done safely given the loads to which it will be subject.
3. For scaffoldings where the span between two supports is greater than three metres, the Contractor shall provide the Departmental Representative an assembly plan signed and sealed by an engineer.

### **Protection against falls during assembly**

1. Workers exposed to the risk of falling more than three metres shall be protected against falls at all times during assembly.

### **Platforms**

1. Scaffolding platforms shall be designed and installed in accordance with the provisions of the *Code de sécurité pour les travaux de construction* (Safety code for the construction industry).
2. If planks are used, they shall be approved and stamped in accordance with section 3.9.8 of the *Code de sécurité pour les travaux de construction* (Safety code for the construction industry)
3. Scaffoldings of four sections (or six metres) high or more shall have a full platform covering the entire surface between the putlogs every three metres high or fraction thereof, and the components of that platform shall not be moved at any time to create an intermediate landing.

### **Guardrails**

1. A guardrail shall be installed on every landing.
2. Cross braces shall not be considered as guardrails.
3. If the platforms are not covering the entire surface between the putlogs, the guardrail must be installed just above the edge of the platform so that there is no empty horizontal space between the platform and the guardrail.
4. Where scaffoldings has four sections (or six metres) high or more and full platforms are required, the guardrails shall be installed on each landing at the start of work and shall remain in place until the work is completed.

### **Access**

1. The Contractor shall ensure that access to the scaffoldings does not compromise worker safety.
2. Where the platforms of the scaffoldings are comprised of planks, ladders shall be installed in such a way that planks extending beyond the platform do not block the way up or down.
3. Notwithstanding the provisions of the *Code de sécurité pour les travaux de construction* (Safety code for the construction industry), stairs shall be installed on all scaffoldings that have six or more rows of uprights or is six sections (or nine metres) high or higher.

### **Protection of the public and occupants**

1. When scaffoldings are installed in a zone accessible to the public, the Contractor shall take the necessary measures to prevent the public from having access to them and, if applicable, to the work or storage area located in the vicinity of these scaffolding.

2. Contractor must install covered walkways, nets or other similar devices to protect workers, the public and the occupants against falling objects. The means of protection must be approved by the Departmental Representative.

### **Engineering plans**

1. In addition to those required by the *Code de sécurité pour les travaux de construction* (Safety code for the construction industry), the Departmental Representative reserves the right to require engineering plans for other types or configurations of scaffoldings.
2. A plan signed and sealed by an engineer is required for all scaffoldings that will be covered with a canvas, a tarpaulin or any other material that has wind resistance.
3. A certificate of conformity signed by an engineer is required in all cases where an engineering plan is required and this, before anybody uses the facility. A copy of these documents must be available on the construction site at all times.

### **1.28 EXCAVATION WORK**

In addition to the requirements of the *Code de sécurité pour les travaux de construction* (Safety code for the construction industry), the Contractor who performs the digging of trenches or excavations must respect the following requirements:

1. Fill out the following form and submit it to the Departmental Representative before beginning to excavation work.
2. Submit to the Departmental Representative, as appropriate, the following documents:
  - a. plans and specifications, signed and sealed by an engineer, of the shoring needed to be installed for the excavation work; or
  - b. engineer's advice specifying the wall angles of the trench or excavation.



# Excavation guidelines

N° \_\_\_\_\_ of \_\_\_\_\_

This directive is provided as an example by the Commission de la santé et de la sécurité du travail (CSST). It contains the main instructions that the employer should give to the person responsible for the work on the site and to the operator of the earth-moving machine.

Company name	
Project name	Project no.
Address of the site	Construction start date

## Field survey

Chaining or axes : from \_\_\_\_\_ to \_\_\_\_\_ Attached plan  Plan no. : \_\_\_\_\_

## Working method to use

- While making sure the excavation walls do not pose the risk of landslide
- dig and shore according to the plans and specifications of the engineer ;
  - dig and shore using a trench box ;
  - dig without shoring as long as one of the following conditions is respected:
    - rock is sound;
    - no worker goes down in the trench or excavation;
    - the walls are dug according to the engineer's advice.

## Dimensions of excavation (Dig according to the following profile.)

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

	Minimum	Maximum
H Depth		
Wb Width at bottom		
Width at top		

## Safety measures

Deposit the materials at a distance of at least 1.2 metre (4 feet) from top of walls.  
 Do not allowed any vehicle to come closer than 3 metres (10 feet) from top of walls.

- Respect the engineer's plan concerning work in the proximity of an existing facility.
- Follow the location plan to locate the underground infrastructures.
- Install signaling devices prescribed in the traffic plan (barriers, visual references, etc.).
- Assign a flag person or more to control the flow of traffic.
- Respect the procedure prescribes for work near power lines.
- Provide protection devices for the workers, such as concrete crash barriers.

Name	Occupation	
Signature	Date	Telephone no.
Directive submitted		
<input type="checkbox"/> to the responsible of the work on the site <input type="checkbox"/> to the operator of the earth-moving machine		

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## **1.29 LIFTING LOADS WITH CRANE OR BOOM TRUCK**

1. Unless specified otherwise, the Contractor must prepare a hoisting plan and submit it to the Departmental Representative for all lifting operations done with a crane or a boom truck at least 5 days before these lifting operations begin. The hoisting plan must contain at a minimum the information listed at the end of this article.
2. The hoisting plan must be signed and sealed by an engineer for the following lifting operations:
  - a. lifting of concrete panels;
  - b. lifting mechanical/electrical equipment on a roof or on the floor of a building;
  - c. lifting of loads encroaching on the public road;
  - d. lifting large dimensions or very heavy loads;
  - e. all other lifting operation, in accordance with the requirements of the Departmental Representative.
3. In addition to the above requirements, the Contractor must plan the hoisting operations in a way as to avoid that the loads pass over the occupied zones on the site. When there is no alternative, the hoisting plan must absolutely be signed and sealed by an engineer and must guarantee the security of the occupants in that zone; the plan must also be approved by the Departmental Representative. The Departmental Representative can, if he deems necessary, require that the work be done at night or on weekends.
4. Upon the beginning of the work on the construction site, the Contractor must submit the list of the hoisting plans anticipated for the whole project to the Departmental Representative. That list shall be updated as needed if changes occur during the work.
5. In addition to the mechanical service inspection certificate, the annual inspection certificate and the crane logbook must be aboard all cranes and boom truck cabs.
6. The entire lifting area shall be marked off to prevent the entry of non-authorized persons.
7. The Contractor shall carefully inspect all of the slings and lifting accessories and make sure that those in poor condition are destroyed and scrapped.
8. Compressed-gas cylinders shall be lifted with a basket specially designed for this purpose.

### **MINIMUM CONTENT OF HOISTING PLAN**

- Sketch indicating at a minimum, the location of the crane, the surrounding facilities, the zone covered by the hoisting operations, the pedestrian's pathways and vehicular routes, the security perimeter, etc.
- Weight of loads
- Dimensions of loads
- List of hoisting devices and weight of each

- Total weight lifted
- Maximum height of obstacles to clear
- Height of loads lifting relative to the surface of the roof (in the case of loads to be placed on roofs)
- Use of guide cables
- Type of crane used
- Crane capacity
- Boom length
- Boom angle
- Crane's radius of action
- Deployment of stabilizers
- Percentage usage of the crane's capacity
- Verification confirmation of hoisting equipment
- Identification of the crane operator and the person responsible for the hoisting operations with date and signatures

### **1.30 HOT WORK**

Hot work means any work where a flame is used or a source of ignition may be produced, i.e., riveting, welding, cutting, grinding, burning, heating, etc.

1. A working portable fire extinguisher suitable to the fire risk shall be available and easily accessible within a 5 m radius from any flame, spark source or intense heat.
2. The Contractor must appoint an individual to do continuous monitoring of the fire risks for a period of one (1) hour after the end of the shift of hot work. This individual shall sign the section for this purpose on the permit and give it to the person in charge of the construction site after the one-hour period.

## **Welding and cutting**

In addition to the requirements prescribed in the preceding paragraphs, the Contractor must respect the following requirements:

1. Welding and cutting work must be carried out in accordance with the requirements of the *Code de Sécurité pour les travaux de construction, S-2.1, r.4* (Safety code for the construction industry) and CSA standard W117.2, Safety in Cutting, Welding and Allied Processes.
2. Air extraction system with filters must be used for all welding and cutting work performed inside.
3. Stop all activities producing flammable or combustible gas, vapours or dust in the vicinity of the welding or cutting work.
4. Store all compressed gas cylinder on a fireproof fabric and make sure that the room is well ventilated.
5. Store all oxygen cylinders more than 6 metres from a flammable gas cylinder (ex: acetylene) or a combustible such as oil or grease, unless the oxygen cylinder is separated from it by a wall made of non-combustible material as mentioned in the article 3.13.4 of the *Code de sécurité pour les travaux de construction, S-2, r. 6* (Safety code for the construction industry)
6. Store the cylinders far from all heat sources.
7. Not to store the cylinders close to the staircases, exits, corridors and elevators.
8. Do not put acetylene in contact with metals such as silver, mercury, copper and alloys of brass having more than 65% copper, to avoid the risk of an explosive reaction.
9. Check that welding equipment with electric arc has the necessary tension and are grounded.
10. Ensure that the conducting wires of the electric welding equipment are not damaged.
11. Place the welding equipment on a flat ground away from the bad weather.
12. Install fireproof canvas when the welding work is done in a superposition and where there is the risk of falling sparks.
13. Move away or protect the combustible materials which are closer than 15 meters from the welding work.
14. Prohibition to weld or cut any closed container.
15. Do not perform any cutting, welding or work with a naked flame on a container, a tank, a pipe or other container containing a flammable or explosive substance unless:
  - a. they have been cleaned and air samples indicating that work can be done without danger has been taken; and
  - b. provisions to ensure the safety of the workers have been made.

### **1.31 WORK CLOSE TO AERIAL ELECTRIC LINES**

- .1 Where there is an overhead power line in the work area and the Contractor chooses to apply paragraph 5.2.2 (b) of the Safety Code for the Construction Work (2.1) , r.4), a copy of the agreement with the electrical operating company and a copy of the work process, as required by Article 5.2.2 b), must be sent to the Departmental Representative prior to the commencement of the work. in connection with these documents.

### 1.32 HEALTH AND SAFETY SUBORDINATION AGREEMENT

Project: \_\_\_\_\_ Address: \_\_\_\_\_

#### EXTERNAL CONTRACTOR

I hereby agree to submit to the authority of (name of the Principal Contractor's business) \_\_\_\_\_, which is the Principal Contractor for the project indicated above during the entire duration of our work on the construction site. Accordingly, I confirm that I have reviewed the Principal Contractor's prevention program, and I agree to:

- inform my employees of the content of the Principal Contractor's prevention program and ensure that its content are complied with at all times;
- apply the prevention program that is specific to the activities that we carry out under this project;
- inform the Principal Contractor of my actions or dealings on the construction site and obtain the Principal Contractor's agreement before the start of work; and
- follow the health and safety directives provided by the Representative of the Principal Contractor on the construction site and, depending on requirements, attend training sessions and health and safety meetings organized by the Representative of the Principal Contractor.

Name of Representative: \_\_\_\_\_

Name of business: \_\_\_\_\_

Description of work to be done on the construction site: \_\_\_\_\_

Approximate dates of work (start-end): \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

#### PRINCIPAL CONTRACTOR

I hereby agree to allow the business (name of external contractor) \_\_\_\_\_ to perform the work under this project indicated above and, as Principal Contractor, to take the necessary steps to protect the health and safety of workers on the construction site. Should the Contractor repeatedly refuse or fail to comply with my directives, I agree to inform PWGSC's Departmental Representative of this and to provide documentary evidence of my actions or dealings with the Contractor.

Name of Representative: \_\_\_\_\_

Name of the Principal Contractor's business: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Submit a completed and signed copy to PWGSC's Departmental Representative

**END OF SECTION**

**Part 1           General**

**1.1               REFERENCE STANDARDS**

- .1 MSDEFCC: Intervention Guide - Soil Protection and Contaminated Sites Rehabilitation.
- .2 Environment Quality Act (CQLR, Chapter Q-2).
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.

**1.2               DEFINITIONS**

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

**1.3               DISPOSAL OF USED OIL**

- .1 **The existing gate is operated by hydraulic cylinders, the contractor shall make arrangements with local authorities for the disposal of hydraulic oils in accordance with laws and regulations.**

**1.4               ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets.
  - .2 Submit (2) copies of WHMIS Safety Data Sheets (SDS) in accordance with Section 01 35 29.06- Health and Safety Requirements and section 01 35 43- Environmental Procedures.
- .3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.
- .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .6 Include in Environmental Protection Plan:
  - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.

- .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
- .3 Names and qualifications of persons responsible for training site personnel.
- .4 Descriptions of environmental protection personnel training program.
- .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations and EPA 832/R-92-005, Chapter 3.
- .6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
  - .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
- .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
  - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
- .9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
- .12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

## **1.5 FIRES**

- .1 Fires and burning of rubbish on site is not permitted.

## **1.6 DRAINAGE**

- .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations US EPA General Construction Permit, EPA 832/R-92-005, Chapter 3.
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.

- .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

## **1.7 POLLUTION CONTROL**

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
  - .1 Provide temporary enclosures where indicated Departmental Representative.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

## **1.8 NOTICE OF NON-COMPLIANCE**

- .1 A written non-compliance notice will be issued to the Contractor by the Departmental Representative whenever any non-compliance with a federal, provincial or municipal law, regulation or permit or other environmental protection plan implemented by the Contractor.
- .2 Upon receipt of a notice of non-compliance, the Contractor shall propose corrective actions to the Departmental Representative and shall implement them with the approval of the Departmental Representative.
  - .1 The Contractor must wait for the written approval of the Departmental Representative before proceeding with the implementation of the proposed measures. The Departmental Representative will order the work stoppage until satisfactory corrective action is taken.
- .3 No time extensions granted or equitable adjustments allowed to Contractor for work stoppage.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

**Part 3            Execution**

**3.1                CLEANING**

- .1      Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning. Leave Work area clean at end of each day.
- .2      Do not bury rubbish and waste materials on site.
- .3      Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning.
- .4      Waste Management: separate waste materials for reuse or recycling in accordance with Section 01 74 19- Waste Management and Disposal.

**END OF SECTION**

**Part 1           General**

**1.1           INSPECTION**

- .1   Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2   Give timely notice requesting inspection 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           INDEPENDENT INSPECTION AGENCIES**

- .1   Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
- .2   Provide equipment required for executing inspection and testing by appointed agencies.
- .3   Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4   If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and reinspection.

**1.3           ACCESS TO WORK**

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

**1.4           PROCEDURES**

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

**1.5 REJECTED WORK**

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

**1.6 REPORTS**

- .1 Submit three (3) copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested.

**1.7 TESTS AND MIX DESIGNS**

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

**1.8 MILL TESTS**

- .1 Submit mill test certificates as required of specification Sections.

**1.9 EQUIPMENT AND SYSTEMS**

- .1 Submit adjustment and balancing reports for mechanical, electrical [and building equipment] 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                REFERENCE STANDARDS**

- .1 Canadian General Standards Board (CGSB)
  - .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .2 CSA Group (CSA)
  - .1 CSA-A23.1/A23.2-F04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.
  - .3 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.
- .3 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC).
- .4 U.S. Environmental Protection Agency (EPA) / Office of Water
  - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

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

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

### **1.3                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.

### **1.4                SCAFFOLDING**

- .1 Scaffolding in accordance with CAN/CSA-S269.2.  
If required, provide and maintain temporary stairs, ladders, swing staging, ramps, platforms and scaffoldings.

### **1.5                HOISTING**

- .1 Provide, operate and maintain hoists [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.

## **1.6 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.

## **1.7 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.

## **1.8 SECURITY**

- .1 If necessary, provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

## **1.9 OFFICES**

- .1 Provide marked and fully stocked first-aid case in a readily available location.
- .2 The Contractor must have his own office in a construction trailer, the location of which will be determined by the Departmental Representative.
- .3 Keep the premises clean.

## **1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 A location will be determined by the Departmental Representative for the Contractor to store tools, equipment and materials.
- .2 Provide lockable, weatherproof sheds for storage of materials, equipment and tools, and keep them clean and orderly.
- .3 Leave on the site materials and equipment that do not have to be protected from weather, but ensure that they interfere as little as possible with the work.
- .4 Keep the premises clean.

## **1.11 SANITARY FACILITIES**

- .1 The Contractor may use the sanitary facilities available in the garage and at the terminal.

## **1.12 ELECTRICAL ENERGY**

- .1 The Contractor may use the standard electrical installations available in the garage.
- .2 If any special construction requirements exist, the Contractor must provide temporary power supply (generator or other), pay for and maintain in accordance with current regulations and ordinances.

**1.13 WATER SUPPLY**

- .1 The Contractor may use the water supplies available in the garage.
- .2 If any special construction needs exist, the Contractor shall provide temporary water supply, pay for and maintain in accordance with the regulations and ordinances in effect.

**1.14 SIGNALIN IN A REGULATED AREA**

- .1 Refer to Section 01 35 13.13 - Special project procedures for airport facilities for temporary signaling devices required during the execution of the works.

**1.15 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 If required, provide snow removal during period of Work.

**1.16 SECURITY GUARD SHELTER**

- .1 The shelter shall be located at a location acceptable to the Department Representative in the vicinity of the temporary access shown on the plans.
- .2 The shelter shall be of sufficient size to accommodate one person during work shifts and shall have a minimum area of 10 m<sup>2</sup> and a minimum headroom of 2.3 metres.
- .3 The shelter shall be insulated, heated to maintain a temperature between 19°C and 24°C.
- .4 The shelter shall have a door with window and an operable window that provides a view of the temporary access.
- .5 Shelter shall be equipped with a potable water supply.
- .6 Shelter shall have 110-120V electrical lighting and a minimum of two electrical outlets.
- .7 The shelter shall be furnished for the comfort and use of the shelter such as chairs, table, refrigerator, lighting, electrical outlets, etc.

- .8 Sanitary facilities must be provided in close proximity to the shelter and include a toilet and hand washing facilities.

**1.17 CLEANING**

- .1 Remove debris, waste and packaging materials from construction site daily.
- .2 Remove dust and mud from paved roads.
- .3 Store materials/materials recovered during demolition work.

**Part 2 Products**

Not Used.

**Part 3 Execution**

**3.1 SECURITY GUARD SERVICE AND SECURITY GUARD SHELTER**

- .4 The shelter shall be installed in a location acceptable to the Departmental Representative in close proximity to the temporary access shown on the plans.
- .5 Provide janitorial services, toilet paper, soap, towels and all supplies necessary to keep the shelter in good order.
- .6 The contractor shall provide security guard services 10 hours per day 7 days per week, from the day the existing automatic gate is taken out of service until the new automatic gate is put into service.
- .7 Outside of the guarding hours, the contractor shall provide access to the airport operator via a manual locking/unlocking system (padlock, key lock etc.).
- .8 Security guard services shall commence as soon as the existing automatic gate is deactivated and the manual gate is functional and shall continue until the new automatic gate is fully tested and deemed functional.
- .9 Dismantling of the shelter shall be done after authorization by the Departmental Representative.
- .10 The security guard must ensure that only persons and vehicles authorized by the Departmental Representative have access to the air side.

**END OF SECTION**

**Part 1           General**

**1.1               REFERENCE STANDARDS**

- .1       Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .2       If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .3       Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents in event of non-conformance.

**1.2               QUALITY**

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

**1.3               AVAILABILITY**

- .1       Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2       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.

#### **1.4 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 or panel 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.

#### **1.5 TRANSPORTATION**

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

#### **1.6 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.

#### **1.7 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.

#### **1.8 COORDINATION**

- .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.

#### **1.9 CONCEALMENT**

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

#### **1.10 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.

#### **1.11 LOCATION OF FIXTURES**

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Departmental Representative of conflicting installation. Install as directed.

#### **1.12 FASTENINGS**

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

**1.13 FASTENINGS - EQUIPMENT**

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

**1.14 PROTECTION OF WORK IN PROGRESS**

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

**1.15 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 and pedestrian and vehicular traffic.
- .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                REFERENCE STANDARDS**

- .1            Owner's identification of existing survey control points and property limits.

**1.2                QUALIFICATIONS OF SURVEYOR**

- .1            Qualified registered land surveyor, licensed to practise in Place of Work, acceptable to Departmental Representative.

**1.3                SURVEY REFERENCE POINTS**

- .1            Existing base horizontal and vertical control points are designated on drawings.
- .2            Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .3            Make no changes or relocations without prior written notice to Departmental Representative.
- .4            Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5            Require surveyor to replace control points in accordance with original survey control.

**1.4                SURVEY REQUIREMENTS**

- .1            Establish two (2) permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.
- .2            Establish lines and levels, locate and lay out, by instrumentation.
- .3            Mark out the site for grading, placement of backfill material and location of fences, pedestals, detection loops etc. Establish pipe invert elevations.
- .4            Establish lines and levels for mechanical and electrical work.

**1.5                EXISTING SERVICES**

- .1            Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.

**1.6                LOCATION OF EQUIPMENT AND FIXTURES**

- .1            Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2            Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3            Inform Departmental Representative of impending installation and obtain approval for actual location.

- .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

**1.7 RECORDS**

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 Record locations of maintained, re-routed and abandoned service lines.

**1.8 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit name and address of Surveyor to Departmental Representative.
- .2 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.

**1.9 SUBSURFACE CONDITIONS**

- .1 Promptly notify Departmental Representative in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.
- .2 After prompt investigation, should Departmental Representative determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

**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                PROJECT CLEANLINESS**

- .1      Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2      Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .3      Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4      Dispose of waste materials and debris at designated dumping areas on property.
- .5      Provide and use marked separate bins for recycling.
- .6      Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .7      Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .8      Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

**1.2                FINAL CLEANING**

- .1      When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2      Prior to final review remove surplus products, tools, construction machinery and equipment.
- .3      Remove waste products and debris including that caused by Owner or other Contractors.
- .4      Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .5      Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6      Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors.
- .7      Clean lighting reflectors, lenses, and other lighting surfaces.
- .8      Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .9      Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .10     Remove dirt and other disfiguration from exterior surfaces.

- .11 Sweep and wash clean paved areas.
- .12 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

**1.3 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse/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                RELATED REQUIREMENTS**

- .1        Section 01 52 00 – Construction Facilities.
- .2        Section 02 41 16.09 – Structure Demolition – Short form.

**1.2                REFERENCE STANDARDS**

- .1        American Society for Testing and Materials (ASTM):
  - .1        ASTM E1609-01, Standard Guide for Development and Implementation of a Pollution Prevention Program.

**1.3                WASTE MANAGEMENT OBJECTIVE**

- .1        Prior to start of work, meet with Departmental Representative to review PWGSC's plan and objectives for waste management.
- .2        Exercise maximum control of solid construction waste
- .3        Protecting the environment and preventing pollution and impacts.

**1.4                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 monthly progress reports indicating cumulative totals representing progress towards achieving diversion and reduction goals of waste materials away from landfill and identifying any special programs, landfill options or alternatives to landfill used during construction.
  - .2        Owner 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.

**1.5                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 are null.

- .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.

## **1.6 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 Owner, Contractor, affected Subcontractor's and Representative to discuss the Construction Waste Management Plan and to develop mutual understanding of the requirements for a consistent policy towards waste reduction and recycling.

## **1.7 SUBMITTALS**

- .1 Provide required information in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Record Documentation: Submit as constructed information in accordance with Section 01 78 00 – Closeout Submittals as follows:
  - .1 Summary written report, detailing the cumulative amounts of reused, recycled and landfilled waste, as well as a summary of activities related to ongoing waste management.

## **1.8 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 Owner, the 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 Owner, Contractor and Representative.
  - .2 Monthly waste summary shall contain the following information:
    - .1 The amount in tonnes or m<sup>3</sup> and location of material landfilled,
    - .2 The amount in tonnes or m<sup>3</sup> 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.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCE STANDARDS**

- .1            Canadian Environmental Protection Act (CEPA)

**1.2                ADMINISTRATIVE REQUIREMENTS**

- .1            Pre-warranty Meeting:
  - .1            Convene meeting one week prior to contract completion with Departmental Representative and contractor's representative, in accordance with Section 01 31 19- Project Meetings to:
    - .1            Verify Project requirements.
    - .2            Review 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.

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.4                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 process flow, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
  - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in dwg format on CD. All files required for the reproduction of the drawing must be provided.

## **1.5 CONTENTS - PROJECT RECORD DOCUMENTS**

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

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

- .1 Maintain, in addition to requirements in General Conditions, at site 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.

- .9 Operations and Maintenance Manual.
- .10 Construction Operation Plan (COP) will be provided before the beginning of works.
- .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.

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

- .1 Record information on set of black line opaque drawings, 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 depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.
  - .5 Changes made by change orders.
  - .6 Details not on original Contract Drawings.
  - .7 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 and required by individual specifications sections.
- .7 Provide digital photos, if requested, for site records.

- .8 Keep an annotated copy of the Construction Operation Plan (COP) during construction.

## **1.8 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.
  - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
  - .2 Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control.
- .15 Additional requirements: as specified in the various technical sections of the specifications;
- .16 At the end of the work, the Contractor must submit a specific document containing, in detail, the maintenance tasks to be carried out on the newly installed equipment.

## **1.9 MAINTENANCE MATERIALS**

- .1 Spare Parts:
  - .1 Provide spare parts, in quantities specified in individual specification sections.

- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver and store to location as directed.
- .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 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 and store to location as directed.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative.
    - .2 Include approved listings in Maintenance Manual.

#### **1.10 DELIVERY, STORAGE AND HANDLING**

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

#### **1.11 WARRANTIES AND BONDS**

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.
- .3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
- .6 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .7 Include information contained in warranty management plan as follows:
  - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

- .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include commissioned systems.
- .3 Provide list for each warranted equipment, item, and 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 two years overall warranty of construction, parts and labor. Indicate items that have extended warranties and show separate warranty expiration dates.
  - .7 Cross-reference to warranty certificates as applicable.
  - .8 Starting point and duration of warranty period.
  - .9 Summary of maintenance procedures required to continue warranty in force.
  - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
  - .11 Organization, names and phone numbers of persons to call for warranty service.
  - .12 Typical response time and repair time expected for various warranted equipment.
- .4 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.
- .8 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .9 Written verification to follow oral instructions.
  - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against 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        Prior to the scheduled date of the final inspection of the work, provide to the Owner's personnel, the planned demonstrations of the operation and maintenance operations of the installed equipment, materials and systems.
- .2        Owner: 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 equipment has been inspected and put into operation.
  - .4        Ensure testing, adjusting, balancing has been performed and equipment and systems are fully operational.
- .4        Demonstration and Instructions:
  - .1        Demonstrate start-up, operation, control, adjustment, trouble-shooting, times, at the agreed upon location, on designated equipment.
  - .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.

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2        When required, submit schedule of time and date for demonstration of each item of equipment and each system prior to designate dates, for Departmental Representative's approval.
- .3        Submit reports within one (1) 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 Owner'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 This Section includes the following:
  - .1 Demolition and removal of site improvements adjacent to a building or structure being demolished.
  - .2 Disconnecting, capping, sealing, and removing site utilities.
- .2 Drawings contain details that suggest directions for solving some of the major demolition and removal requirements for this project; contractor representative is required to develop these details.

### **1.2               REFERENCE STANDARDS**

- .1 Canadian Council of Ministers of the Environment (CCME)
  - .1 PN 1326-2003, Environmental Code of Practice for aboveground and underground tank systems containing petroleum products and allied petroleum products.
- .2 CSA Group (CSA)
  - .1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
- .3 National Research Council Canada (NRC)
  - .1 National Building Code of Canada 2015 (NBC).
  - .2 National Fire Code of Canada 2015 (NFC).

### **1.3               DEFINITIONS**

- .1 Demolition: rapid destruction of building following removal of Hazardous Substances.
- .2 Hazardous Substances: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos, PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by the Federal Hazardous Products Act (RSC 1985) including latest amendments.
- .3 Waste Management Coordinator (WMC): Contractor representative responsible for supervising waste management activities as well as coordinating requirements for reports, documents and samples to be submitted
- .4 Construction Waste Management Plan (CWM Plan): Written plan addressing opportunities for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19- Construction Waste Management and Disposal.

- .5 Construction Waste Management Report (CWM Report): Written report identifying actual materials that formed CWM Plan for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19- Construction Waste Management and Disposal.

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

- .1 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Shop Drawings: Submit drawings stamped and signed by professional engineer registered or licensed in Quebec.
  - .2 Submit required documents and samples in accordance with sections 01 74 19- Construction/Demolition Waste Management Disposal, 01 33 00- Submittal Procedures.
- .2 Informational Submittals: Provide the following submittals when requested by the Consultant:
  - .1 Qualification Data: Submit information on companies and their staff indicating their abilities and experience to perform work of this Section including but not limited to, a list of completed projects with project names and addresses, names and addresses of Departmental Representative, for work of similar complexity and extent.
- .3 Informational Submittals:
  - .1 Construction Waste Management: Submit project CWM Plan highlighting recycling and salvage requirements in accordance with Section 01 74 19- Construction Waste Management and Disposal.

#### **1.5 QUALITY ASSURANCE**

- .1 Regulatory Requirements: Ensure Work is performed in compliance with applicable Provincial/Territorial regulations.
  - .1 Comply with hauling and disposal regulations of Authority Having Jurisdiction.
  - .2 Standards: Comply with ANSI A10.6 and NFPA 241
- .2 Regulatory Requirements: Perform work of this Section in accordance with the following:
  - .1 Provincial/Territorial Workers' Compensation Boards/Commissions.
  - .2 Government of Canada, Labour Program: Workplace Safety.

#### **1.6 EXISTING CONDITIONS**

- .1 Should material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.
  - .1 Do not proceed until written instructions have been received from Departmental Representative.
- .2 Notify Departmental Representative before disrupting access or services.

**Part 2 Products**

**2.1 MATERIALS AND EQUIPMENT**

- .1 Stop equipment, tools and machinery when not in use.
- .2 Demonstrate that tools, equipment and machinery are being used in manner which allows for salvage of materials in best condition possible.

**2.2 BACKFILL**

- .1 Satisfactory Soils: Provide soil in accordance with Division 31.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of structure demolition required.
- .2 Departmental Representative does not guaranty that existing conditions are the same as those indicated in Project Record Documents.

**3.2 PREPARATION**

- .1 Execute Work in accordance with Section 01 35 29.06- Health and Safety Requirements.
- .2 Protection:
  - .1 Execute Work in accordance with Section 01 35 43- Environmental Procedures.
  - .2 Take the necessary measures to prevent the movement, settlement or damage to adjacent structures, utilities, and parts of the building to remain in place. Provide required shoring and bracing.
  - .3 Minimize dust and noise generated by the work as well as inconvenience to occupants.
  - .4 Protect equipment, mechanical and electrical installations of the building as well as utility lines.
  - .5 Provide dust screens, covers, railings, support elements and other necessary protective devices.
- .3 If required, disconnect the service lines from the electrical, telephone and telecommunications networks. Post warning signs on electrical lines and equipment which must remain energized to serve other products during period of demolition.
- .4 Locate and protect utility lines.

**3.3 DEMOLITION, RECOVERY AND DISPOSAL**

- .1 Remove parts of existing installation to permit new construction. Sort materials and group them into separate piles depending on whether they will be recycled or reused.
- .2 Remove items to be reused, store and re-install in accordance with the requirements of Departmental Representative.

- .3 Unless specified otherwise, remove materials to appropriate recycling facilities in accordance with the requirements of the appropriate authorities.

### **3.4 STOCKPILING**

- .1 Label stockpiles, indicating material type and quantity.
- .2 Take appropriate security measures and allocate sufficient resources to prevent theft, vandalism and materials deterioration.
- .3 Stockpile materials in a location suitable for reuse. Eliminate double handling as much as possible.

### **3.5 REMOVAL FROM SITE**

- .1 Dispose of materials in accordance with applicable regulations at approved facilities. It is forbidden to ship materials elsewhere without the written permission of the Departmental Representative.

### **3.6 SITE RESTORATION**

- .1 Below Grade Areas: Rough grade below grade areas ready for further excavation or new construction.
- .2 Below Grade Areas: Completely fill below grade areas and voids resulting from structure demolition operations. Use recycled pulverized concrete, satisfactory soil materials.
- .3 Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes.
- .4 Provide a smooth transition between adjacent existing grades and new grades.

### **3.7 REPAIRS**

- .1 General: Promptly repair damage to adjacent construction caused by structure demolition operations.
- .2 Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- .3 Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

### **3.8 CLEANING AND RESTORATION**

- .1 Keep site clean and organized throughout demolition procedure.
- .2 Upon completion of project, reinstate, areas, parking surfaces, walkways affected by Work to condition which existed prior to beginning of Work.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 01 33 00 – Submittal Procedures
- .2        Section 32 31 13 – Chain Link Fences and Gates

**1.2                REFERENCE STANDARDS**

- .1        ASTM International
  - .1        ASTM C260/C260M-10a(2016), Standard Specification for Air-Entraining Admixtures for Concrete.
  - .2        ASTM C494/C494M-16, Standard Specification for Chemical Admixtures for Concrete.
- .2        CSA Group
  - .1        CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2        CSA A283-06-R2016, Qualification Code for Concrete Testing Laboratories.
  - .3        CSA A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005),

**1.3                ABBREVIATIONS AND ACRONYMS**

- .1        Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement types:
  - .1        GU, GUb and GUL - General use cement.
  - .2        MS and MSb - Moderate sulphate-resistant cement.
  - .3        MH, MHb and MHL - Moderate heat of hydration cement.
  - .4        HE, HEb and HEL - High early-strength cement.
  - .5        LH, LHb and LHL - Low heat of hydration cement.
  - .6        HS and HSb - High sulphate-resistant cement.
- .2        Fly ash types:
  - .1        F - with CaO content maximum 8%.
  - .2        CI - with CaO content 15 to 20%.
  - .3        CH - with CaO minimum 20%.
- .3        GGBFS - Ground, granulated blast-furnace slag.
  - .1        Verify work requirements.

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

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
  - .1 Submit installation drawings required; these must be prepared in accordance with the plans so as to clearly indicate the dimensions, shapes and location of the reinforcements and any other relevant details required.
  - .2 Provide a certificate stating that the selected dosing formula will produce concrete with the prescribed quality, strength and performance, and that it meets the requirements of CAN / CSA-A23.1-00.
- .3 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete delivered to site of Work and discharged after batching.

#### **1.5 QUALITY ASSURANCE**

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Provide Departmental Representative, minimum four (4) weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
  - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture meet specified requirements.
- .3 Minimum four (4) weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items:
  - .1 Falsework erection.
  - .2 Hot weather concrete.
  - .3 Cold weather concrete.
  - .4 Curing.
  - .5 Finishes.
  - .6 Formwork removal.
  - .7 Joints.

#### **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements:
- .2 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
  - .1 Modifying maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2. is prohibited.
  - .2 Deviations submitted for review by Departmental Representative.
  - .3 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

- .3 Packaging Waste Management: remove for reuse and return padding, pallets, crates, packaging materials in accordance with Section 01 74 19- Waste Management and Disposal.

## **1.7 SITE CONDITIONS**

- .1 Placing concrete during rain or weather events that could damage concrete is prohibited.
- .2 Protect newly placed concrete from rain or weather events in accordance with CSA A23.1/A23.2.
- .3 Cold weather protection:
  - .1 Maintain protection equipment, in readiness on Site.
  - .2 Use such equipment when ambient temperature below 5°C, or when temperature may fall below 5°C before concrete cured.
  - .3 Placing concrete upon or against surface at temperature below 5°C is prohibited.
- .4 Hot weather protection:
  - .1 Protect concrete from direct sunlight when ambient temperature above 27°C.
  - .2 Prevent forms of getting too hot before concrete placed. Apply accepted methods of cooling not to affect concrete adversely.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Portland Cement: in accordance with standard CAN/CSA A5.
- .2 Composite hydraulic cement: in accordance with CAN / CSA 23.5.
- .3 Water: to CSA A23.1.
- .4 Aggregates: to CSA A23.1/A23.2.
- .5 Rebars, according to the dimensions on the plans.

### **2.2 MIXES**

- .1 Alternative 1 - Performance Method for specifying concrete: to Departmental Representative performance criteria to CSA A23.1/A23.2.
  - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.

Type	Resistance at 28 days (MPa)	Concrete min mass (Kg/m <sup>3</sup> )	Water /binder ratio	sagging before superplasticizer		coarse aggregates	Air content	Use
				+/- 20mm	+/- 30mm			
1	30	390	0,45		80mm	5-20	5-8%	Concrete base
2	20	340	0,45		75-100mm	10	5-8%	Duct bank

- .2 Do not modify concrete mix formulas until prior approval of Departmental Representative has been obtained.

### Part 3 Execution

#### 3.1 PREPARATION

- .1 Obtain Departmental Representative's written approval before placing concrete.
  - .1 Provide 24 hours minimum notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
  - .1 Development of cold joints not allowed.
  - .2 Ensure concrete delivery and handling facilitate placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Ensure reinforcement and embedded parts are not displaced during concrete placement.
- .5 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .6 Protect previous Work from staining.
- .7 Clean and remove stains prior to application for concrete finishes.
- .8 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, workability, air content, temperature and test samples taken.
- .9 Do not place load upon new concrete until authorized by Departmental Representative.

#### 3.2 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .2 Sleeves and inserts:
  - .1 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.

- .2 Sleeves and openings greater than 100 x 100 mm not indicated reviewed by Departmental Representative.
- .3 Confirm locations and sizes of sleeves and openings shown on drawings.
- .4 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts:
  - .1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.
  - .2 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from Departmental Representative.
  - .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
  - .4 Set bolts and fill holes with epoxy grout.
  - .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .4 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.
- .5 Finishing and curing:
  - .1 Finish concrete surfaces to CSA A23.1 / A23.2.
  - .2 Use methods reviewed to the satisfaction of the Departmental Representative to remove excess bleed water. Take care not to damage the surfaces of the concrete elements.
  - .3 Use curing agents compatible with the finishing product
  - .4 Unless otherwise specified, perform a trowel-shaped trowel finish to the ruler.
  - .5 Unless otherwise indicated, rub the exposed sharp edges with a piece of carborundum to obtain a radius of at least 3 mm radius.

### **3.3 TOLERANCES OF IMPLEMENTATION**

- .1 Construction tolerances for concrete surfaces to be in accordance with CSA A23.1.

### **3.4 FIELD QUALITY CONTROL**

- .1 Site tests: conduct tests as follows in accordance with Section 01 45 00- Quality Control and submit report as described in part 1 - action and informational submittals.
  - .1 Concrete pours.
  - .2 Slump.
  - .3 Air content.
  - .4 Compressive strength at 7 and 28 days.
  - .5 Air and concrete temperature.
- .2 Inspection and testing of concrete and concrete materials carried out by testing laboratory designated by Departmental Representative for review to CSA A23.1/A23.2.
- .3 Ensure that test results are forwarded to the Departmental Representative for review during the pre-concrete assembly meeting.

- .4 The Departmental Representative will take additional test pieces during cold weather concreting work. The cure of these specimens must be done on site, under the same conditions as the tempered concrete from which they are extracted.
- .5 Non-destructive testing of concrete shall be performed in accordance with the methods described in CSA-A23.1 / A23.2.
- .6 The Consultant's inspection and testing may not replace or supplement the Contractor's quality control, nor does it release the Contractor from its contractual responsibilities in this regard.

### **3.5 CLEANING**

- .1 Clean in accordance with Section 01 74 00- Cleaning.
- .2 Waste Management: separate waste materials for reuse or recycling in accordance with Section 01 74 19- Waste Management and Disposal.
  - .1 After receiving written authorization from the Departmental Representative, route unused concrete and concrete components to a local recycling facility or recycling facility.
  - .2 Provide on-site adequate space for the safe washing of concrete trucks.
  - .3 Transfer unused additives (pigments, fibers) to an approved hazardous materials collection site authorized by the Departmental Representative.
  - .4 It is forbidden to dump unused additives in sewers, streams, lakes, on the ground, or any other place where it could pose a health or environmental hazard.
  - .5 Arrange for adjuvants to contaminate bodies of water or drinking water supplies.
  - .6 If necessary, collect or solidify this liquid waste with non-combustible inert material, taking all appropriate safety precautions.
  - .7 Dispose of and dispose of waste in accordance with the requirements of provincial / territorial and federal local regulations.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCE STANDARDS**

- .1 CSA Group
  - .1 CSA C22.1, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
  - .2 CSA C22.2, Current edition.
  - .3 CAN3-C235-83(R2010), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

**1.2 DEFINITIONS**

- .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets. These sheets must indicate product characteristics, performance criteria, dimensions, limits and finish.
- .3 Shop drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
  - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
  - .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
  - .4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
  - .5 Submit an electronic version of drawings to Departmental Representative.
  - .6 If changes are required, notify Departmental Representative of these changes before they are made.
- .4 Certificates:
  - .1 Provide CSA certified material and equipment.
  - .2 Permits and fees: in accordance with General Conditions of contract.
  - .3 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.

#### **1.4 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data.
  - .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
  - .2 Operating instructions to include following:
    - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
    - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
    - .3 Safety precautions.
    - .4 Procedures to be followed in event of equipment failure.
    - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
  - .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
  - .4 Post instructions where directed.
  - .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
  - .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in dry location, indoors, off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return, by manufacturer of packaging materials, padding, pallets, crates as specified in Construction Waste Management Plan in accordance with Section 01 74 19- Waste Management and Disposal.

### **Part 2 Products**

#### **2.1 DESIGN REQUIREMENTS**

- .1 Operating voltages: to CAN3-C235.

- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
  - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language operating requirements: provide identification nameplates for control items in French and English.
- .4 Use one nameplate for both languages.

**2.2 MATERIALS AND EQUIPMENT**

- .1 Provide material and equipment in accordance with Section 01 61 00- Common Product Requirements.
- .2 Equipment and material to be CSA certified. Where CSA certified equipment and material is not available, obtain special approval from Departmental Representative before delivery to site and submit such approval according to section 01 33 00 – Submittal Procedures.
- .3 Factory assemble control panels and component assemblies.

**2.3 WARNING SIGNS**

- .1 Warning Signs: in accordance with requirements of Departmental Representative.
- .2 Porcelain enamel signs, minimum size 175 x 250 mm.

**2.4 WIRING TERMINATIONS**

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

**2.5 EQUIPMENT IDENTIFICATION**

- .1 Identify electrical equipment with nameplates as follows:
  - .1 Nameplates: plastic laminate lamicoïd of 3 mm thick plastic engraving sheet, black face, white core, lettering accurately aligned and engraved into core, mechanically attached with self tapping screws fixed with aluminium rivets

Sizes as follows:

NAMEPLATE SIZES			
Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

- .2 Labels: unless otherwise indicated, use plastic labels with embossed letters 6 mm high.
- .3 Sign placards must be approved by the Departmental Representative prior to manufacture.

- .4 Provide at least twenty-five (25) letters per plate.
- .5 Terminal board and terminal box nameplates shall indicate network and / or voltage characteristics.
- .6 Indicator plates for disconnects, starters and contactors shall indicate the controlled device, voltage and the source of the power supply.
- .7 The nameplates of the terminal boxes and pull boxes must indicate the network, the voltage and the source of the power supply.
- .8 Transformer nameplates shall indicate power, primary and secondary voltages.
- .9 "P-Touch" type nameplates are not accepted.
- .10 Nameplates must be fixed with two aluminum rivets.

**2.6 WIRING IDENTIFICATION**

- .1 Identify wiring with permanent indelible identifying markings, coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

**2.7 CONDUIT AND CABLE IDENTIFICATION**

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

Type	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

**2.8 FINISHES**

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
  - .1 Paint outdoor electrical equipment "equipment green" finish.
  - .2 Paint indoor switchgear and distribution enclosures light gray.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: Before proceeding to installation
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

**3.2 INSTALLATION**

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CAN/CSA-C22.3 No.1 except where specified otherwise.

**3.3 NAMEPLATES AND LABELS**

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

**3.4 CONDUIT AND CABLE INSTALLATION**

- .1 Install conduit and sleeves prior to pouring of concrete.
- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .3 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

**3.5 MOUNTING HEIGHTS**

- .1 Unless otherwise indicated or prescribed, measure the mounting height of the material from the coated floor surface to their axis.
- .2 In cases where mounting height is not indicated, check with qualified personnel before beginning installation.
- .3 Unless otherwise indicated, install the equipment at the height indicated below.
  - .1 Distribution Panels: as required by Code or indications.

**3.6 CO-ORDINATION OF PROTECTIVE DEVICES**

- .1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

**3.7 FIELD QUALITY CONTROL**

- .1 Load Balance:

- .1 Measure phase current to panel boards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
- .2 Provide upon completion of work, load balance report as directed in section 01 78 00 – Closeout Submittals. and informational submittals, phase and neutral currents on panel boards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.
- .2 Conduct following tests in accordance with Section 01 45 00- Quality Control.
  - .1 Power distribution system including phasing, voltage, grounding and load balancing.
  - .2 Circuits originating from branch distribution panels.
  - .3 Lighting and its control.
  - .4 Insulation resistance testing:
    - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
    - .2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
    - .3 Check resistance to ground before energizing.
- .3 Carry out tests in presence of Departmental Representative.
- .4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .5 Manufacturer's Field Services:
  - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in section 01 78 00 - Closeout Submittals;
  - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

### **3.8 SYSTEM STARTUP**

- .1 Instruct Departmental Representative in operation, care and maintenance of systems, system equipment and components.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation and ensure that operating personnel are conversant with aspects of its care and operation.

**3.9 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling, in accordance with Section 01 74 19 - Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 26 05 00 - Common Work Results For Electrical

**1.2                REFERENCE STANDARDS**

- .1        CSA Group (CSA)
  - .1        CAN/CSA-C22.2 No.18-98(R2003), Outlet Boxes, Conduit Boxes and Fittings.
  - .2        CAN/CSA-C22.2 No.65-03(R2008), Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).
- .2        Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
  - .1        EEMAC 1Y-2-1961, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
- .3        National Electrical Manufacturers Association (NEMA)

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 26 05 00 - Common Work Results for Electrical.

**1.4                CLOSEOUT SUBMITTALS**

- .1        Submit in accordance with Section 26 05 00 - Common Work Results for Electrical.

**1.5                DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle materials in accordance with Section 26 05 00 - Common Work Results for Electrical.

**Part 2            Products**

**2.1                MATERIALS**

- .1        Pressure type wire connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.
- .2        Fixture type splicing connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3        Bushing stud connectors: to NEMA to consist of:
  - .1        Connector body and stud clamp for tube, round, copper conductors.
  - .2        Clamp for round copper conductors.
  - .3        Clamp for conductors.
  - .4        Stud clamp bolts.
  - .5        Bolts for copper conductors.

- .6 Bolts for aluminum conductors.
- .7 Sized for conductors as indicated.
- .4 Clamps or connectors for TECK cable, armoured cable, aluminum sheathed cable, mineral insulated cable, non-metallic sheathed cable and flexible conduit, as required to: CAN/CSA-C22.2 No.18.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of conditions: perform the work in accordance with the written instructions of the Manufacturer and section 26 05 00 - Common Work Results for Electrical.

#### **3.2 INSTALLATION**

- .1 Remove insulation carefully from ends of conductors and cables and:
  - .1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.
  - .2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No.65.
  - .3 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65. Replace insulating cap.
  - .4 Install bushing stud connectors in accordance with NEMA.

#### **3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1    Section 26 05 00 – Common Work Results for Electrical.
- .2    Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.
- .3    Section 26 05 43.01 – Installation of Cables in Trenches and Ducts.
- .4    Section 26 05 20 – Wire and Box Connectors (0-1000 V).

**1.2                REFERENCE STANDARDS**

- .1    Canadian Standards Association (CSA International) CSA C22.2, No. 3 Test Methods for Electrical Wires and Cables.

**1.3                PRODUCT DATA**

- .1    Provide product data in accordance with Section 26 05 00 – Common Work Results for Electrical.

**1.4                DELIVERY, STORAGE AND HANDLING**

- .1    Packaging Waste Management: remove or reuse, in accordance with Section 26 05 00 – Common Work Results for Electrical.

**Part 2            Products**

**2.1                BUILDING WIRES**

- .1    Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2    Copper conductors: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RWU90 XLPE, jacketed.

**2.2                TECK 90 CABLE**

- .1    Cable: in accordance with Section 26 05 00- Common Work Results for Electrical.
- .2    Conductors:
  - .1    Grounding conductor: copper.
  - .2    Circuit conductors: copper, size as indicated.
- .3    Insulation:
  - .1    Cross-linked polyethylene XLPE, type RW90;
  - .2    Rating: 600 V.
- .4    Inner jacket: polyvinyl chloride material.
- .5    Armour: galvanized steel.

- .6 Overall covering: thermoplastic polyvinyl chloride, compliant to applicable Building Code classification for this project.
- .7 Fastenings:
  - .1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.
  - .2 Channel type supports for two or more cables.
  - .3 Threaded rods: 6 mm diameter to support suspended channels.
- .8 Connectors:
  - .1 Watertight, approved for TECK cable.

### **2.3 NON-METALLIC SHEATHED CABLE**

- .1 Non-metallic sheathed copper cable type: NMWU, size as indicated.

## **Part 3 Execution**

### **3.1 FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00- Common Work Results for Electrical.
- .2 Perform tests using methods appropriate to local conditions and approved by Departmental Representative.
- .3 Perform tests before powering up the electrical installation.

### **3.2 GENERAL CABLE INSTALLATION**

- .1 Install cable in trenches in accordance with Section 26 05 43.01 – Conduits, conduit fastenings and conduit fittings.
- .2 Lay cable in cable trays in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduits Fittings in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).
- .3 Cable Colour Coding: to Section 26 05 00- Common Work Results for Electrical.
- .4 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.
- .5 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.
- .6 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.
- .7 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

**3.3           INSTALLATION OF BUILDING WIRES**

- .1    Install wiring as follows:
  - .1    In conduit systems in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
  - .2    In underground ducts in accordance with Section 26 05 43.01 – Installation of Cables in Trenches and Ducts.

**3.4           INSTALLATION OF TECK90 CABLE (0 -1000 V)**

- .1    Group cables wherever possible on channels.
- .2    Install cable concealed or exposed, securely supported by fasteners.

**3.5           INSTALLATION OF NON-METALLIC SHEATHED CABLE**

- .1    Install cables.
- .2    Install straps and box connectors to cables as required.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 26 05 00 – Common Work Results For Electrical.
- .2        Section 26 05 33 - Raceway and Boxes for Electrical Systems
- .3        Section 26 05 34 – Conduits, Conduit Fastenings and Conduits Fittings

**1.2                REFERENCE STANDARDS**

- .1        CSA Group
  - .1        CSA C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
  - .2        CSA C22.2 No.41-13, Grounding and Bonding Equipment (Tri-National Standard, with NMX-J-590ANCE and UL 467).
  - .3        CSA C22.2 No.65-13, Wire connectors (Tri-National Standard, with UL 486A-486B NMX-J-543-ANCE).

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with 01 33 00 – Submittal Procedures.

**1.4                CLOSEOUT SUBMITTALS**

- .1        Submit in accordance with Section 01 78 00 – Closeout Submittals.

**1.5                DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle materials in accordance with 01 61 00 – Common Products Requirements.

**Part 2            Products**

**2.1                CONNECTORS AND TERMINATIONS**

- .1        Copper, short barrel compression connectors to CSA C22.2 No.65 as required sized for conductors.
- .2        Two (2) way joint boxes dry location type in accordance with Section 26 05 33 - Raceway and Boxes for Electrical Systems.
- .3        Two (2) way junction boxes with respective pothead for 2 conductor cables with for enclosing stress - cone within for polyethylene or X - linked polyethylene copper cable with sheath and overall jacket in accordance with Section 26 05 33 - Raceway and Boxes for Electrical Systems.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under Section 26 05 00 – Common Work Results for Electrical

**3.2 INSTALLATION**

- .1 Install stress cones, terminations, and splices in accordance with manufacturer's instructions.
- .2 Bond and ground as required to CSA C22.2 No.41.

**3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Section 26 05 00 – Common Work Results for Electrical.

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

- .1            Submit in accordance with Section 26 05 00 – Common Work Results for Electrical.

**1.3                DELIVERY, STORAGE AND HANDLING**

- .1            Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

**Part 2            Products**

**2.1                SUPPORT CHANNELS**

- .1            U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted.

**Part 3            Execution**

**3.1                EXAMINATION**

- .1            Verification of Conditions: verify that conditions of substrate previously installed under 26 05 00 – Common Work Results for Electrical.

**3.2                INSTALLATION**

- .1            Secure equipment to solid masonry, tile and plaster surfaces with nylon shields.
- .2            Secure equipment to poured concrete with expandable inserts.
- .3            Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- .4            Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.
- .5            Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .6            Fasten exposed conduit or cables to building construction or support system using straps.
  - .1            One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
  - .2            Two-hole steel straps for conduits and cables larger than 50 mm.
  - .3            Beam clamps to secure conduit to exposed steel work.
- .7            Suspended support systems.

- .1 Support individual cable or conduit runs with 6 mm diameter threaded rods and spring clips.
- .2 Support 2 or more cables or conduits on channels supported by 6 mm diameter threaded rod hangers where direct fastening to building construction is impractical.
- .8 For surface mounting of two or more conduits use channels at indicated places shown on plan.
- .9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .11 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .12 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Departmental Representative.
- .13 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

### **3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Section 26 05 00 – Common Work Results for Electrical.

**1.2                REFERENCE STANDARDS**

- .1            CSA Group (CSA)
  - .1            CSA C22.1-06, Canadian Electrical Code, Part 1, 20<sup>th</sup> Edition.

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1            Provide submittals in accordance with Section 26 05 00 – Common Work Results for Electrical.

**1.4                DELIVERY, STORAGE AND HANDLING**

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

**Part 2            Products**

**2.1                SPLITTERS**

- .1            Construction: sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.
- .2            Terminations: main and branch lugs to match required size and number of incoming and outgoing conductors as indicated.
- .3            Spare Terminals: minimum three (1) spare terminals or lugs on each connection or lug block sized less than 400 A.

**2.2                JUNCTION AND PULL BOXES**

- .1            Construction: welded steel enclosure.
- .2            Covers Flush Mounted: 25 mm minimum extension all around.
- .3            Covers Surface Mounted: screw-on flat covers.

**2.3                CABINETS**

- .1            Construction: welded sheet steel as indicated hinged door, handle, and lock with 2 keys, latch and catch.
- .2            Type E Empty: flush overlapping sides mounting as indicated.
- .3            Type T Terminal: sheet steel, flush overlapping sides mounting as indicated containing 19 mm plywood backboard.

**Part 3 Execution**

**3.1 SPLITTER INSTALLATION**

- .1 Mount plumb, true and square to building lines.
- .2 Extend splitters full length of equipment arrangement except where indicated otherwise.

**3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION**

- .1 Install pull boxes in inconspicuous but accessible locations.
- .2 Mount cabinets with top not higher than 2 m above finished floor except where indicated otherwise.
- .3 Install terminal block as indicated in Type T cabinets.
- .4 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1.

**3.3 IDENTIFICATION**

- .1 Equipment Identification: to Section 26 05 00- Common Work Results for Electrical.
- .2 Identification Labels: size 2 indicating voltage and phase and system name or as indicated.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Section 26 05 00 – Common Work Results for Electrical.

**1.2                REFERENCE STANDARDS**

- .1            CSA Group (CSA)
  - .1            CSA C22.2 No.40-M1989 (R2009), Cutout, Junction and Pull Boxes.

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1            Submit in accordance with Section 01 33 00 – Submittal Procedures.

**1.4                CLOSEOUT SUBMITTALS**

- .1            Submit in accordance with Section 01 78 00 – Closeout Submittal.

**1.5                DELIVERY, STORAGE AND HANDLING**

- .1            Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

**Part 2            Products**

**2.1                SPLICE BOXES**

- .1            Splice boxes cast iron enclosures 6 mm thick painted with chromate primer and grey enamel to provide mechanical protection and moisture seal for direct buried cable splices rated 5 kV and consisting of:
  - .1            Two halves, split along cable axis, finely ground matching surfaces, fastened with galvanized steel bolts, top half with large filling holes with gasketed plugs for medium hard asphalt base compound, bottom half with screws on inside for bonding armour, and box end openings sealed by:
    - .1            Wrapping cables with anhydrous tape and clamping to make snug fit, for 2-way splices.
    - .2            Fitting boxes with cable entrance fittings suitable for steel tape armour interlocking armour sheaths, for 2-way splices.
- .2            Submarine splice boxes to provide mechanical protection and waterproof seal for submarine cables as follows:
  - .1            Cast iron split boxes with cast iron cones and split armour clamps painted with chromate primer and grey enamel with four (4) bronze rods fastened rigidly to splice box and attached to armour clamps to relieve joint of longitudinal stress, designed to be filled with medium hard asphalt base compound, and rated 5 kV.

- .2 Galvanized steel pipe with filling holes for medium hard asphalt base compound, gasketed plugs, with ends right hand and left hand threaded, cast steel end caps with wire armour clamps, to relieve conductors and splice from mechanical stresses.

## **2.2 JUNCTION BOXES SUBWAY LEVEL**

- .1 Cast iron octagonal box with joints ground smooth and sealed with gasket, painted with chromate primer and grey enamel fitted with contacts mounted on porcelain supports to which conductors are fastened by soldered-on lugs, air filled, suitable for 3 phase, 5 kV non-shielded cable up to 500 MCM, 2 ways, for direct burial.
- .2 Welded steel rectangular boxes, gasketed steel plate lid, fastened with silicon-bronze bolts, copper buses mounted on insulating supports, wiring sleeve entrances, cable conductor lugs detachable from bus contacts at no voltage, rated 500 MCM maximum at 3 pole, 5 kV, 2-way, designed for wall mounting in maintenance hole.
- .3 Welded steel rectangular boxes, painted with chromate primer and grey enamel, steel plate lids, galvanized forged steel C clamps, silicon-bronze screws, oil resistant gaskets, lined and phases partitioned with bakelite, copper strap buses plastic insulation enclosed mounted on porcelain supports, disconnecting links, insulated switch stick operated at no voltage, interchangeable unit cable heads compound filled, equipped with air valve, designed to operate at 14 kPa air pressure, rated 3 phase, 5 kV, 250 A with number of ways and sets of disconnecting links, for wall mounting in maintenance holes.

## **2.3 JUNCTION BOXES DISTRIBUTION LEVEL**

- .1 Welded steel rectangular boxes 6 mm thick minimum painted with chromate primer and grey enamel with removable plate on front side, designed for through run of main cable and porcelain enclosed disconnecting branches of 2 single conductor cables, using pothead plug and socket disconnectors enclosed in porcelain tubes and caps, standard designed for no voltage disconnecting, and for wall mounting in maintenance holes, branch cables rated 250 A, 5 kV, filled with medium hard asphalt base compound.

## **2.4 JUNCTION BOXES POWER LEVEL**

- .1 Cast iron octagonal box painted with chromate primer and grey enamel with joints ground smooth and fitted with gasket, contacts mounted on porcelain supports to which conductors are fastened by soldered-on lugs, medium hard asphalt compound filled, suitable for 3 phase, 15 kV cable, 250 MCM maximum cable size, with stuffing box entrance.
- .2 Welded steel rectangular boxes, oil resistant gasketed steel plate lids fastened with silicon-bronze bolts, shot blasted and painted with chromate primer and grey enamel, cable heads medium hard asphalt compound filled cap nut sealed potheads with stuffing box entrances, disconnecting links insulated switch stick operated at no voltage rated 250 A at 7500 V, 4-way for wall mounting in maintenance holes.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under Section 26 05 00 – Common Work Results for Electrical.

**3.2 INSTALLATION**

- .1 Install splice boxes at cable joint, on floor of trench. Tighten armour clamps and fill with compound.
  - .1 Ground splice boxes as required.
- .2 Install junction boxes on trench floor around cable splice to CSA C22.2 No.40. Connect cable terminals to box contacts.
  - .1 Ground junction boxes as required.
  - .2 Fasten lid securely and check for air leaks before trench is backfilled.
- .3 Install subway level steel boxes on wall of maintenance holes. Connect cables to bus, install links, fasten lid and fill with compound.
  - .1 Ground steel boxes as required.
- .4 Install distribution level steel boxes on walls of maintenance holes. Splice main cable in box and connect branch feeder. Fasten cover and fill with compound.
  - .1 Ground steel boxes as required.
- .5 Install power level boxes as follows:
  - .1 Cast iron type: on trench floor, connect cable terminals to box contacts, fasten lid and fill with compound before trench is backfilled.
  - .2 Steel type: mount on wall of maintenance holes; connect cables to box terminals; install disconnect links, fasten lid securely check for air leaks.
  - .3 Ground power level boxes as required.

**3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Section 26 05 00 – Common Work Results for Electrical.

**1.2                REFERENCE STANDARDS**

- .1            CSA Group (CSA)
  - .1            CAN/CSA C22.2 No. 18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
  - .2            CSA C22.2 No. 45-M1981 (R2003), Rigid Metal Conduit.
  - .3            CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
  - .4            CSA C22.2 No. 83-M1985 (R2003), Electrical Metallic Tubing.
  - .5            CSA C22.2 No. 211.2-M1984 (R2003), Rigid PVC (Unplasticized) Conduit.
  - .6            CAN/CSA C22.2 No. 227.3-05, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.4                WASTE MANAGEMENT AND DISPOSAL**

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

**Part 2            Products**

**2.1                CABLES AND REELS**

- .1            Provide cables on reels or coils.
  - .1            Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.
- .2            Each coil or reel of cable to contain only one continuous cable without splices.

**2.2                CONDUITS**

- .1            Rigid metal conduit: to CSA C22.2 No. 45, galvanized steel threaded.
- .2            Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.
- .3            Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with expanded ends.
- .4            Rigid pvc conduit: to CSA C22.2 No. 211.2.
- .5            Flexible metal conduit: to CSA C22.2 No. 56, liquid-tight flexible metal.

### **2.3 CONDUIT FASTENINGS**

- .1 One hole steel straps to secure surface conduits 50 mm and smaller.
  - .1 Two hole steel straps for conduits larger than 50 mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits.
- .4 Threaded rods, 6 mm diameter, to support suspended channels.

### **2.4 CONDUIT FITTINGS**

- .1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified.  
Coating: same as conduit.
- .2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.
- .3 Watertight connectors and couplings for EMT.
  - .1 Set-screws are not acceptable.

### **2.5 EXPANSION FITTINGS FOR RIGID CONDUIT**

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for 200 mm linear expansion.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.
- .3 Weatherproof expansion fittings for linear expansion at entry to panel.

### **2.6 FISH CORD**

- .1 6 mm polypropylene cord.

## **Part 3 Execution**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

### **3.2 INSTALLATION**

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in unfinished areas or in mechanical and electrical service rooms.
- .3 Surface mount conduits except in cases indicated on plans.
- .4 Use rigid galvanized steel threaded conduit except where specified otherwise.
- .5 Use epoxy coated conduit underground.

- .6 Use electrical metallic tubing (EMT) except in cast concrete.
- .7 Use rigid PVC conduit underground.
- .8 Use liquid tight flexible metal conduit for damp, wet or corrosive locations.
- .9 Use explosion proof flexible connection for connection to explosion proof motors.
- .10 Install conduit sealing fittings in hazardous areas.
  - .1 Fill with compound.
- .11 Minimum conduit size for lighting and power circuits: 19 mm.
- .12 Install EMT conduit from branch circuit panel to outlet boxes.
- .13 Bend conduit cold:
  - .1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .14 Mechanically bend steel conduit over 19 mm diameter.
- .15 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .16 Install fish cord in empty conduits.
- .17 Remove and replace blocked conduit sections.
  - .1 Do not use liquids to clean out conduits.
- .18 Dry conduits out before installing wire.

### **3.3 SURFACE CONDUITS**

- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
- .3 Run conduits in flanged portion of structural steel.
- .4 Group conduits wherever possible on suspended or surface channels.
- .5 Do not pass conduits through structural members except as indicated.
- .6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

### **3.4 CONCEALED CONDUITS**

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.
- .3 Do not install conduits in terrazzo or concrete toppings.

### **3.5 CONDUITS IN CAST-IN-PLACE CONCRETE**

- .1 Locate to suit reinforcing steel.
  - .1 Install in centre one third of slab.
- .2 Protect conduits from damage where they stub out of concrete.

- .3 Install sleeves where conduits pass through slab or wall.
- .4 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed.
  - .1 Use cold mastic between sleeve and conduit.
- .5 Conduits in slabs: minimum slab thickness 4 times conduit diameter.
- .6 Encase conduits completely in concrete with minimum 25 mm concrete cover.
- .7 Organize conduits in slab to minimize cross-overs.

### **3.6 CONDUITS IN CAST-IN-PLACE SLABS ON GRADE**

- .1 Run conduits 25 mm and larger below slab and encase in 75 mm concrete envelope.
  - .1 Provide 50 mm of sand over concrete envelope below floor slab.

### **3.7 CONDUITS UNDERGROUND**

- .1 Slope conduits to provide drainage.
- .2 Waterproof joints (excepted PVC) with heavy coat of bituminous paint.

### **3.8 CLEANING**

- .1 Proceed in accordance with Section 01 74 00 – Cleaning.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 26 05 00 - Common Work Results for Electrical
- .2        Section 31 23 33.01 - Excavating, Trenching and Backfilling

**1.2                REFERENCE STANDARDS**

- .1        CSA Group (CSA)
- .2        Insulated Cable Engineers Association, Inc. (ICEA)

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 – Submittal Procedures.

**1.4                DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.

**Part 2            Products**

**2.1                PVC CONDUITS AND FITTINGS**

- .1        PVC rigid ducts: Schedule 80 type, thick-walled, with prefabricated connections, for direct burial; commercial size 5.
  - .1        Nominal length of 6 m plus or minus 12 mm.
- .2        Rigid PVC ducts, split.
- .3        Elbows, couplings, reducers, interlocking fittings, plugs, caps and adapters made of rigid PVC identical to conduit material, required for complete installation.
- .4        90 degree and 45-degree rigid PVC elbows, as required.

**2.2                SOLVENT ADHESIVE**

- .1        Solvent adhesive for assembly of PVC conduits.

**2.3                POLYETHYLENE PIPES**

- .1        Rigid pipes, polyethylene, with approved couplings and fittings and required for complete installation with drainage of water inside ducts.

**2.4                CABLE PULLING EQUIPMENT**

- .1        Nylon stranded pull rope, 6 mm in diameter, with a tensile strength of 5 kN.

## **2.5 WARNING TAPE**

- .1 Standard 4 mils thick and 76 mm wide polyethylene warning tape, marked "CAUTION - ELECTRICAL WIRE" in black letters on a yellow background.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under Section 26 05 00 – Common Work Results for Electrical

### **3.2 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: Comply with manufacturer's written requirements, recommendations, and specifications, including any available technical bulletins, instructions for handling, storage, and installation of products, and data sheets.

### **3.3 INSTALLATION**

- .1 Once the foundation sand has been laid in accordance with Section 31 23 33.01 - Excavation, Trenching and Backfilling, lay the cables and conduits at least 75 mm from the sides of the trench:
  - .1 Do not pull or drag cables along the trench.
  - .2 Install conduit in accordance with manufacturer's instructions and at specified levels.
  - .3 Clean interior of ducts before installing.
  - .4 Cable separation:
    - .1 Maintain 75 mm minimum separation between ducts of different circuits.
    - .2 Maintain 300 mm minimum horizontal separation between low voltage ducts and high voltage ducts.
    - .3 When low voltage ducts cross high voltage ducts, maintain 300 mm vertical separation with low voltage ducts in upper position.
    - .4 At crossover, maintain 75 mm minimum vertical separation between low voltage ducts and 150 mm between high voltage ducts.
    - .5 Maintain 300 mm minimum lateral and vertical separation for fire alarm and control ducts when crossing other ducts, with fire alarm and control ducts in upper position.
  - .5 Provide conduits with a slope of at least 1: 400.
  - .6 During and after work, seal conduit ends with caps to prevent foreign material from entering.
  - .7 Insert in each conduit a steel mandrel at least 300 mm in length and 6 mm smaller than the inside diameter of the conduit, followed by a stiff-bristled brush (brush) to remove the sand, earth or other matter or foreign matter.
    - .1 Swab in each conduit immediately before pulling cables.

- .8 Install in each conduit a pull cord of uninterrupted length, protruding 3 m from both ends of the conduit.
- .9 Lay cables in duct as indicated.
- .10 Do not pull spliced cables into ducts.
- .11 To reduce draft tension, use CSA approved lubricants that are compatible with the outer casing of the cable.
- .12 Lay all cables passing in the same duct simultaneously.
- .13 To make it easier to match multicore color coded control cables, always unroll them in the same direction during installation.
- .14 Before pulling the cables into the ducts, and until they are permanently connected, close the ends of the lead-wrapped cables with a wiped weld, and those of the other cables, using a waterproof sealing tape.
- .15 Once the installation of the cables is complete, seal the ends of the ducts for future use with a product designed for sealing the ducts.
- .16 Upon completion of the installation of the underground electrical conduits by direct burial, but prior to backfilling of the trenches, inform the Departmental Representative for a control of the on-site installation for the purpose of receiving the work.
- .17 Once the protective sand layer has been installed in accordance with Section 31 23 33.01 - Excavation, Trenching and Backfilling, place a marking tape midway between the duct and the ground level.

### **3.4 FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00- Common Work Results for Electrical.
- .2 Perform tests using qualified personnel.
  - .1 Include necessary instruments and equipment.
- .3 Check phase rotation and identify each phase conductor of each feeder.
- .4 Check each feeder for continuity, short circuits and grounds.
  - .1 Ensure resistance to ground of circuits is not less than 50 mega ohms.
- .5 Pre-acceptance tests:
  - .1 After installing cable but before splicing and terminating, perform insulation resistance test with 1000 V megger on each phase conductor.
  - .2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.
- .6 Acceptance Tests:
  - .1 Ensure that terminations and accessory equipment are disconnected.
  - .2 Ground shields, ground wires, metallic armour and conductors not under test.
    - .1 Conduct hipot testing at manufacturer's recommendations and ICEA.
  - .3 Leakage Current Testing:

- .1 Perform dielectric strength tests in accordance with manufacturer's and ICEA recommendations.
- .7 Provide Departmental Representative with list of test results showing location at which each test was made, circuit tested and result of each test.
- .8 Remove and replace entire length of cable if cable fails to meet any of test criteria.

### **3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Common Work Results for Electrical.

### **3.6 PROTECTION**

- .1 Repair damage to adjacent materials and equipment by cable installation.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1    Section 26 05 00 - Common Work Results For Electrical
- .2    Section 28 13 00 – Access control
- .3    Section 28 13 01 – Traffic Management

**1.2                REFERENCE STANDARDS**

- .1    CSA Group
  - .1    CSA C22.1, Canadian Electrical Code, Part 1 (22<sup>nd</sup> Edition), Safety Standard for Electrical Installations.
  - .2    CSA C22.2, Current edition.
  - .3    CAN3-C235-83(R2010), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

**1.3                DEFINITIONS**

- .1    Electrical and Electronics Terms: Unless otherwise indicated, the terminology used in this section and on the drawings is based on that defined in IEEE SP1122.

**1.4                ACTION AND INFORMATIONAL SUBMITTALS**

- .1    Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2    Product Data:
  - .1    Submit manufacturer's instructions, printed product literature and data sheets. These sheets must indicate product characteristics, performance criteria, dimensions, limits and finish.
- .3    Shop drawings:
  - .1    Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
  - .2    Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
  - .3    Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
  - .4    Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
  - .5    Submit an electronic version of drawings to Departmental Representative.
  - .6    If changes are required, notify Departmental Representative of these changes before they are made.

- .4 Certificates:
  - .1 Provide CSA certified material and equipment.
  - .2 Permits and fees: in accordance with General Conditions of contract.
  - .3 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.

## **1.5 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data.
  - .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
  - .2 The manual must be approved prior to the final inspection by the Departmental Representative who will retain the final copies.
  - .3 Operating instructions to include following:
    - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
    - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
    - .3 Safety precautions.
    - .4 Procedures to be followed in event of equipment failure.
    - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
  - .4 Maintenance sheets should include the following.
    - .1 Instructions for the maintenance, repair, operation and troubleshooting of each component.
    - .2 A maintenance schedule specifying the frequency and duration of the tasks, as well as the tools necessary for their execution. Print or engrave operating instructions and frame in approved laminated plastic.
  - .5 Post instructions where directed.
  - .6 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
  - .7 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

## **1.6 MATERIALS/ REPLACEMENT/MAINTENANCE MATERIALS**

- .1 Submit materials / equipment in accordance with Section 01 78 00- Submittal procedures upon completion.
- .2 Provide a kit for all special tools required for the maintenance of equipment / materials, as recommended by the manufacturers.

- .3 Provide the following spare parts:
  - .1 Two loop detectors
  - .2 One radio receiver for the remote controls
  - .3 Two antennas for the radio receiver
  - .4 One complete access controller with accessories
  - .5 Two card readers
  - .6 Two protection pads
  - .7 A connection system (wiring) between the protective pad and the operator
  - .8 Provide the departmental representative with enough spare batteries to replace twice the number of batteries required to operate the 10 remote controls.

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

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in dry location, indoors, off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return, by manufacturer of packaging materials, padding, pallets, crates as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

## **Part 2 Product**

### **2.1 MATERIALS AND EQUIPMENT**

- .1 Provide material and equipment in accordance with Section 01 61 00 Common Product Requirements and Section 28 13 01 Traffic Management.
- .2 Equipment and material to be CSA certified. Where CSA certified equipment and material is not available, obtain special approval from Departmental Representative before delivery to site and submit such approval as described in part 1 - action and informational submittals.
- .3 Factory assemble control panels and component assemblies.

### **Part 3 Execution**

#### **3.1 INSPECTION**

- .1 Verification of conditions: before proceeding with installation.
  - .1 Visually inspect surfaces / supports in the presence of the Departmental Representative.
  - .2 Notify the Departmental Representative immediately of any unacceptable conditions found.
  - .3 Start installation work only after correcting unacceptable conditions and receiving written approval from Departmental Representative.
  - .4 Visually inspect surfaces / media in presence Departmental Representative.
  - .5 Notify the Departmental Representative immediately of any unacceptable conditions identified.
  - .6 Begin installation work only after correcting unacceptable conditions and receiving written approval Departmental Representative.
- .2 The main works of this section are the following (non-exhaustive list):
  - .1 The supply, installation and connection of specific equipment to the access control system such as:
    - .1 Controller with its accessories;
    - .2 All electrical equipment to connect this controller including a junction box;
    - .3 Card Readers.
    - .4 Wiring.
  - .3 Configuration, programming and commissioning of equipment specific to the access control system by the subcontractor.
  - .4 Supply of diagrams showing the arrangement of components for each box and for each controller for approval by the Departmental Representative from the subcontractor. Detailed connection diagrams should be presented in schematic ladder format.
  - .5 The connection, configuration, programming and commissioning of the additional buttons for the control of the barrier must be done by the subcontractor.
  - .6 The provision of "Workshop drawing" duly completed by the electrical subcontractor for each of the controlled doors and other components connected to the access control system. Refer to Annex A of Section 01 33 00 - Submittal Procedures.
  - .7 The provision of "test forms" duly completed by the access control subcontractor during the preliminary verification for each of the elements of the controlled doors and other components connected to the access control system. Refer to Annex B of Section 01 33 00 - Submittal Procedures.

#### **3.2 INSTALLATION**

- .1 Unless otherwise specified, complete the entire installation in accordance with CSA C22.1.

- .2 Unless otherwise indicated, install overhead and underground systems in accordance with CAN / CSA-C22.3 Number 1.

### **3.3 LABELS, INDICATOR PLATE AND MATERIAL PLATES**

- .1 Ensure that CSA labels, nameplates and nameplates are visible and legible once installed equipment.

### **3.4 CONDUITS AND CABLES INSTALLATION**

- .1 Install the junction box et conduits as shown on drawings.
- .2 Install cables, ducts and fittings that are to be embedded or plastered by placing them in a neat manner against the structure of the building, so as to minimize furring thickness.

### **3.5 MOUNTING HEIGHTS**

- .1 Unless otherwise indicated or prescribed, measure the mounting height of the material from the coated floor surface to their axis.
- .2 In cases where mounting height is not indicated, check with qualified personnel before beginning installation.
- .3 Unless otherwise indicated, install the equipment at the height indicated below.

### **3.6 PROTECTIVE DEVICE COORDINATION**

- .1 Ensure that circuit protection devices such as overcurrent trip units, relays and fuses are installed, are of the required size and are set to the required values.

### **3.7 FIELD QUALITY CONTROL**

- .1 Conduct following tests in accordance with Section 01 45 00 - Quality Control.
  - .1 Power distribution system including phasing, voltage, grounding and load balancing.
  - .2 Circuits originating from branch distribution panels.
  - .3 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
  - .4 Insulation resistance testing:
    - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
    - .2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
    - .3 Check resistance to ground before energizing.
- .2 Carry out tests in presence of Departmental Representative.
- .3 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .4 Manufacturer's Field Services:

- .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in part 1 - action and informational submittals.
- .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

### **3.8 SYSTEM STARTUP**

- .1 Instruct Departmental Representative in operation, care and maintenance of systems, system equipment and components.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation and ensure that operating personnel are conversant with aspects of its care and operation.

### **3.9 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 10 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 10 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling, in accordance with Section 01 74 19 - Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

## **Part 1 General**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - Common Work Results for Electrical
- .2 Section 28 05 00 – Access Control – General requirements
- .3 Section 28 13 01 – Traffic Management.

### **1.2 REFERENCE STANDARDS**

- .1 CSA Group:
  - .1 CSA C22.2 NO. 230, Tray cables (TC)
  - .2 CSA C22.2 NO. 239, control and instrumentation
  - .3 CSA C22.2 NO. 38, Thermoset insulated wires and cables (XLPE)

### **1.3 RELATED WORKS**

- .1 All Division 26 electrical work associated with access control system.
- .2 Power circuits and connections for 120 V and over circuits are made by the electrical contractor in Division 26.
- .3 Unless otherwise indicated, all conduit and access control cables are provided, installed, identified and connected at both ends by the electrical contractor in Division 26 based on the Departmental Representative documents and technical documents of the accredited subcontractor of present section.
- .4 Unless otherwise indicated, all access control components are installed and connected by the Electrical Subcontractor in Division 26 based on the technical documents of the Departmental Representative as well as the technical documents of the Contractor's subcontractor of this section.
- .5 Unless otherwise indicated, all electrified hardware conduits and cables shall be provided, installed, identified and connected on the junction box (BJ) side by the Electrical Subcontractor under Division 26 in accordance with the technical documents of Departmental Representative as well as the technical documents of the subcontractor of this section.

### **1.4 SHOP DRAWINGS**

- .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.

### **1.5 WARRANTY**

- .1 Provide a warranty covering all equipment and accessories against defects in material and labor in accordance with the requirements Section 01 33 00 – Submittal Procedure.

## **1.6 GENERAL**

- .1 The main works of this section are the following (non-exhaustive list):
  - .1 Unless otherwise indicated, all conduits and cables are supplied and installed by Electrical Subcontractor of Division 26. Refer to Drawings for Cable Descriptions and Division of Responsibilities.
  - .2 Complete technical documents required for coordination such as access control information sheets and any other document to be completed and maintained at the request of the Departmental Representative.

## **1.7 COORDINATION WITH OTHER SPECIALITIES**

- .1 Coordinate work with all contractors of project as well as Departmental Representative.

## **1.8 SPECIALIZED WORKFORCE**

- .1 The Electrical Subcontractor must have at his job, one or more qualified electricians in the assembly and connection of industrial control panels. The various housings must be assembled and wired in a careful manner.

## **1.9 SERVICE CONTINUITY**

- .1 Organize and coordinate work with other disciplines so that work and start-ups do not affect operations at Kuujjuaq airport.

## **1.10 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide all required documents and samples in accordance with section 28 05 00 – Common Work Results for Access Control.

## **1.11 CLOSEOUT SUBMITTALS**

- .1 Provide all required documents and items in accordance with section 01 78 00 – Closeout Submittals.

## **1.12 TRANSPORTATION, STORAGE AND HANDLING**

- .1 Transport, store and handle materials and equipment in accordance with section 28 05 00 – Access control –General Requirements.

## **PART 2 Products**

### **2.1 ACCESS CONTROL**

- .1 For ease of use and high availability of parts, the barrier will be controlled by a Kantech KT-1 controller installed in a box.
- .2 Card reader, exterior with code for automatic barrier control.
- .3 The access control system integrates all the alarm points, the inputs / outputs for the activation of the barrier, the supply and supervision of the boxes and the control of beacons.
- .4 Remote controls and radio system for operation at a distance of 30 meters.

## 2.2 CABLE

- .1 Control cables must be suitable for use in ventilated, non-ventilated, cable trays, direct burial, cable trays and for exposed or hidden wiring in wet, damp or dry environments, temperatures of -40 ° C (40 ° F). Applicable for use in public, industrial or commercial services, meeting the following standards:
  - .1 CSA C22.2 NO. 230, Tray Cables (TC)
  - .2 CSA C22.2 NO. 239, control and instrumentation  
Cables (CIC type)
  - .3 CSA C22.2 NO. 38, thermosetting insulated wires  
Cables (XLPE)
  - .4 CSA FT4, - ST1 without halogen and UL 1685 FT4,
  - .5 Rated Vertical Tank Flame Test  
IEEE 383 and 1202 (70,000 BTU / h), vertical
  - .6 Rated Flame Test ICEA T-30-520 (70,000 BTU / hr), vertical flame
  - .7 Test evaluated  
XLPE (RW90) rated, 90 ° C wet / dry  
UV resistant sun "SUN RES" (all colors)  
Direct burial evaluated  
Cold bend of -40 ° C  
Cold impact of -25 ° C rated
  - .8 Suitable for hazardous locations:  
Class I Zone 0 (intrinsically safe cables only)  
Class I Zone 2 (Div 2)

## 2.3 TECHNICAL DESCRIPTIONS OF THE MAIN EQUIPMENT AND COMPONENTS TO BE SUPPLIED, INSTALLED, PROGRAMMED AND STARTED

- .1 Refer to plans for cable description.
- .2 Controller: Complete Kantech KT-1 controller with box and accessories. The empty box must be returned to the electrical contractor in Division 26 for installation and connection.
- .3 License required to program the controller.
- .4 Two (2) Kantech IoProx P600 Outdoor Card Readers for control and access to the automatic barrier on the city side.
- .5 One hundred (100) programmed and functional cards Kantech P10SHL.
- .6 Ten (10) remote controls and the radio system.
- .7 Controller Box: Complete with door monitoring switch and document holder.

- .8 Controller Power Supply Unit
- .9 One (1) lamicoid plate for the identification of each box installed: Lamicoid plastic plate with white engraved inscriptions on a red background. Registration: "Card Reader - automatic Gate Garage".
- .10 Laptop computer complete with 30' network cable terminated at each end. Provide the type of cable needed to connect the computer to the controller for programming new access cards or any other interventions.

The computer must have the necessary characteristics to install the license and it must be very resistant (industrial use to be expected).

### **PART 3 Execution**

#### **3.1 INSPECTION**

- .1 Verification of conditions: perform work in accordance with manufacturer's written instructions and section 28 05 00 - Access Control - General Requirements for Work Results.

#### **3.2 WORK MORE SPECIFIC TO THE PROJECT (NON-LIMITATIVE LIST)**

- .1 Supply, installation and connection of a new external box type NEMA 4X for the installation of the electrical equipment and the controller.
- .2 The supply, installation and connection of a transformer and an electrical panel as well as all the necessary connection accessories for the optimal functioning of the system.
- .3 Supply, installation and programming of new access control components.
- .4 The supply, installation, connection and programming of one (1) new controller.
- .5 Supply, installation and connection of power supply for new controller.
- .6 Supply and programming of a laptop computer and a network cable for local programming of new card.
- .7 Supply, installation and connection of wiring.
- .8 Commissioning and testing of access control components.

#### **3.3 COORDINATION WITH OTHER SPECIALTIES**

- 1. Coordinate work with all subcontractors and project stakeholders as well as Departmental Representative.

### **3.4 SPECIALIZED WORKFORCE**

1. The Electrical Subcontractor in Division 26 shall have one (1) or more qualified electricians in the job of assembling and connecting industrial control panels. The various boxes must be assembled and wired in a careful manner.

## **PART 4 – Installation**

### **4.1 INSTALLATION AND PROGRAMMING OF THE ACCESS CONTROL SYSTEM**

- .1 The exact positions of the access control devices must be coordinated with the Departmental Representative.
- .2 The programming of access control devices must be coordinated with the Departmental Representative.
- .3 All installation, programming and customization shall be in accordance with the standards established by the Departmental Representative and the latest methods already in place in the existing system.

### **4.2 ARRANGEMENT, IDENTIFICATION, TERMINATION AND CONNECTION OF CABLES**

- .1 Unless otherwise specified, all access control cables and cables used for voltages less than 120V, including accessory cables and components to be installed in access control-specific enclosures, shall be placed, neatly attached, identified and connected by the electrical subcontractor of Division 26.
- .2 Arrangement of cables in housings:
  - .1 Inside a housing, each cable must have a minimum length corresponding to the sum of the dimensions of the four (4) sides of the housing.
- .3 Cable identification:
  - .1 Identify all cables at each of the two (2) ends.
  - .2 Use heat shrink tubing labels of appropriate size for each cable diameter.
  - .3 Labels must be yellow and inscriptions must be black.
- .4 Termination of cables:
  - .1 Each cable must be equipped with a heat shrink tube (Heat Shrink) to cover the sheath at the exit of the conductors. The length of the tube must be equal to three (3) times the outer diameter of the cable. Heat Shrink tubes must be of appropriate size for each cable size. Use a hot air appliance for narrowing the tubes. Do not use a naked flame.
  - .2 The length of the conductors at the exit of the cable sheath shall be approximately 150 mm.

- .5 Connecting conductors and cables:
  - .1 Use a ferrule of appropriate size for each conductor size. Use only the crimping tools recommended by the manufacturer.
  - .2 Use multiple ferrules for connecting multiple conductors to one terminal.

#### **4.3 TESTING AND STARTING**

- .1 Test access control components provided in Annex B of Section 01 33 00 - Submittal Procedures.
- .2 One-to-one check all devices and ensure that they react, as appropriate, alarms and faults. Also make sure that:
  - .1 The system is complete and works according to plans and specifications.
  - .2 The system is installed in accordance with the manufacturer's requirements and recommendations.
  - .3 Regulations concerning the requirements for monitoring components and circuits are respected.
- .3 All cables, including junction connectors and jumpers, must be checked together systematically, ie using a complete link of the devices to the controller concerned.
- .4 Provide equipment, materials, accessories and personnel required to perform tests during installation and / or substantial completion of work.
- .5 The electrical subcontractor must verify the installations performed on the controlled barrier and its accessories. He / she must complete the "checklist" provided in Appendix B of Section 01 33 00 - Submittal Procedures.
- .6 The electrical subcontractor must send the "verification sheets" to the Departmental Representative and the access control subcontractor for confirmation of the compliant and functional installations.
- .7 Once the barrier has been verified and accepted by the Departmental Representative and the Subcontractor, a demonstration for approval will be made with the Departmental Representative, the Subcontractor and the Contractor to validate the operation of the system.
- .8 The "System Test Forms" must be signed by the professional, the Departmental Representative and the Subcontractor and then incorporated into the Operations and Maintenance Manual.

#### **4.4 CLEANING**

- .1 Cleaning work-in-progress: perform cleaning in accordance with Section and Section 28 05 00 - Access Control - General Requirements for Work Results.

**END OF SECTION**

## **Part 1 General**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 03 30 00 – Cast-in-place concrete (short version).
- .2 Section 26 05 00 – Common Work Results for Electrical
- .3 Section 28 05 00 – Common Work Results for Access Control
- .4 Section 20 05 43.01 – Installation of Cables in Trenches and Ducts
- .5 Section 28 13 00 – Access Control
- .6 Section 28 13 01 – Traffic Management.

### **1.2 RELATED WORKS**

- .1 All Division 26 electrical work associated with the traffic management system.
- .2 Power circuits and connections for 120 V and greater circuits are made by the Division 26 Electrical Subcontractor.
- .3 All work of supply and installation of conduits, boxes, cables and concrete bases of motorized gates.
- .4 Motorized gates: Unless otherwise indicated, all conduits and power cables are supplied, installed, identified and connected by the Division 26 Electrical Subcontractor according to the Departmental Representative technical documents, as well as technical documents from the manufacturer of motorized gates.
- .5 Detection loops: unless otherwise noted, all conduits shall be supplied and installed by the Division 26 Electrical Subcontractor in accordance with the motorized barrier Manufacturer's technical documents.

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

- .1 Submit shop drawings in accordance with the general requirements of Section 01 33 00 – Submittal Procedures. For drawings specific to this section, use the identification sheet for shop drawings attached as Appendix A of Section 01 33 00 - Documents and Samples. An electronic version will be sent on request.

### **1.4 GENERAL**

- .1 The principal work of this section is the supply, installation and connection of the following equipment (non-limiting list):
  - .1 Motorized barrier;
  - .2 Operator control panel;
  - .3 Remote control;
  - .4 Radio system and remote controls;
  - .5 Detection loops.

## **1.5 COORDINATION WITH OTHER SPECIALITIES**

- .1 Coordinate the work with all contractors and project stakeholders as well as the Departmental Representative.

## **1.6 SPECIALIZED WORKFORCE**

- .1 The Gate Supplier shall have qualified labor for factory assembly of equipment, field installation, and coordination with other stakeholders.

## **1.7 SERVICE CONTINUITY**

- .1 Organize and coordinate work with other disciplines so that work and start-ups do not affect operations at Kuujjuaq Airport.

## **1.8 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 – Closeout Documents.

## **1.9 TRANSPORTATION, STORAGE AND HANDLING**

- .1 Transport, store and handle materials and equipment in accordance with section 01 61 00 – Common Products Requirements.

## **PART 2 Products**

### **2.1 RELATED REQUIREMENTS**

- .1 Industrial motorized barrier for intensive services with lateral displacement of the type sliding barrier supported by the top whose free opening must be of 8 meters, moved by a mechanical drive. The barrier shall be adapted and resistant to the climatic conditions and the environment of Kuujjuaq, including the constraints related to strong winds and low temperatures up to -50 °Celsius.

### **2.2 MOTORIZED GATE WITH LEVER ARM**

- .1 Motorized gate with lateral movement meeting the following requirements:
  - .1 Dimensions are shown on drawings;
  - .2 Three phase 600V power supply for motor with lockable safety switch installed in operator housing;
  - .3 120V single-phase power supply for NEMA 5 15R dual utility receptacle installed in the operator housing;
  - .4 Thermostatically controlled extreme cold auxiliary heater 120V to allow operation at temperatures from -40°C to +40°C;
  - .5 Moving time for full opening less than 15 seconds;
  - .6 Moving time to full closure of less than 15 seconds;
  - .7 NEMA 4X motorized operator main enclosure, thermally insulated;
  - .8 The control cabinet shall be inserted into the main housing;

- .9 Average cycle before repair: over 750,000 cycles providing at least 100 complete cycles per hour and 1,000 cycles per day;
- .10 Each access to the operator's enclosure (doors, covers, etc.) shall be equipped with a lock for key locking or padlocking, the door shall be equipped with a closing device that ensures water tightness;
- .11 Include a contact detection safety cushion on both edges of the gate that may collide with an object that would obstruct the movement of the gate;
- .12 Include the following operating safety devices: opening limit switch, closing limit switch, stop and change of direction in case of obstacle detection by the safety cushion;
- .13 Include an adjustable automatic gate force limiter to prevent breakage in the event of failure of protective devices;
- .14 Include a disengagement system to allow manual operation of the gate;
- .15 Include a manual selector inside the main box for the following 4 functions: Open, Close, Stop, Automatic. All limit switches, safety cushions and overloads must remain active when using the manual selector switch.

### **2.3 REQUIRED ACCESSORIES AND COMMON FEATURES REGARDING THE GATE**

- .1 The GATE shall be equipped with the following features and accessories:
  - .1 Auxiliary limit switches:
    - .1 A limit switch when the gate is fully closed;
    - .2 A limit switch when the gate is fully open;
  - .2 The barrier can be activated for opening, closing and stopping by the following devices:
    - .1 A manual selector switch with four (4) positions, "Open", "Close", "Stop" and "Automatic", installed inside the motorized operator housing of the barrier;
    - .2 Card readers at the entrance as described in Access Control section 28 13 00;
    - .3 Three-button remote controls "Open", "Close" and "Stop" connected to the automatic gate control system by a radio system.

### **2.4 REMOTE CONTROLS FOR OPERATION OF THE AUTOMATIC BARRIER**

- .1 Provide ten (10) remote controls to the Departmental Representative in accordance with section 28 13 00 – Access Control.
- .2 The manual selector has priority over the remote controls.
- .3 The remote controls have priority over the card reader and the detection loops.
- .4 Safety devices must be functional during operation by remote controls.
- .5 Each remote control must have at least three buttons:
  - .1 "Open": turns on the gate in the direction of the opening regardless of its position when the button is pressed.

- .2 "Closing ": starts the barrier in the closing direction whatever its position at the time the button is pressed.
- .3 "Stop": stops the gate in the position it is in when the button is pressed. The barrier remains stopped as long as one of the " Open " or " Close " buttons on the remote control is not pressed or another action is requested by the manual selector. The functions from the detection loops and the card reader must remain inoperative in stop mode.
- .6 Remote controls with a range of 30 meters controlled via radio control.

## 2.5 RADIO RECEIVER

- .1 A radio receiver must be installed in the control box to allow control of the automatic gate from the remote controls. Coordinate with the control box supplier to provide sufficient space to receive the radio system and ensure there is no interference with other components of the control system.
- .2 The radio system shall receive the signal from the remote controls and transmit the desired operation to the automatic gate controller.
- .3 An antenna mounted on the control box must allow a reliable signal from the remote controls.
- .4 Coordinate with the automatic gate controller supplier to ensure compatibility between the automatic gate controller and the radio system, including adequate power supply and connections between the two systems to meet the operating requirements described in Section 2.4 REMOTE CONTROLS FOR OPERATION OF THE AUTOMATIC BARRIER of Section 28 13 01 TRAFFIC MANAGEMENT.

## 2.6 CONCRETE BASE

- .1 The concrete bases required for the gates are described in the drawings and must comply with the specifications of Division 3.

## 2.7 VEHICLES DETECTION LOOPS

- .1 Provide and install PVC vehicle detection loops with one (1) relay each, accessories and interconnections to the gate controller. Loops shall be sized to meet the requirements listed in Sub-Chapter - DETECT LOOP OPERATION and suitable for the intended use. Coordinate installation work with other civil and electrical work lots.
- .2 The automatic gate supplier shall propose an arrangement of detection loops to meet the requirements of the subchapter - OPERATION BY DETECTION LOOP as to the number of loops, their dimensions and their location.
- .3 Detection loops shall be buried in gravel to a minimum depth of 150 mm but not exceeding 200 mm.
- .4 Loops shall have a T-connection where the two (2) ends of the conductor will exit. Conductor shall be splice free, continuous and identified by polarity. The sides shall be joined by elbows and shall be well cemented with a suitable adhesive so that water cannot penetrate. **The loop shall be filled with polyurethane for waterproofing.**

- .5 Upon exiting the loop T, the conductor shall be of sufficient length at both ends to reach the input (or output terminal as applicable). Both ends of the conductor shall pass through a section of 13 mm diameter PVC conduit from the loop to the appropriate terminal.

## **2.8 LOOP DETECTOR OPERATION (automatic)**

- .1 From the air side, an automatic opening by the presence of a vehicle near the automatic gate.
- .2 From the city side and **only upon detection of a vehicle near the pedestal**: opening by access card.
- .3 From the city side and the air side: opening by remote control.
- .4 The automatic gate shall close automatically after a delay of 0 to 60 seconds (adjustable with timer) after it has reached the fully open position.
- .5 Detection loop operations shall be inoperative when the 4-position manual selector switch is in the "Off" position and shall be operative when the manual selector switch is in the "Automatic" position.

## **2.9 MATERIALS / MAINTENANCE EQUIPMENT**

- .1 Spare parts:
  - .1 Provide spare parts in the quantities prescribed in section 28 05 00 – Common Work Results for Access Control.

## **PART 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of conditions: perform work in accordance with manufacturer's written instructions.

### **3.2 INSTALLATION**

- .1 Before beginning installation work, have each of the proposed components approved.
- .2 Provide component location drawings based on manufacturer's recommendations and specifications before performing the work.
- .3 Installation of the equipment must conform to the Quebec Electrical Code and fulfill the orders and directives of the Office of the Quebec Electrical Examiners.
- .4 Provide, set up and connect detection loops.
- .5 Ensure the correct location of the control cables. Make the connection and start-up, and provide a written guarantee certificate that the cables and the installation comply with the codes and standards in force.
- .6 In all cases, installations must be carried out by the manufacturer's representative.

- .7 Supply, installation and connection of the radio system and its antenna for the controls via remote controls.
- .8 Adjustments and start-up of gates and associated accessories must be performed by an authorized representative of the manufacturer.

### **3.3 TEST AND START**

- .1 Motorized gates and detection loops
  - .1 Testing and commissioning of motorized gates with arms and detection loops must be carried out by the supplier with the assistance of the Electrical Subcontractor.

### **3.4 CLEANING**

- .1 Cleaning work-in-progress: Perform cleaning in accordance with Section 01 74 10 - Cleaning.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Section 31 05 16 – Aggregates for Earthwork

**1.2                REFERENCE STANDARDS**

- .1            American Society for Testing and Materials International (ASTM)
  - .1            ASTM C127-04, Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.
  - .2            ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup>(600 kN-m/m<sup>3</sup>)).
  - .3            ASTM D1557-02e1, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>(2,700 kN-m/m<sup>3</sup>)).
  - .4            ASTM D4253-00, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

**1.3                DEFINITIONS**

- .1            Corrected maximum dry density is defined as:
  - .1             $D = (F1 \times D1) + (0.9 \times D2 \times F2)$
  - .2            Where:
    - .1            D = corrected maximum dry density kg/m
    - .2            F1 = fraction (decimal) of total field sample passing 4.75 to 19 mm sieve
    - .3            F2 = fraction (decimal) of total field sample retained on 4.75 to 19 mm sieve (equal to 1.00 - F1)
    - .4            D1 = maximum dry density, kg/m<sup>3</sup> of material passing 4,75 mm sieve determined in accordance with Method.
    - .5            D2 = bulk density, kg/m<sup>3</sup>, of material retained on 4,75 mm sieve, equal to 1000G where G is bulk specific gravity (dry basis) of material when tested to ASTM C127.
  - .3            For free draining aggregates, determine D1 (maximum dry density) to ASTM D4253 dry method when directed by Departmental Representative.

**Part 2            Products**

**2.1                NOT USED**

- .1            Not Used.

SPAC : R116435.600  
Kuujjuaq Airport  
Automated gate replacement  
TC : 24QG

Section 31 05 10  
CORRECTED MAXIMUM DRY DENSITY FOR FILL  
Page 2

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCE STANDARDS**

- .1    ASTM International (ASTM)
  - .1        ASTM D4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
- .2    U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1        EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

- .1    Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2    Product Data:
  - .1        Submit manufacturer's instructions, printed product literature and data sheets for [aggregate materials] and include product characteristics, performance criteria, physical size, finish and limitations.
- .3    Samples:
  - .1        Provide Departmental Representative with access to source and processed material for sampling.
  - .2        Supply new or clean sample bags or containers according appropriate to aggregate materials.
  - .3        Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

**1.3                DELIVERY, STORAGE AND HANDLING**

- .1    Deliver, store and handle materials in accordance with manufacturer's written instructions and section 01 61 00- Common Product Requirements.
- .2    Transportation and Handling: handle and transport aggregates to avoid segregation, contamination and degradation.

**Part 2            Products**

**2.1                MATERIALS**

- .1    Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.
- .2    Flat and elongated particles of coarse aggregate: to ASTM D4791.
  - .1        Greatest dimension to exceed five (5) times least dimension.

- .3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
  - .1 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
  - .2 Reclaimed asphalt pavement.
  - .3 Reclaimed concrete material.
- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
  - .1 Crushed rock.
  - .2 Gravel and crushed gravel composed of naturally formed particles of stone.
  - .3 Light weight aggregate, including slag and expanded shale.
  - .4 Reclaimed asphalt pavement.
  - .5 Reclaimed concrete material.

### **Part 3 Execution**

#### **3.1 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00- Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning.
- .3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .4 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.
- .5 Waste Management: Sort waste for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal:
  - .1 Remove bins and recycling bins from site and dispose of materials at appropriate facilities.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1    Section 02 41 16.09 - Structure Demolition - Short Form
- .2    Section 31 05 10- Corrected Maximum Dry Density for Fill
- .3    Section 31 05 16- Aggregates for Earthwork

**1.2                MEASUREMENT PROCEDURES**

- .1    Work referencing this section of the specifications will not be subject to a separate measurement for payment purposes and their costs must be allocated to the fixed prices in the bid form.

**1.3                REFERENCE STANDARDS**

- .1    Standard NQ 2560-114 - Civil works - Aggregates.
- .2    American Society for Testing and Materials International (ASTM)
  - .1    ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
  - .2    ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3    ASTM D422-63 2002, Standard Test Method for Particle-Size Analysis of Soils.
  - .4    ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup>) (600 kN-m/m<sup>3</sup>).
  - .5    ASTM D1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>) (2,700 kN-m/m<sup>3</sup>).
  - .6    ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .3    Canadian General Standards Board (CGSB)
  - .1    CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
  - .2    CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .4    CSA Group (CSA)
  - .1    CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
    - .1    CSA-A3001-03, Cementitious Materials for Use in Concrete.
  - .2    CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .5    U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1    EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

#### 1.4 DEFINITIONS

- .1 Excavation classes: [two] classes of excavation will be recognized; common excavation and rock excavation.
  - .1 Rock: solid material in excess of 1.00 m<sup>3</sup> and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m<sup>3</sup> bucket. Frozen material not classified as rock.
  - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.
- .3 Topsoil:
  - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
  - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.
- .4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .6 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
- .7 Unsuitable materials:
  - .1 Weak, chemically unstable, and compressible materials.
  - .2 Frost susceptible materials:
    - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.2 and CAN/CGSB-8.1.
    - .2 Table:

Designation of sieves	% sieve
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45
    - .3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.
- .8 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

## **1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Quality Control: in accordance with Section 01 45 00- Quality Control:
  - .1 Submit condition survey of existing conditions as described in existing conditions article of this section.
  - .2 Submit for review by Departmental Representative proposed dewatering methods as described in part 3 of this Section.
  - .3 Submit to Departmental Representative written notice when bottom of excavation is reached.
  - .4 Submit testing and inspection to Departmental Representative. Results and report as described in part 3 of this Section.
- .3 Preconstruction Submittals:
  - .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
  - .2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field.
- .4 Samples:
  - .1 Submit samples in accordance with Section 01 33 00- Submittal Procedures.
  - .2 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.

## **1.6 QUALITY ASSURANCE**

- .1 Health and Safety Requirements:
  - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

## **1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse or recycling in accordance with Section 01 74 19- Waste Management and Disposal.
- .2 Divert excess aggregate materials from landfill to local recycling facility for reuse as directed by Departmental Representative.

## **1.8 EXISTING CONDITIONS**

- .1 Examine soil report.
- .2 Buried services:
  - .1 Before commencing work verify location of buried services on and adjacent to site.
  - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

- .3 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
- .4 Prior to beginning excavation Work, notify Departmental Representative establish location and state of use of buried utilities and structures. Departmental Representative to clearly mark such locations to prevent disturbance during Work.
- .5 Confirm locations of buried utilities by careful soil hydrovac methods and test excavations.
- .6 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
- .7 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing. Costs for such Work to be paid by Departmental Representative.
- .8 Record location of maintained, re-routed and abandoned underground lines.
- .9 Confirm locations of recent excavations adjacent to area of excavation.
- .3 Existing buildings and surface features:
  - .1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.
  - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Type 1 Backfill Type 1: Crushed Stone 20-0
  - .1 Crushed stone or gravel clean, hard, resistant and free from shale, clay and loose, organic or deleterious materials; the particle size of materials shall be within the limits specified below when tested in accordance with ASTM C136-06 and ASTM C117-04, and the grain size curve plotted on a semi-logarithmic chart shall be continuous and progressive. The embankment must be certified as a DB 0-20 fill.

Sieves ASTM	Passing %
31.5 mm	100
20 mm	90-100
14 mm	68-93
5 mm	35-60
1.25 mm	19-38
315 µm	9-17
80 µm	2-7

- .2 Type 2 backfill material: class "B"
  - .1 Compactable soils consisting primarily of granular, hard and strong, non-plastic materials, such as MG-112 sand, gravel or crushed stone. These soils must be free from shale, clay, friable, organic or deleterious materials and contaminated materials. These soils must be non-freezing. These floors must not contain blocks greater than 100mm in diameter.
- .3 Type 3 fill: selected material from excavation or other sources, approved by Departmental Representative for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.

### **Part 3 Execution**

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

- .1 Implement temporary erosion and sediment control measures to prevent loss of soil from stormwater runoff or wind erosion and entrainment of soil. On properties and adjacent pedestrian ways. These means must comply with the requirements of the competent authorities.
- .2 Inspect, maintain and repair control equipment as required until permanent vegetation is established.
- .3 Remove control means at the appropriate time and restore and stabilize surfaces disturbed during this work.

#### **3.2 SITE PREPARATION**

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

#### **3.3 PREPARATION/PROTECTION**

- .1 Protect existing features in accordance with Section 01 56 00- Temporary Barriers and Enclosures and applicable local regulations.
- .2 Keep excavations clean, free of standing water, and loose soil.
- .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.
- .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .5 Protect buried services that are required to remain undisturbed.

#### **3.4 DEPOSIT**

- .1 Deposit embankment materials at locations designated by Departmental Representative.
  - .1 Deposit granular materials to prevent segregation.
- .2 Protect backfill material against contamination.

- .3 Take appropriate control measures against erosion and sedimentation to prevent the migration of sediment from the boundaries of the site and into the watercourse.

### **3.5 DEWATERING AND HEAVE PREVENTION**

- .1 Keep excavations free of water while Work is in progress.
- .2 Provide for Departmental Representative's approval details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
  - .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in [accordance with Section 01 35 43- Environmental Procedures collection and in runoff areas manner not detrimental to public and private property, or portion of Work completed or under construction.
  - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

### **3.6 EXCAVATION**

- .1 Advise Departmental Representative at least 7 days in advance of excavation operations for initial cross sections to be taken.
- .2 Excavate to lines, grades, elevations and dimensions as indicated Departmental Representative.
- .3 Remove walks, paving, concrete, masonry and other obstructions encountered during excavation in accordance with Section 02 41 16.09 - Structure Demolition.
- .4 Excavation must not interfere with bearing capacity of adjacent foundations.
- .5 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.
- .6 The trench shall not interfere with the management of vehicular and aircraft traffic. An airport traffic management plan shall be planned with the Departmental Representative prior to digging in traffic lanes.
- .7 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.
- .8 Restrict vehicle operations directly adjacent to open trenches.
- .9 Dispose of surplus and unsuitable excavated material in approved location on site.
- .10 Do not obstruct flow of surface drainage or natural watercourses.
- .11 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .12 Notify Departmental Representative when bottom of excavation is reached.

- .13 Obtain Departmental Representative approval of completed excavation.
- .14 Remove unsuitable material from trench bottom including those that extent below required elevations to extent and depth as directed by Departemental Representative.

### **3.7 BACKFILLING**

- .1 Do not proceed with backfilling operations until completion of following:
  - .1 Departmental Representative has inspected and approved installations.
  - .2 Departmental Representative has inspected and approved of construction below finish grade.
  - .3 Inspection, testing, approval, and recording location of underground utilities.
  - .4 Removal of concrete formwork.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .5 Backfilling around installations:
  - .1 Place bedding and surround material as specified elsewhere.
  - .2 Place layers simultaneously on both sides of installed Work to equalize loading.
- .6 Place unshrinkable fill in areas as indicated.

### **3.8 SURFACE TREATMENT VIS-À-VIS THE AIRPORT TRAFFIC LANE**

- .1 The last 150 mm of backfill in front of the electrical trench crossing and the airport traffic lane shall consist of a mixture of MG 20 crushed aggregate with 15% by weight of granular sodium formate conforming to AMS 1431E (suggested product: IceCare SF Solid De-icer).
- .2 This surface treatment shall be applied to all surfaces where asphalt has been removed. This does not include the removal of asphalt at the automatic gate site.

### **3.9 RESTORATION**

- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 19 - Waste Management and Disposal, trim slopes, and correct defects as directed
- .2 Clean and reinstate areas affected by Work as directed by Departmental Representative.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 28 13 01 – Traffic Management

**1.2 MEASUREMENT AND PAYMENT**

- .1 Work referencing this section of the specifications will not be subject to a separate measurement for payment purposes and their costs must be allocated to the fixed prices in the bid form.

**1.3 REFERENCE STANDARDS**

- .1 ASTM International
  - .1 ASTM A53/A53M-10, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - .2 ASTM A90/A90M-09, Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
  - .3 ASTM A121-07, Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.
  - .4 A653/A653M-10, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .5 ASTM C618-08a, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
  - .6 ASTM F1664-08, Standard Specification for Poly (Vinyl Chloride) (PVC)-Coated Steel Tension Wire Used with Chain-Link Fence.
  - .7 ASTM A123/A123M-09, Standard Specification for Zinc (Hot Dip Galvanized) coatings on Iron and Steel Products.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-138.1-96, Fabric for Chain Link Fence.
  - .2 CAN/CGSB-138.2-96, Steel Framework for Chain Link Fence.
  - .3 CAN/CGSB-138.3-96, Installation of Chain Link Fence.
  - .4 CAN/CGSB-138.4-96, Gates for Chain Link Fence.
  - .5 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .3 CSA Group (CSA)
  - .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2 CAN/CSA-A3000-08, Cementitious Materials Compendium.
- .4 Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual.
- .5 U.S. Environmental Protection Agency (EPA) / Office of Water

- .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

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

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for concrete mixes, fences, posts and gates and include product characteristics, performance criteria, physical size, finish and limitations.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and with Section 01 61 00- Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations.
  - .2 Store and protect fence and gate materials from damage.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse by manufacturer and return of crates, pallets, padding, packaging materials as specified in Waste Reduction Workplan in accordance with Section 01 74 19- Waste Management and Disposal.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.
  - .1 Nominal coarse aggregate size: 20-5.
  - .2 Compressive strength: 20 MPa minimum at 28 days.
  - .3 Additives: fly ash to CSA A3000.
- .2 Chain-link fence fabric: to CAN/CGSB-138.1.
  - .1 Type 1, Class A, medium style, Grade 3.
  - .2 Height of fabric: as indicated on plans.
- .3 Posts, braces and rails: to CAN/CGSB-138.2, galvanized steel pipe. Dimensions as indicated.
- .4 Top and bottom tension wire: to CAN/CGSB-138.2, single strand, galvanized steel wire.
- .5 Tie wire fasteners: Steel wire, galvanized steel wire.
- .6 Tension bar: to ASTM A653/A653M, 5 x 20 mm minimum galvanized steel.

- .7 Gates: to CAN/CGSB-138.4.
- .8 Gate frames: to ASTM A53/A53M, galvanized steel pipe, standard weight 45 mm outside diameter pipe for outside frame, 35 mm outside diameter pipe for interior bracing.
  - .1 Fabricate gates as indicated with electrically welded joints, and hot-dip galvanized after welding.
  - .2 Fasten fence fabric to gate with twisted selvage at top.
  - .3 Furnish gates with galvanized malleable iron hinges, latch and latch catch with provision for padlock which can be attached and operated from either side of installed gate.
- .9 Fittings and hardware: to CAN/CGSB-138.2, galvanized steel.
  - .1 Tension bar bands: 3 x 20 mm minimum galvanized steel or 5 x 20 mm minimum aluminum.
  - .2 Post caps to provide waterproof fit, to fasten securely over posts and to carry top rail.
  - .3 Overhang tops to provide waterproof fit, to hold top rails and an inward projection to hold barbed wire overhang.
  - .4 Include projection with clips or recesses to hold 3 strands of barbed wire spaced 100 mm apart.
  - .5 Projection of approximately 300 mm long to project from fence at 45 degrees above horizontal.
  - .6 Turnbuckles to be drop forged.
- .10 Zinc Rich Organic Coating: to CAN / CGSB-1.181.
- .11 2 mm diameter galvanized steel barbed wire, conforming to ASTM A121 standard, with four (4) spikes every 125 mm.
- .12 Barbed wire 2.5 mm in diameter, in accordance with CAN / CGSB-138.2.

## **2.2 LOCKS**

- .1 A mechanical lock, with a combination code will be installed on the city side of the pedestrian gate. The air side doorknob will not be locked.

## **2.3 FINISHES**

- .1 Galvanizing:
  - .1 For chain link fabric: to CAN/CGSB-138.1 Grade 2
  - .2 For pipe: 550 g/m<sup>2</sup> minimum to ASTM A90.
  - .3 For barbed wire: to CAN/CGSB-138.2, ASTM A121, Class 2.
  - .4 For other fittings: to ASTM A123/A123M.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for fence and gate installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Coordinate and validate the exact locations for the fences to be replaced and the manual gate.
  - .3 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

#### **3.2 PREPARATION**

- .1 Grading:
  - .1 Remove debris and correct ground undulations along fence line to obtain smooth uniform gradient between posts.
    - .1 Provide clearance between bottom of fence and ground surface of 30 mm to 50 mm, as indicated on plans.

#### **3.3 ERECTION OF FENCE**

- .1 Erect fence along lines as indicated Departmental Representative and in accordance with CAN/CGSB-138.3.
- .2 Excavate post holes to dimensions indicated by Departmental Representative.
- .3 Install intermediate posts at indicated intervals measured parallel to the ground.
- .4 Space straining posts at equal intervals not to exceed 30 m if distance between end or corner posts on straight continuous lengths of fence over reasonably smooth grade, is greater than 30 m.
- .5 Install corner post where change in alignment exceeds 10 degrees.
- .6 Install end posts at end of fence and at buildings.
  - .1 Install gate posts on both sides of gate openings.
- .7 Place concrete in post holes then embed posts into concrete to depths indicated on plans.
  - .1 Extend concrete 50 mm above ground level and slope to drain away from posts.
  - .2 Brace to hold posts in plumb position and true to alignment and elevation until concrete has set.
- .8 Install fence fabric after concrete has cured, minimum of 3 days.
- .9 Install brace between end and gate posts and nearest line post, placed in centre of panel and parallel to ground surface.

- .1 Install braces on both sides of corner and straining posts in similar manner.
- .10 Install overhang tops and caps.
- .11 Install top rail between posts and fasten securely to posts and secure waterproof caps and overhang tops.
- .12 Install bottom tension wire, stretch tightly and fasten securely to end, corner, gate and straining posts with turnbuckles and tension bar bands.
- .13 Lay out fence fabric. Stretch tightly to tension recommended by manufacturer and fasten to end, corner, gate and straining posts with tension bar secured to post with tension bar bands spaced at 300 mm intervals.
  - .1 Knuckled selvedge at bottom.
  - .2 Twisted selvedge at top.
- .14 Secure fabric to top rails, line posts and bottom tension wire with tie wires at 450 mm intervals.
  - .1 Give tie wires minimum two twists.
- .15 Install barbed wire strands and clip securely to lugs of each projection.

### **3.4 INSTALLATION OF GATES AND PEDESTRIAN DOORS**

- .1 Install in locations as indicated by Departmental Representative.
- .2 Level ground between gate posts and set gate bottom approximately 50 mm above ground surface.

### **3.5 INSTALLATION OF AUTOMATED GATE**

- .1 Install as per plans and manufacturers' instructions in accordance with Section 28 13 01 – Traffic Management.

### **3.6 TOUCH UP**

- .1 Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply two (2) coats of organic zinc-rich paint to damaged areas, as indicated.
  - .1 Pre-treat damaged surfaces according to manufacturers' instructions for zinc-rich paint.

### **3.7 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00- Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19- Waste Management and Disposal.

**END OF SECTION**