

SHE-00249217

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**Correctional Service
Canada – Drummond
Establishment**

**Emergency power system
maintenance**

Electrical Specifications
Final

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Prepared by:

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Part 1 General

1.1 WORK BY OTHERS

- .1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from the Departmental Representative.
- .2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to the Departmental Representative, in writing, any defects which may interfere with proper execution of Work.

1.2 WORK SEQUENCE

- .1 All works for the replacement of the equipments (PPUU, P-1000, and banks capacitor) must be done from Friday night (5:00 pm) till the end of works. 24h/24 working.
- .2 The contractor must establish a step-by-step schedule for completion of the work. and submitted for approbation. This calendar must include the lockout procedures.
- .3 All the preparatory work for the temporary, must be done before electrical post replacement. Power shut down works will be done before and after the main power shut down. All shutdowns must be coordinated with director. Same scope of work will be done after the installation.
- .4 Carry out the works step by step, so the ministry representative can be completely functional during scope of work.
- .5 Coordinate the work progress schedule according to the occupancy of the premises Here are some restrictions concerning the time range for shutdown:
 - .1 For pavilions 4 to 9, the only time range disponible is 8:30 to 11:30. Also, only three pavilions can be made in the same day. And for the next three pavilions, the shut down cannot be made until two days later.
 - .2 For others shut down, during the day, there's no restriction except do not exceed the maximum time allowed for shut down described at points 1.2.7.8 and 1.2.7.2.1 (several shut down can be done in same time).
 - .3 For the evening shut down. They must be made between 5:30 pm and 8:30 pm. Do not exceed the maximum time allowed for shut down described at points 1.2.7.8 and 1.2.7.2.1 (several shut down can be done in same time).
- .6 The substation is connected on the regular/emergency power grid. The replacement of the substation will be done on a period of approximately 20 to 32 hours straight, will require many shut down by sector. To limit the sector's shutdown. The loads connected to the panel will be reconnected to a temporary distribution from an

automatic transfer switch (connected to the regular power grid and the temporary generator). We do not expect a temporary power for elevator and building #10. However, the shutdown of the elevator and building #10 must be the last before the regular/emergency station is de-energized and must be the first to be re-energized when the new regular/emergency station is energized.

- .7 The replacement of the substation is proposed as well:
 - .1 Identification of wires with appropriate personal protection equipment for electric arcs. Measure the lengths of existing cables to ensure that breakers can be installed in the proper locations.
 - .2 Verification of the phases rotation for each load with appropriate personal protection equipment for electric arcs.
 - .3 Installation of the temporary distribution in the electrical room. Connection of the normal power grid from 600A breaker (bypass) to the transfer switch.
 - .4 Installation of a mobile generator 500 kW and connection to the transfer switch by the junction box outside. Start control connection between transfer switch and generator.
 - .5 Connection of the temporary distribution via 600A breaker from the mobile generator box. Connection on the upstream cables.
 - .6 Cables installation between temporary distribution and panels in electrical room and in tunnels. And attached to the cables tray on the catwalks:
 - .1 panel building #1 PPU-1000 (cables installation to the equipment);
 - .2 panel building #1 PPU-2 (cables installation to the automatic transfer switch);
 - .3 panel building #1 TU-1000/PU-1000 (cables installation to the transformer);
 - .4 kitchen panel PU-AN2 (cables installation via catwalk to the kitchen panel);
 - .5 catwalk panel PU-AN1 (installation of a cable and a junction box, over the actual guard post);
 - .6 poterne panel PPU-100 (installation of a cable and a junction box, over the actual guard post);
 - .7 pavilion #4 panel (installation of cable to the junction box in the tunnel);
 - .8 pavilion #5 panel (installation of cable to the junction box in the tunnel);
 - .9 pavilion #6 panel (installation of cable to the junction box in the tunnel);
 - .10 pavilion #7 panel (installation of cable to the junction box in the tunnel);
 - .11 pavilion #8 panel (installation of cable to the junction box in the tunnel);

- .12 pavilion #9 panel (installation of cable to the junction box in the tunnel);
- .13 generator room panel TU-4000/PU-4000 (installation of cable to the transformer);
- .14 building #1 Gym panel PPU-3000 (installation of cable and junction box over the actual guard post);
- .15 building #2 panel PPU-8000/9000;
- .16 building #1 panel PPU-1000A (installation of cable to the equipment);
- .17 building #3 panel PPU-6000/7000 (installation of cable and junction box over the actual guard post).
- .7 Temporary distribution feeders by regular power network and automatic setting of the temporary generator.
- .8 Transferring the followings existing loads on temporary distribution. (installation of cable in the box, disconnection of the existing cable and connection of the new cable). If the box has more than one power source, the contractor shall be equipped with appropriate tools for working under tension and energizing each of the panels:
 - .1 building #1 panel PPU-1000 (Installation of cable to the equipment). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
 - .2 building #1 panel PPU-2 (installation of a cable to the automatic transfer switch). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
 - .3 building #1 panel TU-1000/PU-1000 (installation of cable to the transformer). Work can be done during the evening from 5:30 pm. Duration of the shutdown, 2 hours;
 - .4 kitchen panel PU-AN2 (installation of cable via catwalk to the panel in the kitchen). Work can be done during the evening from 8:30 pm (after meals). Duration of the shutdown, 2 hours;
 - .5 catwalk panel PU-AN1 (installation of cable and junction box over the actual guard post). Work can be done during the evening from 5:30 pm. Duration of the shutdown, 2 hours
 - .6 poterne panel PPU-100 (installation of cable and junction box over the actual guard post). Work can be done during the evening from 5:30 pm. Duration of the shutdown, 2 hours;
 - .7 pavilion #4 panel (installation of cable to the junction box in the tunnel). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
 - .8 pavilion #5 panel (installation of cable to the junction box in the tunnel). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;

- .9 pavilion #6 panel (installation of cable to the junction box in the tunnel). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
- .10 pavilion #7 panel (installation of cable to the junction box in the tunnel). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
- .11 pavilion #8 panel (installation of cable to the junction box in the tunnel). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
- .12 pavilion #9 panel (installation of cable to the junction box in the tunnel). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
- .13 generator room panel TU-4000/PU-4000 (installation of cable to the transformer). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
- .14 building #1 GYM panel PPU-3000 (installation of cable and junction box over the actual guard post). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
- .15 building #2 panel PPU-8000/9000 (installation of cable). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
- .16 building #1 panel PPU-1000A (installation of cable to the equipment). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
- .17 building #3 panel PPU-6000/7000 (installation of cable and junction box over the actual guard post). Work can be done during the evening from 5:30 pm. Duration of the shutdown, 2 hours;
- .18 disconnection of the elevator and building #10 power (Friday before the shutdown of 5 :00 pm).
- .9 Opening the power circuit breakers 1600A in panel PP-N and 1200A from generator panel, and installation of padlocks to lock everything.
- .10 Dismantling of cables/bars from the transfer switch.
- .11 Dismantling of cables from the slab (approx. 21 cables/conducts).
- .12 Dismantling of cables from the ceiling (approx. 12 cables/conducts).
- .13 Dismantling of Panel PP-U.
- .14 Preparation of the new panel (opening on the top, the side and underneath).
- .15 Installation of the new panel in the same location of the existing one.
- .16 Installation of new breakers according to the length of the cables of each of the existing loads as measured prior to demolition.
- .17 Settings of circuit breaker protections (if applicable).
- .18 Re-install existing cables and conduits in the panel and connect them to the appropriate circuit breakers.

- .19 Closing the 1600 A power breakers in the PP-N panel and 1200 A power breakers in the generator panel.
- .20 Verification of the phase rotation of each of the circuits.
- .21 Transfer all of the following existing loads to the new regular/emergency (PPU) panel (disconnection of temporary cable, removal of temporary cable from enclosure and connection of existing cable) If the enclosure contains more than one power source, the Contractor shall be equipped with appropriate tools for live work and powering of each panel:
 - .1 reconnection of the elevator and building #10;
 - .2 building #1 panel PPU-1000 (transfer and deinstallation of cable to equipment). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
 - .3 building #1 panel PPU-2 (transfer and deinstallation of cable to automatic transfer switch). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
 - .4 building #1 panel TU-1000/PU-1000 (transfer and deinstallation of cable to automatic transfer switch). Work can be done during the evening from 5:30 pm. Duration of the shutdown, 2 hours;
 - .5 kitchen panel PU-AN2 (transfer and deinstallation of cable via catwalk to the panel in the kitchen). Work can be done during the evening from 8:30 pm. Duration of the shutdown, 2 hours;
 - .6 catwalk panel PU-AN1 (transfer and deinstallation of cable and junction box over the actual guard post). Work can be done during the evening from 5:30 pm. Duration of the shutdown, 2 hours;
 - .7 poterne panel PPU-100 (transfer and deinstallation of cable and junction box over the actual guard post). Work can be done during the evening from 5:30 pm. Duration of the shutdown, 2 hours;
 - .8 pavilion #4 panel (transfer and deinstallation of cable to the junction box in the tunnel). Work can be done during the evening from 8:30 pm. Duration of the shutdown, 2 hours;
 - .9 pavilion #5 panel (transfer and deinstallation of cable to the junction box in the tunnel). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
 - .10 pavilion #6 panel (transfer and deinstallation of cable to the junction box in the tunnel). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
 - .11 pavilion #7 panel (transfer and deinstallation of cable to the junction box in the tunnel). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
 - .12 pavilion #8 panel (transfer and deinstallation of cable to the junction box in the tunnel). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;

- .13 pavilion #9 panel (transfer and deinstallation of cable to the junction box in the tunnel). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
- .14 generator room panel TU-4000/PU-4000 (transfer and deinstallation of cable to the transformer). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
- .15 building #1 GYM panel PPU-3000 (transfer and deinstallation of cable and junction box over the actual guard post). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
- .16 building #2 panel PPU-8000/9000 (transfer and deinstallation of cable to the junction box in the tunnel). Work can be done during the evening from 5:30 pm. Duration of the shutdown, 2 hours;
- .17 building #1 panel PPU-1000A (transfer and deinstallation of cable to the equipment). Work can be done during the day from 8:30 am. Duration of the shutdown, 2 hours;
- .18 building #3 panel PPU-6000/7000 (transfer and deinstallation of cable and junction box over the actual guard post). Work can be done during the evening from 5:30 pm. Duration of the shutdown, 2 hours.
- .22 Connect customer metering to Delta's control panel via the Bacnet network to provide all energy data from the PP-U distribution and program the graphical pages as the existing metering device on the regular network. (work can be done during the day on the Monday following the shutdown).
- .23 Shutdown of temporary feeders.
- .24 Deinstallation of temporary cables and distribution. The deinstallation does not require any shutdown.
- .25 Connect existing cables from the mobile generator to the appropriate circuit breaker in the panel.
- .26 Identification of incident energy level.
- .8 Maintain access for firefighting purposes and provide firefighting capabilities.

1.3 CONTRACTOR USE OF PREMISES

- .1 Unrestricted use of site according to section 01 35 13 rules - Project's procedure to SCC's security.
- .2 Limit use of premises for Work to allow.
- .3 Co-ordinate use of premises under direction of Departmental Representative.
- .4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

- .5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .7 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.4 OCCUPANCY BY THE DEPARTMENTAL REPRESENTATIVE

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

1.5 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

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

1.6 EXISTING UTILITY SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 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.
- .3 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.
- .4 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .5 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .6 Record locations of maintained, re-routed and abandoned service lines.

1.7 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 Other documents as specified.

Part 2 Products

- .1 Not used.

Part 3 Execution

- .1 Not used.

END OF SECTION

PART 1 GENERAL

1.1 ADMINISTRATIVE

- .1 Submit to Ministerial 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 Ministerial 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 by the contractor. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Ministerial 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 Ministerial Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Ministerial Representative review.
- .10 Keep one reviewed copy of each submission on site.

1.2 WORK SCHEDULE

- .1 Contractor will submit a complete timetable including:
 - .1 Contract submission
 - .2 Submit document (work schedule, prevention program, notice of start of work, ...)
 - .3 Kick-off meeting
 - .4 Shop drawings
 - .1 Shop drawing revised
 - .5 Mobilization
 - .1 Equipment delivery

- .6 Temporary work installation
 - .7 Shutdown (identifying each shutdown)
 - .8 New equipment installation
 - .9 Main shutdown
 - .10 Testing
 - .11 Training
 - .12 Submit the closeout manual
 - .13 Provisory acceptance
 - .14 Approbation of the closeout manual
 - .15 Fixing deficiencies
 - .16 Final acceptance
- .2 Submit one (1) paper copy and one (1) computerised copy of the planed work schedule to the ministerial representative.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Québec.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow 5 work days for Ministerial Representative's review of each submission.
- .5 Adjustments made on shop drawings by Ministerial Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Ministerial Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as Ministerial Representative may require, consistent with Contract Documents. When resubmitting, notify Ministerial 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 Material and fabrication details.
 - .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 Ministerial Representative's review, distribute copies.
- .10 Submit one (1) paper copy and one (1) electronic copy of shop drawings for each requirement requested in specification Sections and as Ministerial Representative may reasonably request.
- .11 Submit one (1) electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Ministerial Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit one (1) paper copy and one (1) electronic copy of test reports for requirements requested in specification Sections and as requested by Ministerial 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 one (1) paper copy and one (1) electronic copy of certificates for requirements requested in specification Sections and as requested by Ministerial 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) paper copy and one (1) electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Ministerial 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) paper copy and one (1) electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Ministerial 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) paper copy and one (1) electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Ministerial Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.
- .20 If upon review by Ministerial 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 Correctional Services Canada is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that the Minister 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.

1.4 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of colour digital photography in jpg format, standard resolution as directed by Ministerial Representative and one hard copy at the end of the project.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: 2 locations.
 - .1 Viewpoints and their location as determined by Ministerial Representative.
- .4 Frequency of photographic documentation: as directed by Ministerial Representative.

PART 2 PRODUCTS

- .1 Not Used.

PART 3 EXECUTION

- .1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 OBJECT

- .1 See that the project as well as the usual activities of the establishment proceed without interruption and that the security of the establishment is maintained at all times.

1.2 DEFINITIONS

- .1 « Prohibited items » include:
 - .1 All intoxicants including alcoholic beverages, drugs or narcotics;
 - .2 Weapons or parts of weapons, ammunition as well as all objects designed to kill, injure or neutralize a person, or all objects modified or assembled to do so, unless possession was pre-authorized;
 - .3 Bombs, explosives or their parts;
 - .4 Amounts of money in excess of \$50.00;
 - .5 All other articles not described in points .1 to .4 that could compromise the security of the people or the penitentiary.
- .2 « Unauthorized smoker's articles » designate all tobacco related products including, but without limiting itself to, cigarette, cigars, tobacco, chewing tobacco, snuff, cigarette roller, matches and lighters.
- .3 « Commercial vehicle » designates all motorised vehicles destined for the transportation of material, equipment or tools required for the project.
- .4 « CSC » designates Correctional Services Canada.
- .5 « Director » designates the director of the establishment or their authorized representative.
- .6 « Construction workers » designates all employees of the contractor, the sub-contractors, equipment operators, material manufacturers, laboratories (expertise and inspection), and the organisations responsible of regulations.
- .7 « Perimeter » designates establishment area surrounded by security fences or walls to restrict prisoner's moving.
- .8 « Construction zone » designates the area where, as indicated in the contractual documents, the contractor will be authorized to work. This area can or cannot be isolated from the security enclosure of the establishment.

1.3 PRELIMINARY MEASURES

- .1 Before beginning the project, the contractor must meet with the director to:

- .1 discuss the scope of the project and all adjacent activities;
- .2 establishes security measures, accepted by each party, in conformity with the present specification and to specific needs of the establishment.
- .2 The contractor must:
 - .1 ensure that all construction workers know the CSC security requirements;
 - .2 ensure that the CSC security requirements be clearly and visibly posted at the construction site;
 - .3 collaborates with the establishment's personnel to ensure that all construction workers respect all the security requirements.
- .3 All construction employees on site will be evicted of the establishment properties if:
 - .1 Seams to be under the influence of alcohol or drug;
 - .2 Seams to be confused or abnormal;
 - .3 In possession of restricted object.

1.4 CONSTRUCTION WORKERS

- .1 The contractor must submit, to the director, a list of the names and birth dates of all the employees that must work on the construction site, as well as the security verification form duly completed for each employee.
- .2 Access to the establishment's property is prohibited to all persons that may represent a risk for security.

1.5 VEHICLES

- .1 All persons leaving an unattended vehicle on the CSC's property must close the windows, lock the doors and trunk and remove the keys. The owner of the vehicle or the employee of the company that owns the vehicle must keep the keys securely with them.
- .2 At all times the director can limit the number and types of vehicles present in the establishment's enclosure.
- .3 Delivery personnel for material for the project are not required to obtain a security authorization, however they must remain close to their vehicle at all times during their stay in the establishment. The director can demand that they be accompanied by an employee of the establishment.
- .4 If the director allows for trailers to be left in the security perimeter of the establishment, the doors must remain securely locked at all times, as well as the windows when the trailer is unoccupied. The windows must be protected by a metallic mesh. All trailers used for storing material, inside as well as outside of the security perimeter, must remain securely locked at all times.

1.6 PARKING

- .1 The director will identify the authorized parking areas for the construction worker's vehicles. Parking in non-designated areas is prohibited and vehicles will be towed.

1.7 DELIVERIES

- .1 All delivery of material, equipment or tools for the project must be addressed to the contractor to clearly distinguish with deliveries meant for the establishment. The contractor must ensure that employees are present to receive the deliveries. The CSC personnel will not accept any deliveries of material, equipment or tools destined for the contractor.

1.8 TOOLS AND EQUIPMENT

- .1 Keep, on site, a complete list of the tools and equipment that will be used during the project. This list must be available for inspection upon request.
- .2 Keep the aforementioned list updated during the course of the entire project
- .3 Never leave tools unattended, especially motorised tools, tools with cartridges, cartridges, files, saw blades, carbide saws, wires, cords, ladders and all other lifting equipment
- .4 Store tools and equipment in safe and approved locations.
- .5 Lock all tool boxes after use. The contractor's employees must keep the keys with the mat all times.
- .6 Fix and lock all non-installed scaffolding. Once installed, scaffolding must be securely fixed, to director's satisfaction.
- .7 Advise director immediately of the disappearance or loss of a tool or equipment
- .8 The director will ensure that the security personnel perform a check of the contractor's tools and equipment according to the list he provided:
 - .1 at the beginning and end of each project
 - .2 when entering and exiting the prison.; and/or
 - .3 in accordance the frequencies required by the prison's director.
- .9 If propane or natural gas is used for heating during the project, it will be mandatory that an employee of the contractor supervise the construction site outside of regular work hours.

1.9 PRESCRIPTION MEDICATION

- .1 Contractor and/or contractor's employe who need to carry prescription medication, need prison's director authorisation before carry inside the prison.The person will be allowed to bring inside for one day medication.

1.10 RESTRICTIONS ON TOBACCO USE

- .1 Contractors and construction workers are not authorized to smoke inside the establishment or outside in the establishment perimeter. They must not have any unauthorized tobacco products in their possession inside the establishment perimeter.
- .2 Contractors and construction workers found in violation of this directive will be asked to stop smoking and to throw out all unauthorized tobacco products. If they refuse to comply they will have to leave the site.
- .3 Smoking will be allowed outside the establishment perimeter, in an area designated by the director.

1.11 PROHIBITED OBJECTS

- .1 Weapons, ammunition, explosives, alcoholic beverages, drugs and narcotics are forbidden on the establishment's property.
- .2 The presence of prohibited objects on the construction site as well as the identity of the individual or individuals' responsible for their presence must be reported to the director immediately.
- .3 The contractor must be vigilant with their employees and the employees of sub-contractors since the discovery of a prohibited object can lead to the cancellation of the security authorization of the faulty employee.
- .4 If weapons or ammunition are found in the vehicle of a contractor, a sub-contractor, a supplier or one of their employees, the security authorization of the driver will be immediately revoked.

1.12 ELECTRONIC DEVICES

- .1 With any exception of detention center's director authorization, all electronic devices, as cellular, tablets, computers, laptops, USB keys and cameras are strictly forbidden inside the detention center. If they are authorized, they must be kept away from any prisoners.
- .2 Notwithstanding the above, with director's permission to use electronic devices, it is strictly forbidden to take pictures of prisoners, SCC's employees or any parts of the building is not in the scope of work.

1.13 SEARCHES

- .1 All persons and vehicles entering the establishment's property are subject to a search.
- .2 All personal effects of all employees arriving at establishment can be checked to detect the presence of illegal drug residue.

1.14 CONTACT WITH INMATES

- .1 It is forbidden, without specific authorization, to engage with, talk to, give or receive objects from an inmate. Any individual found in violation of this rule will be immediately expelled from the construction site and have their security authorisation revoked.

1.15 CONTRATOR'S DISPONIBILITIES DURING WORKING PHASES

- .1 From the beginning of the start of the work and the contractor's mobilization. The contractor must be available at all time, 24 hrs/day, 7 days/week, for any emergency operation concerning power loss or electricity failure who may cause any breach of security operation of the detention center concerning the project's scope of work. The contractor must supply an emergency phone number for contacting one of his representant in case of emergency.

PART 2 PRODUCTS

- .1 n/a

PART 3 EXECUTION

3.1 VEHICLE CIRCULATION

- .1 Contractor's vehicles can move inside the security area and move out in specific period of time, with the permission of the ministry's representative. The period of time may change or be restricted from a prison to another one. Please be advised from your ministry's representative.
- .2 The contractor must advise forty-eight (48) hours in advance the arrival of heavy equipment such as cement trucks, cranes, etc.
- .3 Vehicles transporting dirt or debris, or all other vehicles which are considered impossible to search, must be supervised at all times by a CSC employee.
- .4 Before a commercial vehicle can be granted access to the establishment, the contractor or his representative must attest that the contents are necessary for the execution of the project.
- .5 Access to the CSC property will be refused to all vehicles whose contents may represent, in the director's opinion, a safety risk.
- .6 Personal vehicles of construction workers are not permitted in the security perimeter of the establishment for medium or maximum security facilities without authorization from the director.

3.2 CIRCULATION OF CONSTRUCTION WORKERS ON THE ESTABLISHMENT'S PROPERTY

- .1 The director will leave as much liberty as possible to the contractor and his employees without compromising security.

- .2 However, the director can:
 - .1 deny or limit access to any part of the establishment
 - .2 demand, during the entire project or at certain times, that the construction workers be accompanied by a CSC security guard in certain areas.
- .3 All construction workers may only leave the construction site during breaks or lunch time. The break hours will be established by the contractor with director approval. The construction workers are not permitted to eat in the correctional agents break room or in the establishment lunchroom.

3.3 SUPERVISION AND INSPECTION

- .1 Construction activities and the movement of personnel and vehicles will be subject to supervision and inspection by CSC security personnel to ensure all safety regulations are followed.
- .2 The CSC personnel will ensure that the construction workers understand the necessity of the supervision and inspections, and that this understanding be maintained throughout the project.

3.4 WORK INTERRUPTION

- .1 At all times, the director can order the contractor, his employees, sub-contractors and their employees to not enter the construction site or leave the site immediately due to security reasons. The foreman must note the name of the CSC employee who gave the order, the time of the order and conform to the order as quickly as possible.
- .2 The contractor must inform the Ministerial representative of the situation in the twenty-four (24) hours following the work interruption.

3.5 DAILY SCOPE OF WORK

- .1 Contractor must give back his daily work timetable to the Ministerial representative by mail, one day before noon, to coordinate those works with the establishment security, operations other works and schedule security agent for worker surveillance.

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).

1.2 **ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Make submittals in accordance with Section [01 33 00 - Submittal Procedures].
- .2 Submit to Departmental representative, [and the CNESST] 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, [determine frequency, but 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 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.
- .9 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.
- .10 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 likely to release asbestos dust (mandatory for all work where asbestos is present);
 - .3 work in confined spaces (mandatory for all work in confined spaces);
 - .4 lockout-tagout procedures (mandatory for all work requiring lockout);
 - .5 safely operating forklift trucks (mandatory for all forklift usage);
 - .6 safely operating elevating work platforms (mandatory for the use of all elevating platforms);
 - .7 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.
- .11 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 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.

1.10 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.

1.11 PERSON IN CHARGE OF HEALTH AND SAFETY

- .1 If the construction site meets the requirements of article 2.5.3 of the *Code de la sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the construction industry), the Contractor needs to hire a competent person authorized as a safety officer and appoint this person full time from the beginning of the work. This person's tasks shall solely be dedicated to the management of health and safety on the construction site. This safety officer must have the following qualifications:
 - .1 have a safety officer certificate issued by the CNESST;
 - .2 have site-related working experience of at least [_____] years specific to the activities associated with the present project;
 - .3 have working knowledge of occupational health and safety regulations in the workplace;

- .4 be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter the construction site to perform work;
- .5 be responsible for implementing, enforcing in detail and monitoring site-specific Contractor's Health and prevention program;
- .6 be on construction site at all times during execution of work;
- .7 inspect the work and ensure compliance with all regulatory requirements and those indicated in the contract documents or the site-specific prevention program.
- .8 Keep a daily log of actions taken and submitting a copy to Departmental representative each week.

The safety officer's certificate shall be submitted to the Departmental representative before the start of the work.

- .2 When the hiring of a safety officer is not required or if this person is hired by the Departmental representative, the Contractor shall designate a competent person to supervise and take responsibility for health and safety, no matter the size of the construction site or how many workers are present at the workplace. This person shall be on construction site at all times and be able to take all necessary measures to ensure the health and safety of persons and property at or in the immediate vicinity of the construction site and likely to be affected by any of the work. The Contractor shall submit the name of this person to the Departmental representative before the start of work.

1.12 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.

1.13 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 the safety officer or, where there is no safety officer, 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.

1.14 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.

1.15 POWDER ACTUATED DEVICE

- .1 Use powder actuated devices only after receipt of written permission from Departmental representative.
- .2 Any person using an explosive actuated tool shall hold a training certificate and meet all requirements of Section 7 of the *Code de la sécurité pour les travaux de construction* (S- 2.1, r. 4). (Safety code for the construction industry)
- .3 Any other explosive-actuated device shall be used in accordance with the manufacturer's directions and applicable standards and regulations.

1.16 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.

1.17 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:
 - .5 description of work to carry out;
 - .6 identification, description and location of the circuit and/or equipment to lockout-tagout;
 - .7 identification of energy sources that feeds the equipment;
 - .8 identification of each cutout point;
 - .9 sequence of lockout-tagout and the release of residual energy as well as the sequence of unlocking;
 - .10 list of material needed for the lockout-tagout;
 - .11 method of verification of zero energy implementation;
 - .12 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.

- .13 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.

1.18 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:
- .1 description of the circuit and equipment and its location;
 - .2 justification for having to do the work in an energized condition;
 - .3 description of safe work practices to apply;
 - .4 results of the shock hazard analysis;
 - .5 limit of the protective perimeter against electric shocks;
 - .6 results of the arc flash hazard analysis;
 - .7 description of the arc flash protection boundary;
 - .8 description of the personal protective equipment required;
 - .9 description of the means to limit access to unqualified persons;
 - .10 proof that an information session has been carried out;
 - .11 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.

1.19 ASBESTOS EXPOSURE

- .1 It is not anticipated that the work covered by the present specifications involves the manipulation of materials containing asbestos; however, if the Contractor or the Departmental representative or his agent discover materials which are susceptible of containing asbestos, the Contractor must immediately stop the work and advise the Departmental representative. If more investigation demonstrates that the materials do contain asbestos, the Contractor shall comply with the following requirements.
- .2 Prior to starting any work likely to emit asbestos dust, the Contractor must:
 - .1 Provide a written procedure for the work, identifying the risk level of the work (low, moderate, high), as defined in section 3.23 of the *Code the sécurité pour les travaux de construction* S-2.1, r- 4, (Safety code for the construction industry). This procedure must take into account all the requirements of that section 3.23.
 - .2 Submit certificates that demonstrate that all workers involved in the work have received training on asbestos hazards and on the procedure required in the preceding paragraph.
 - .3 Demonstrate that he has all the material and equipment required on hand to respect the procedure and for safely conducting the work.

1.20 FUNGAL CONTAMINATION

- .1 It is not anticipated that the work covered by the present specifications involves the manipulation of materials contaminated by mould; however, if the Contractor or the Departmental representative or his agent discover materials which are susceptible of being contaminated by mould, the Contractor must immediately stop the work and advise the Departmental representative. If more investigation demonstrates that the materials do contain mould, the Contractor shall comply with the following requirements.
- .2 Prior to starting any work where workers are likely to be in contact with materials contaminated by mould, the Contractor must:
 - .1 Provide a written procedure for the work which respects all the requirements of the *Code the sécurité pour les travaux de construction* S-2.1, r- 4, (Safety code for the construction industry), as well as the requirements indicated in the document "*Mould Guidelines for the Canadian Construction Industry*" published by the Canadian Construction Association
(<http://www.cca-acc.com/documents/electronic/cca82/cca82.pdf>).
 - .2 Demonstrate that he has all the material and equipment required on hand to respect the procedure and for safely conducting the work.

1.21 EXPOSURE TO SILICA

- .1 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 Sand and pickle surfaces by using an abrasive containing less than 1% of silica (also called amorphous silica).
 - .4 Install shields or other containment device to prevent silica dust from migrating toward other workers or 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.

1.22 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.

1.23 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 metres from a fall hazard of three metres 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 metres.

1.24 SCAFFOLDINGS

- .1 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:
 - .1 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.
 - .2 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.
 - .3 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.
 - .4 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.
- .5 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.
- .6 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.
- .7 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.
- .8 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 for the installation and this, before anybody uses the facility. A copy of these documents must be available on the construction site at all times.

1.25 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:
- .1 lifting of concrete panels;
 - .2 lifting mechanical/electrical equipment on a roof or on the floor of a building;
 - .3 lifting of loads encroaching on the public road;
 - .4 lifting large dimensions or very heavy loads;
 - .5 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

1.26 HOT WORK

- .1 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 Before the beginning of each shift of work and for each sector, the Contractor must obtain a "Hot Work Permit" emitted by the person responsible for the site.

- .2 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.
 - .3 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.
 - .4 When the hot work is done in areas where there is combustible materials or where the walls, ceilings or floors are made of or covered with combustible materials, a final inspection of the work area must be scheduled four (4) hours after the work has finished. Unless specified otherwise by the Departmental representative, the Contractor must assign a person to carry out this monitoring.
- .2 Welding and cutting
- .1 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 metres 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:
 - .1 they have been cleaned and air samples indicating that work can be done without danger has been taken; and
 - .2 provisions to ensure the safety of the workers have been made.

1.27 INTERIOR USE OF INTERNAL COMBUSTION ENGINES

- .1 In addition to respecting article 3.10.17 of the Code de sécurité pour les travaux de construction (S-2.1, r.4) (Safety code for the Construction Industry), the Contractor must also respect the requirements described in the following paragraphs.
- .2 The use of a gas-powered equipment inside a building is prohibited even if the building is provided with openings.
- .3 The use of other equipment powered by an internal combustion engine inside a building must be submitted to the approval of the Departmental representative.
- .4 For the use of any piece of equipment powered by an internal combustion engine inside a building, even if the building is provided with openings, the Contractor must install a ventilation system able to maintain the concentrations of toxic gases below the regulatory values. The stale air shall be exhausted outside the building.
 - .1 Before using equipment powered by an internal combustion engine, the Contractor must plan and write the following:
 - .2 number of fans to install;
 - .3 power of the fans;
 - .4 location of the fans;
 - .5 dimensions of the openings that will be open during the work.
- .5 During the operation of equipment with internal combustion engine, the Contractor must measure the concentrations of carbon monoxide and nitrogen oxides in the work area and at the breathing area of the workers; the concentration levels measured must be recorded in a register every 30 minutes that must be available for consultation.

- .6 If work is in an occupied building, the Contractor must also measure the concentrations of carbon monoxide and nitrogen oxides in the rooms next to the work area and the concentration levels measured must be recorded in a register every 30 minutes.
- .7 If the carbon monoxide or nitrogen oxides detector alarm goes off during the work, the Contractor must stop the work and take the corrective measures required before resuming the work.
- .8 A portable fire extinguisher must be available at all times in the work area during the use of equipment with internal combustion engines.
- .9 The equipment must be maintained at a safe distance from all combustible material.
- .10 The storage of fuel for any equipment with internal combustion engine is prohibited inside a building.

1.28 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

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 Submittal Procedures

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 MATERIALS

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

1.4 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

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

1.5 EXECUTION

- .1 Execute cutting, fitting and patching to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .9 Restore work with new products in accordance with requirements of Contract Documents.
- .10 Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material.
- .12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse recycling.
- .2 Provide a certificate from an accredited site as proof.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-94, Stipulated Price Contract.
- .2 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions "C", In Effect as Of: May 14, 2004.

1.2 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Ministerial Representative.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide on-site containers (if required) for collection of waste materials and debris.
- .5 Provide and use marked separate bins for recycling.
- .6 Dispose of waste materials and debris off site.
- .7 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.3 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove all waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove all waste products and debris.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Ministerial Representative.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls and floors.
- .9 Clean lighting reflectors, lenses, and other lighting surfaces.
- .10 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .11 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .12 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .13 Remove dirt and other disfiguration from exterior surfaces.
- .14 Sweep and wash clean paved areas.
- .15 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse recycling.
- .2 Provide a certificate from an accredited site as proof.

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 Architecture:
 - .1 01 11 01 General information about the work
 - .2 01 33 00 Submittal procedures
 - .3 01 35 13 Project procedures relative to security requirements
 - .4 01 35 29.06 Health and safety Requirements
 - .5 01 73 00 Execution Requirements
 - .6 01 74 11 Cleaning
- .2 References:
 - .1 CSA Group
 - .1 CSA C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
 - .2 CAN/CSA-B44-07, Safety Code for Elevators and Escalators.
 - .3 CAN3-C235-83(R2010), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
 - .2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
 - .1 IEEE SP1122-2000, *The Authoritative Dictionary of IEEE Standards Terms*, 7th Edition.

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 and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Submit for review single line electrical diagrams under plexiglass and locate as indicated.
 - .1 Electrical distribution system in main electrical room.
- .4 Submit for review fire alarm riser diagram, plan and zoning of building under plexiglass at fire alarm control panel and annunciator.
- .5 Shop drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the 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 circuit terminals on wiring diagrams and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
- .4 Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment devices.
- .5 Submit 3 number of copies of 600 x 600 mm minimum size drawings and product data to authority having jurisdiction.
- .6 If changes are required, notify Departmental Representative of these changes before they are made.
- .6 Certificates:
 - .1 Provide CSA certified equipment.
 - .2 Where CSA certified equipment is not available, submit such equipment to authority having jurisdiction for approval before delivery to site.
 - .3 Submit test results of installed electrical systems and instrumentation.
 - .4 Permits and fees: in accordance with General Conditions of contract.
 - .5 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
 - .6 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.
- .7 Manufacturer's Field Reports: submit to Departmental Representative manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.
 - .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.
- .7 One (1) year warranty on materials and labors.
- .8 All document should be in a binder (3 rings) with table of contents, suppliers list and as built drawings.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's instructions.
- .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 off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse.

1.5 TRAINING

- .1 Supply tools, materials and instructor's services for the maintenance and operation's staff training of running, command, maintenance, tuning for operation and maintenance of the electrical/mechanical equipment and all modification of changes on the equipment in accordance with the warranty.
- .2 The training must be done in regular working hour, before system are accepted and presented to the operation staff.
- .3 Show the operations and maintenance of the installation to the operators.
- .4 Trained the maintenance staffs on new installations requirements.
- .5 The training course must include a plan on each specific component of the system.
- .6 The course must include a theoretical part (including practical examples on paper) and practical scenarios and other plan of the formation will cover a description of system's operation and maintenance to refer of supplied manuals.

- .7 Operating and maintenance guide will be available for the staff's training and will be verified by an engineer before the training.
- .8 Contractor must present an attendance sheet with staff's signature on who assist at the training.
- .9 The minimum time of the training is 4 hours.

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 English and French.
- .4 Use one nameplate for both languages.
- .5 All electrical conduits needing a surface installation accessible by the prison population must be rigid, dual anchor, at a limitative height of 12 ft.

2.2 MATERIALS AND EQUIPMENT

- .1 Provide equipment in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Equipment to be CSA certified. Where CSA certified equipment are not available, obtain special approval from authority having jurisdiction 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.

2.3 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

- .1 Verify installation and co-ordination responsibilities related to motors, equipment and controls, as indicated.
- .2 Control wiring and conduit: except for conduit, wiring and connections below 50 V which are related to control systems specified in mechanical sections or as shown on mechanical drawings (Division 25).

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 lamicaid 3 mm thick plastic engraving sheet black face, white core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.
 - .2 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: embossed plastic labels with 6 mm high letters unless specified otherwise.
- .3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.
- .4 Allow for minimum of twenty-five (25) letters per nameplate and label.
- .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .6 Identify equipment with Size 3 labels engraved "ASSET INVENTORY NO. [____]" as directed by Departmental Representative.
- .7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .8 Identify the electrical outlets and switches using an adhesive laminated label (Brother P-Touch), indicating panel and power circuit number. Labels must be white with black letters.
- .9 Transformers: indicate capacity, primary and secondary voltages.
- .10 Replace the circuits' identification in the modified panels using typed cards and make new cards for the new panels. Submit for approval the panel schedules before their manufacturing and/or installation.

2.6 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, numbered, 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.

	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
Control	Orange	

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 to EEMAC Y1.1.
 - .2 Paint indoor switchgear and distribution enclosures light gray to EEMAC 2Y.1.
 - .3 Paint the outside of the junction boxes according to color code, but not the cover. Using a thick permanent marker, identify, on the cover, the source (panel) and the number(s) of the circuit for all wiring going through the junction and pull boxes only when those are located in an unfinished space or in the ceiling space.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
 - .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.
 - .1 Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding [50] mm.
- .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 LOCATION OF OUTLETS

- .1 Locate outlets in accordance with Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.
- .2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.
- .3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.
- .4 Locate light switches on latch side of doors.
 - .1 Locate disconnect devices in mechanical and elevator machine rooms on latch side of floor.

3.6 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install electrical equipment at following heights unless indicated otherwise.

- .1 Local switches: 1200] mm.
- .2 Wall receptacles:
 - .1 General: 400 mm.
 - .2 Above top of continuous baseboard heater: 200 mm.
 - .3 Above top of counters or counter splash backs: 175 mm.
 - .4 In mechanical rooms: 1200 mm.
- .3 Panel boards: as required by Code or as indicated.
- .4 Telephone and interphone outlets: 400 mm.
- .5 Wall mounted telephone and interphone outlets: 1500 mm.
- .6 Fire alarm stations: 1200 mm.
- .7 Fire alarm bells: 2100 mm.
- .8 Television outlets: 400 mm.
- .9 Wall mounted speakers: 2100 mm.
- .10 Clocks: 2100 mm.
- .11 Door bell pushbuttons: 1200 mm.
- .12 Thermostat: 1200 mm

3.7 CO-ORDINATION OF PROTECTIVE DEVICES

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

3.8 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 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
 - .3 Provide upon completion of work, load balance report as directed in PART 1 - ACTION 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.

3.9 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.

3.10 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

PART 1 GENERAL

1.1 OBJECT

- .1 Cable connection and electrical boxes, connection material and installation.

1.2 REFERENCES

- .1 CSA International
- .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.
- .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).

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Pressure type wire connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper or aluminum alloy sized to fit conductors as required.
- .2 Fixture type splicing connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit conductors 10 AWG or less.
- .3 Bushing stud connectors: to EEMAC 1Y-2 and NEMA to consist of:
- .1 Connector body and stud clamp for stranded copper or aluminum conductors.
 - .2 Clamp for stranded copper conductors.
 - .3 Clamp for stranded aluminum conductors.
 - .4 Stud clamp bolts.
 - .5 Bolts for copper bar.
 - .6 Sized for conductors as indicated.
- .4 Clamps or connectors for armoured cable, aluminum sheathed cable, flexible conduit, non-metallic sheathed cable as required to CAN/CSA-C22.2 No.18.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Remove insulation carefully from ends of conductors 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. Replace insulating cap.
 - .4 Install bushing stud connectors in accordance with EEMAC 1Y-2.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 20 Wire And Box Connectors, 0-1000 V.

1.2 REFERENCES

- .1 CSA C22.2 no 0.3-92, Test Methods for Electrical Wires and Cables.
- .2 CAN/CSA-C22.2 no 131-m89(C1994), Type TECK 90 Cable.

PART 2 PRODUCTS

2.1 BUILDING WIRES

- .1 Conductors: stranded for 10 AWG and larger.
- .2 Minimum size: 12 AWG.
- .3 Copper conductors: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE.
- .4 Aluminum alloy (NUAL) cable are allowed for conductors of 60 A and more.

2.2 TECK CABLE

- .1 Cable: in accordance with CAN/CSA-C22.2 no 131.
- .2 Conductors:
 - .1 Grounding conductor: copper.
 - .2 Circuit conductors: copper, size as indicated.
 - .3 Aluminum alloy (NUAL) conductors are allowed for conductors of 60 A and more
- .3 Insulation:
 - .1 Cross-linked polyethylene XLPE, Rated for 600 V.
- .4 Inner jacket: polyvinyl chloride material.
- .5 Armour: interlocking aluminum.
- .6 Overall covering: thermoplastic polyvinyl chloride.

- .7 Fastenings:
 - .1 One hole malleable iron, steel, aluminum or zinc 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 at 1500 mm centers.
 - .3 Threaded rods: 6 mm diameter to support suspended channels.
- .8 Connectors:
 - .1 Watertight, approved for TECK cable.

2.3 ARMoured CABLES

- .1 Conductors: insulated, copper, size as indicated.
- .2 Type: AC90.
- .3 Armour: interlocking type fabricated from aluminum strip.
- .4 Type: ACWU90, PVC flame retardant jacket over thermoplastic armour and compliant to applicable Building Code classification for this project.

2.4 CONTROL CABLES

- .1 Type: LVT: 2 soft annealed copper conductors, sized as indicated, Insulation with thermoplastic and sheath with thermoplastic jacket.
- .2 Type: low energy 300 V control cable: stranded annealed copper conductors sized as indicated, Insulated with PVC type TW, TW 40 degrees C, TWH, polyethylene with Shielding as indicated

2.5 WIRING IDENTIFICATION

- .1 Identify with numbering at each end command wire with permanent ink on a plastic band.

PART 3 EXECUTION

3.1 INSTALLATION OF BUILDING WIRES

- .1 Low-voltage wiring (0 to 750 volts): Generally, all electrical distribution services and services for auxiliary systems shall be carried out with wiring installed in thin-wall metallic conduits (EMT) in conformity with Section 16111. Generally, all cables and wire shall be routed through the ceiling of corridors to be installed perpendicularly in the various spaces. Armored cable AC90 (BX) may be used within spaces, in suspended ceilings, and dry walls if the length does not exceed 3 m.
- .2 For 60A or less, only cooper wiring is accepted for 600V or less.

- .3 For 60A or more, NUAL type wiring is accepted if the electrical code is respected or manufacturer recommendations are followed. (piping dimension are the responsibility of the electrician).
- .4 All wiring must be phase color coded for the entire building.
- .5 If color coded wire are not available, each wire must be identified by the same number at each end.
- .6 For non-ventilated motor with H or F insulation class, wire insulation must be degC for a minimum of 1300mm in all direction from the motor.
- .7 Neutral wire must be white color coded and clearly identified. The wire must be continuous, without fuse, switch or other circuit opening device.
- .8 Principal conductors wires must have the at both end the same color code: red, black and blue for phases A, B and C.
- .9 Do not pull spliced cables through conduits.
- .10 Install all cables routed through the same conduit at the same time.
- .11 Use lubricants meeting ACNOR standards and that are compatible with the cable sheath material to reduce pull strain.
- .12 The sizes on the drawings are for the guidance of the Contractor. They have been selected to yield a maximum voltage drop of 3% based on probable routing. The Contractor shall ensure that the final routing ensures that these conditions are complied with.
- .13 Cables installed in technical pit must be adequately fastened to the building's structure at a maximum spacing of 1 m.

3.2 INSTALLATION OF TECK90 CABLE (0 -1000 V)

- .1 Group cables wherever possible on U channels with proper anchoring.
- .2 Terminate cable in accordance with section 26 05 20 Wire And Box Connectors, 0-1000 V.

3.3 INSTALLATION OF ARMoured CABLES

- .1 Group cables wherever possible following building axes.
- .2 Support cables correctly. No cable should hang on suspended ceiling.
- .3 Terminate cable in accordance with section 26 05 20 Wire And Box Connectors, 0-1000 V.

3.4 INSTALLATION OF CONTROL CABLES

- .1 Install control cables in conduit, cable troughs.
- .2 Ground control cable shield.

3.5 INSTALLATION OF NON-METALLIC SHEATHED CABLE

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

3.6 INSTALLATION OF CONNECTORS

- .1 Install compression connectors for lampposts and outdoor equipment, and tighten with an appropriate crimping tool in conformity with the Manufacturer's recommendations. Cover the compression with insulation and a minimum of three wraps of Super 88 insulation tape. Position the connection vertically. Installations must meet safety testing performed in conformity with CSA C22.2.
- .2 Install and compress splicing connectors for lighting equipment and other interior connections. Install the insulating cap.
- .3 Install screw compression device for interior equipment subject to vibration

3.7 ESSAIS

- .1 General
 - .1 Perform all testing required.
 - .2 Test electrical continuity of all circuits, ensure there are no short-circuits or ground leaks.
 - .3 Determine if all electrical connections have been correctly made.

ANNEX 1

MAXIMUM NUMBER OF RW-90 WIRES IN A CONDUIT						
Wire size AWG	Conduit size in mm					
	16	21	27	35	41	53
14	7	14	22	40	55	90
12	4	10	16	30	40	66
10	4	6	12	20	30	50
8	---	3	6	10	16	26
6	---	---	3	8	9	18
4	---	---	---	3	6	12
3	---	---	---	3	6	12
2	---	---	---	---	6	9
1	---	---	---	---	4	6
1/0	---	---	---	---	---	6

Note:

For not shown size, use chapter V – Electricity of Quebec Construction Code (Quebec Electrical Code).

ANNEX 2

MAXIMUM LENGTH (IN METER) OF A 120 V CIRCUIT vs VOLTAGE DROP					
Wire size AWG	Maximum circuit load in Volt-Amperes (VA)				
	Up to 960	1 200	1 920	1 440	2 880
12	36	29	18	23	---
10	58	46	29	37	18
8	92	74	46	59	30
6	147	117	73	94	47

Notes:

For load not shown, use chapter V – Electricity of Quebec Construction Code (Quebec Electrical Code) (D3 table).

Length calculated for cooper wires at 60 °C.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 Submittal Procedures.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .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).
 - .7 CSA C22.10-10, Construction code of Quebec, chapter V – Electricity

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data: submit manufacturer's printed product literature, specifications and datasheets.
 - .1 Submit cable manufacturing data.
- .3 Quality assurance submittals:
 - .1 Test reports: submit certified test reports.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Instructions: submit manufacturer's installation instructions.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse recycling.

PART 2 PRODUCTS

2.1 CONDUITS

- .1 Electrical metallic tubing (EMT): to CSA C22.2 no. 83, with couplings.

2.2 CONDUIT FASTENINGS

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

2.3 CONDUIT FITTINGS

- .1 Fittings: in accordance 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.

2.4 FISH CORD

- .1 Polypropylene.

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 Use electrical metallic tubing (EMT) above 2.4 m not subject to mechanical injury.
- .3 Minimum conduit size for lighting and power circuits: 19 mm.

- .4 Mechanically bend steel conduit over 19 mm diameter.
- .5 Install fish cord in empty conduits.
- .6 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 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 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 Submittal Procedures.
- .2 Section 01 74 11 Cleaning.

1.2 REFERENCES

- .1 CSA International
 - .1 CSA C22.2 No.31-10, Switchgear Assemblies.
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
 - .1 EEMAC G8-3.3-89, Metal Enclosed Interrupter Switchgear Assemblies.

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 for low voltage switchgear and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed by OIQ.
 - .2 Indicate on drawings:
 - .1 Floor anchoring method and foundation template.
 - .2 Dimensioned cable entry and exit locations.
 - .3 Dimensioned position and size of bus.
 - .4 Overall length, height and depth of complete switchgear.
 - .5 Dimensioned layout of internal and front panel mounted components.
- .4 Certificates:
 - .1 Submit certified factory test results.
 - .2 Submit certified field test results.

1.4 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data: submit operation and maintenance data for low voltage switchgear and components for incorporation into manual.

1.5 WARRANTY

- .1 Provide a valid manufacturer's warranty for a period of 18 month after delivery or 12 month after start up whichever comes first.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations, in a clean and dry, well-ventilated area.
 - .2 Store and protect low voltage switchgear from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .3 Packaging Waste Management: remove packaging materials and dispose of them in the location designated by the representative of the institution.

1.7 FACTORY QUALITY CONTROLE

- .1 The representative of the CSC or the engineer can require to assist to the final factory testing.
- .2 When the factory installation of the switchgear is completed, inform the CSC representative or the engineer 7 day before the factory testing date.
- .3 Supply five copy of the factory testing results, certified by the engineer of the factory, or by independent testing laboratory approved by the representative of the CSC.

1.8 PROTECTION COORDINATION STUDY

- .1 Supply a protection coordination study for all circuit breakers include in the switchgear. Include the time/current curve for each type of circuit breaker.

1.9 WORKS INSPECTION

- .1 During the installation of the switchgear, inspect constantly the work done. Supply an inspection rapport including the following information, this list is not limitative:
 - .1 Verified work;

- .2 Switchgear physical installation work;
- .3 Electrical connection to the power source;
- .4 Electrical connection to the load side of circuit breaker;
- .5 Verification of the mechanical solidity and electrical continuity of factory made connections;
- .6 Ground connection;
- .7 Verification of amperage and settings of circuit breaker to insure the proper protections.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Switchgear assembly must be built in accordance to CSA C22.2 No.31 and EEMAC G8-2. Switchgear must be SIMENS FC II or approved equivalent.

2.2 RATING

- .1 Secondary switchgear: 600 V, 4000 A, 3 phases, 4 wire, 60 Hz, minimum short circuit capacity 65000 A (rms symmetrical).

2.3 ENCLOSURE

- .1 Switchgear must be built in gray ASA 61 color and in a EEMAC 1 type casing.
- .2 Switchgear must be built of vertical section bolted together to form a rigid assembly. Sides, top and back must be covered with bolted removable steel plates of proper caliber.
- .3 Each section must have name plate in steel with:
 - .1 Manufacturer's name
 - .2 System's voltage
 - .3 Rated ampere
 - .4 Type
 - .5 Manufacturer's PO # and date
- .4 Each section must have CSA marking and sticker showing short-circuit rating.
- .5 Main incoming section must have 4000A rating and include 3 sections:
 - .1 One section with:
 - .1 Main air circuit breaker, 4000A type Siemens WL, draw out with calibration sheet of 3200A and Hydro-Quebec measuring compartment.

- .2 One section with:
 - .1 Four (4) 2000A. Air circuit breaker type Siemens WL, draw out calibrated with value as shown on line drawing.
- .3 One section with:
 - .1 Moulded case circuit breaker with amperage value as shown on line drawing

2.4 BUSBARS

- .1 Bus bars must be in copper and of sufficient size to limit temperature below 65 °C. They must be built to be able to support a 65000A short circuit current.
- .2 Allow for extension of bus on both sides of unit without need for further drilling or preparation in field.
- .3 Joints in bars must be secured with non-corrosive grade 5 bolts.

2.5 GROUNDING

- .1 Copper ground bus not smaller than 50 mm x 6 mm extending full width of multi-cubicle switchboard and situated at bottom.
- .2 Lugs at each end for size 4/0 AWG grounding cable.

2.6 MOULDED CASE CIRCUIT BREAKERS

- .1 Moulded case circuit breakers must have a current rating as shown on the line diagram. As Siemens Sentron series or approved equivalent.

2.7 INSTRUMENTS

- .1 Client measuring unit must include a computer as Siemens PAC 3200 with all required accessories (CT's, PT's, etc.) and have at least the following characteristics:
 - .1 Mudbus TCP communication interface
 - .2 Mudbus to BACNET converter
 - .3 LCD display
 - .4 Voltage reading (including min/max)
 - .5 Amperage reading (including min/max)
 - .6 Watts reading
 - .7 VA Reading
 - .8 total harmonic distortion reading
 - .9 Power factor

- .10 Energy consumption meter

2.8 INSTRUMENT TRANSFORMERS

- .1 PT's: CAN3-C13, dry type, indoor.
- .2 PT's with separated fuse holder.
- .3 CT'S: Can3-C13-M86, Dry type, indoor.

2.9 FINISHES

- .1 Apply finishes.
 - .1 Cubicle exteriors gray.
 - .2 Cubicle interiors gray.

2.10 EQUIPMENT IDENTIFICATION

- .1 Nameplates:
 - .1 25 x 100 mm, 3 lines, 6 mm high letter.
 - .2 Complete switchgear labelled: voltage, system configuration and main bus ampacity.
 - .3 Main cubicle labelled: "Main Breaker".
 - .4 Distribution units labelled: "Load description and ampacity".

2.11 FACTORY ASSEMBLY

- .1 Completely assemble and pre-wire the switchgear.
- .2 Power the switchgear and verify the phase rotation of each load circuit.
- .3 Verify secondary measure instruments.
- .4 Adjust protection settings as close as possible of the existing switchgear setting.
- .5 At the end of the tests, prepare the switchgear for shipping in one or more sections, place necessary junction materials with the sections.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for low voltage switchgear installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative and Consultant.
 - .2 Inform Departmental Representative and Consultant 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 and Consultant.

3.2 INSTALLATION

- .1 Locate switchgear assembly as indicated and bolt to floor.
- .2 Connect main secondary power supply to main bus.
- .3 Connect load side of breakers in distribution cubicles to distribution feeders.
- .4 Check factory made connections for mechanical security and electrical continuity.
- .5 Run one grounding conductor 4/0 AWG bare copper in 25 mm conduit from ground bus to ground.
- .6 Check trip unit settings against co-ordination study to ensure proper working and protection of components.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for disposal in accordance with SCC representative.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by low voltage switchgear installation.

3.5 START-UP AND TESTS

- .1 Start-up must be done by a qualified manufacturer's technician or approved by manufacturer.
- .2 Place all switchgear circuit breaker and switches in « open » position
- .3 Verify all circuit breaker settings to insure the proper settings.
- .4 Verify long delay, short delay, instantaneous and ground fault settings of the circuit breaker, in conformity with the coordination protection study value.
- .5 Place the main circuit breaker in « close » position following the manufacturer instructions.
- .6 Verify electrical resistivity of contact junction.
- .7 Verify with calibrated measure instrument if voltage value are normal and equal on each phases. Verify and adjust the voltage measurement instruments on the switchgear.
- .8 Place all circuit breaker in « closed » position.
- .9 Verify voltage on switchgear measurement instruments for each phases.
- .10 Measure amperage on each phases with a calibrated and approved for that purpose instrument. Verify the amperage measuring unit on the switchgear. Verify the phases balancing.
- .11 Electrically operate, two time, the opening mechanism and closing mechanism of each circuit breaker.
- .12 Verify each accessory on each circuit breaker.
- .13 Verify each load circuit of the switchgear.
- .14 Give the CSC representative the test rapport.

This list is not limitative, all tests required must be added to this list.

END OF SECTION

Part 1 - General

1.1 RELATED REQUIREMENTS

- .1 Section 01 11 00 – Summary of work

1.2 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.2 No. 190-M1985(R2004), Capacitors for Power Factor Correction.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, and limitations.
- .3 Submit certified test results to Departmental Representative.
- .4 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.
 - .1 Instructions: submit manufacturer's installation instructions.

Part 2 - Products

2.1 CAPACITORS

- .1 Capacitor [assembly] [unit] for power factor correction: to CSA C22.2 No. 190.
- .2 Capacitor characteristics:
 - .1 60 kVAR, isolation class 15 kV.
 - .2 600 V, 3 phases, 60 Hz, 3 wires, Delta connection.
 - .3 Enclosure: indoor enclosed, dustproof.
 - .4 Protective fuses: FCF-125 by Fusetek or equivalent.
 - .5 Discharge device: to 50 V in 1 min.
 - .6 Rack mounted.
 - .7 Threaded stud terminal.
 - .8 Permissible current in short circuit: 200

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.
- .2 Replacement/modification works on capacitors, contactors and reactances must be done on site a specialized company in power factor correction.

3.2 INSTALLATION

- .1 Install and connect capacitors.

3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section [26 05 00 - Common Work Results for Electrical].
- .2 Carry out following tests by manufacturer within 24 hours of energizing equipment:
 - .1 Voltage and current are balanced and within capacity rating.
 - .2 Operating kVAR.
 - .3 Terminal to case resistance is greater than 1000 megohm for two bushing capacitors.

3.4 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION



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