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ISSUED FOR TENDER SPECIFICATIONS
MAY 1, 2020

CSC BOWDEN SALLY PORT GATES F2/F3

Project No. R.100664
Bowden Institution
Bowden, AB

www.pwgsc-tpsgc.gc.ca

LIST OF DRAWINGS

ARCHITECTURAL

A0.0	COVERSHEET, KEY PLAN, GENERAL NOTES
A1.0	DEMOLITION PLAN
A1.1	SITE PLAN AND GATE PLANS
A2.1	ELEVATIONS, SECTIONS & DETAILS

STRUCTURAL

S1.0	GENERAL NOTES
S2.0	GATE REPLACEMENT PLAN, SECTIONS AND DETAILS
S3.0	SECTIONS & DETAILS

ELECTRICAL

ED1.0	DEMOLITION ELECTRICAL LAYOUT
E1.0	ELECTRICAL LAYOUT
E2.0	ELECTRICAL DETAILS
E3.0	ELECTRICAL SPECIFICATIONS

SURVEY

191-09179-G0-000-00-SSDSI001-R00 TOPOGRAPHIC SURVEY

END OF SECTION

Part 1 General

1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises the modification of gates F2 and F3 at the existing sally port at Bowden Institution in Bowden, AB to meet current CSC Technical Criteria and fully accommodate their operational needs.

.2 For all intents and purposes of the contract between Public Works Government Services Canada (otherwise known as Public Services and Procurement Canada) and the Contractor, all contractual obligations for the coordination and performance of the Work remain with the Contractor, regardless if a specialty trade or major subcontractor is listed in the specifications. Major subcontractor and trade references are made to provide an organizationally practical means for coordination and scope division, to aid the Contractor with managing the project with major subcontractors and various trades, but is not intended to otherwise alleviate the Contractor from contractual obligations for the performance and coordination of the Work. All references to Sub-contractors shall ultimately be interpreted as being the contractual responsibility of the Contractor.

.3 Demolition: Refer to drawings. Partial demolition of the existing fencing and gates is required to allow for new construction. The existing sally port office is to remain operational during construction.

.4 Hours of work shall be 8:00h – 16:00h. Contractor to confirm exact work hours and days with Departmental Representative.

.1 No work shall take place on site during federal statutory holidays, unless approved in writing by the Departmental Representative.

.2 All work areas must be made secure and all tools and equipment removed from the area prior to ending shift.

.5 Architectural:

.1 Work is to related to the installation two new sally port gates and fences to meet current CSC technical criteria and operational needs.

.6 Structural:

.1 Work is related to providing foundations for two new sally port gates and fences to meet current CSC technical criteria and operational needs.

.7 Electrical:

.1 Work is related to providing electrical service and a gate operator for two new sally port gates to meet current CSC technical criteria and operational needs. Scope will also include modification of the existing electrical system to suit the new gate and fence configuration.

.8 The work also requires:

.1 Full time supervision during any work at the project site.

.2 Weekly Construction Progress Reports.

.9 Refer to the drawings and specifications for complete Scope of Work.

1.2 CONTRACT METHOD

.1 Construct Work under a stipulated price contract.

1.3 FAMILIARIZATION WITH SITE

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

1.4 WORK BY OTHERS

.1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from 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 Departmental Representative, in writing, any defects which may interfere with proper execution of Work.

1.5 WORK SEQUENCE

.1 Construct Work to accommodate continued use of premises during construction.

.2 Co-ordinate Progress Schedule and co-ordinate with Departmental Representative's Occupancy during construction.

.3 Required Phasing:

.1 Phase 1

.1 The existing fence, gate and gate controller to remain functional and undisturbed, including posts, fabric, concertina wire, conduit, cables, cable tray, etc. For the duration of phase 1.

.2 The existing main gate is to remain functional, operational and available at all times during phase 1 construction. Work that will temporarily eliminate gate access to occur only when dates and times have been prearranged and approved by the departmental representative at Bowden Penitentiary.

.3 Install new fence line posts, as per architectural drawings.

.4 Shop fabricate and install a new sliding gate frame and gate panel to match the existing in width, height, member sizes, tracks, rollers, chain gears, etc. (unless noted otherwise). Install new gate 2400mm to the outside of the existing gate.

.5 Construct new concrete foundations as per structural drawings.

.6 The new gate frame is to be securely and permanently fixed to new concrete foundations.

.7 Slope the finished concrete to create a 'speed bump' between the posts of the new gate, to the full width of new gate. Concrete speed bump to extend the full length of the gate, 1.7m wide with a slope of 1:10, as detailed.

.8 Supply and install a new gate operator enclosure similar to F1 gate operator and designed for the new sliding gate. New enclosure to contain new gate operator motor, gears, heater, etc., as required for gate operation (to match existing or better). Refer to electrical drawings.

.9 Install new fence fabric to the new fence posts, including concertina wire and security sensor cables. New fence fabric to be pre-finished black colour.

.10 New gate to be completed, tested, and fully functional prior to turnover and decommissioning of the existing gate.

.11 Contractors to maintain access through the existing gate at all times during construction. Construction activities that prevent sally port access to be coordinated with departmental representative.

.2 Phase 2

.1 Transfer of gate operation from existing gate to the new gate is to occur after normal working hours, at times to be approved by departmental representative. (Security personnel may be required on site during gate operation turnover when the gates are expected to remain open for extended periods of time). Coordinate gate turnover date and time with penitentiary personnel/departmental representative.

.2 All required cable tray is to be installed to new gate controller locations prior to demolition of existing gate controllers. Once new gate controllers have been installed the cables that feed power to existing gate controllers are to be de-energized, disconnected, and re-routed to new gate controller locations. Electrical contractor is to coordinate with general contractor and department representative regarding how long gate installation will take place so that prison staff can be made aware of non-functional gate during this time. Electrical contractor is also to coordinate with department representative regarding manual gate operation procedures in the event that the gate must be opened during time of construction.

.3 Remove sign panel from existing gate and re-install to new gate panel.

.3 Phase 3

.1 With the new gate now fully functional and operational, remove the existing gate panel, operator enclosure and all other redundant features of the existing gate. Do not remove the outer frame of the existing gate.

.2 Paint existing gate frame to match existing frame at gate F1 (hi-visibility yellow w/black stripe)

.3 Modify and re-secure the existing anchors and supports for the existing conduit and cable tray on the existing fence posts.

.4 Interference with security and daily operations must be minimized.

.1 Gates must remain operable at all times. Coordinate gate installation with Departmental Representative.

.2 Off-site pre-fabrication is expected to expedite installation.

.5 In the instance of a security, safety, or emergency situation, construction may be temporarily suspended at the discretion of CSC.

.6 Construction on the project site will be performed during the full operation of the facilities. Project work and phasing must be planned and coordinated to ensure that disruptions to the daily operation of the facilities are kept to a minimum.

1.6 CONTRACTOR USE OF PREMISES

.1 Maintain 24-hour operational access through all areas of work to meet operational requirements.

.2 Maintain fire access/control through all areas of work.

.3 Refer to Section 01 35 13 - Security Project Procedures.

.4 Co-ordinate use of premises under direction of Departmental Representative.

.5 Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

.6 Keep driveways, loading areas, and entrances serving premises clear and available to Department, Departmental employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

.7 Schedule deliveries to minimize use of driveways and entrances by construction operations. Schedule deliveries to minimize space and time requirements for temporary storage of materials and equipment on site.

.8 Contractor will not be provided with on-site storage. Contractor is to provide storage contained at the specified laydown area outside the Bowden Institution Secure fence. Contractor will be expected to factor in time for moving their tools and material in and out on a daily basis from/to the storage area and work area. If required, obtain and pay for use of additional off-site storage or work areas needed for operations under this Contract.

.9 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by the Departmental Representative.

.10 At completion of operations condition of existing work: equal to or better than that which existed before new work started

1.7 BUILDING OCCUPANCY DURING CONSTRUCTION

.1 Premises will remain occupied during entire construction period for execution of normal operations.

.2 Co-operate with Departmental Representative in scheduling operations to minimize conflict and to facilitate building usage.

.3 Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Departmental Representative.

.4 The facility will be fully occupied during construction.

1.8 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building operations, occupants and normal use of premises. Arrange with Departmental Representative to facilitate execution of work in stages. The Contractor shall ensure the execution of work shall not jeopardize the security of the operation of the institution.

1.9 EXISTING SERVICES

.1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.1 Where Work involves breaking into or connecting to existing services, give the Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to vehicular traffic and existing building operations.

.2 Provide alternative routes for personnel and vehicular traffic only with written permission from the Departmental Representative.

.3 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.

.4 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.5 Provide temporary services when directed by the Departmental Representative to maintain critical building systems.

.6 Where unknown services are encountered, immediately advise the Departmental Representative and confirm findings in writing.

.7 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.8 Record locations of maintained, re-routed and abandoned service lines.

.9 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers & Enclosures.

1.10 DOCUMENTS REQUIRED

.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, System Components List c/w Commissioning Verification Forms and Check Sheets and Commissioning Issues/Resolution Log.

.9 Copy of Approved Work Schedule.

.10 Three (3) week look ahead.

.11 Health and Safety Plan and Other Safety Related Documents.

.12 Manufacturer's Technical Literature and Installation Instructions

.13 Other documents as specified.

END OF SECTION

Part 1 General

1.1 ACCESS AND EGRESS

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

1.2 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security. Refer to Section 01 35 13 – Security Requirements.

.4 Contractor must provide sanitary facilities that will remain outdoors, located inside the security fence, in near proximity to the work area.

.1 Coordinate bathroom access and schedule with Commissionaires.

.2 If Departmental Representative confirms in writing that CSC operational requirements make it unfeasible for contractor to supply a sanitary facility in near proximity to work area, the contractor will be authorized to use one or more sanitary facilities currently existing within the institution.

.3 Contractor must be respectful and keep clean any sanitary facilities existing within the institution that are provided temporarily for use. Mis-use of facilities will result in removal withdrawal permission.

.5 Contractor laydown shall be located where designated by Departmental Representative. Security provisions for all tools, assets, equipment & material located in the contractor laydown shall be the responsibility of the contractor.

.6 Contractor to use rolling trash containers to remove debris from building to ensure that no damage occurs to the existing floors or exterior paving surfaces.

.7 Contractor may provide waste bin located in the laydown area. Departmental Representative will advise which location is permitted.

.8 Closures: protect work temporarily until permanent enclosures are completed.

1.3 CONTRACTOR WORK HOURS

.1 Hours of work shall be 08:00h – 16:00h. Contractor to confirm exact work hours and days with Departmental Representative.

.1 No work shall take place on site during federal statutory holidays, unless approved in writing by the Departmental Representative.

.2 All work areas must be made secure and all tools and equipment removed from the area prior to ending shift.

.3 After hours may be required as required by the Departmental Representative

1.4 ALTERATIONS TO EXISTING BUILDING AND SITE

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

1.5 EXISTING SERVICES

.1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum.

.3 Provide for pedestrian personnel and vehicular traffic.

.4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.6 SPECIAL REQUIREMENTS

.1 All work will be performed under Departmental Representative Commissionaire escort.

.2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations. Refer to 01 35 13 - Security Requirements.

.3 Noise generating activities shall be coordinated with department representative and require authorization from the institution.

.4 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.

.5 All deliveries must be received and offloaded outside the security fence by the contractor, in the contractor’s laydown. No deliveries will be allowed to be received inside the security fence.

.6 Half-an-hour (0.5) allowance to be made for screening each instance of personnel at the beginning of the work shift, and for any re-entries throughout the work shift.

.1 Any personnel to arrive at site at an unscheduled time or otherwise arrive on site for an unscheduled reason (i.e. late for shift, drop-in or unexpected site visit, etc.) shall allow for one (1) hour for security screening and escort to area of work

.1 One (1) hour allowance to be made for screening each vehicle.

1.7 SECURITY

.1 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.

.2 Security escort:

.1 Escort required at all times.

.2 Personnel employed on this project must be escorted when executing work in non-public areas during normal working hours. Personnel must be escorted in all areas after normal working hours.

.3 Submit an escort request to Departmental Representative at least 14 days before service is needed. For requests submitted within time noted above, costs of security escort will be paid for by Departmental Representative. Cost incurred by late request will be Contractor's responsibility.

.4 Any escort request may be cancelled free of charge if notification of cancellation is given at least 4 hours before scheduled time of escort. Cost incurred by late request will be Contractor's responsibility.

.5 Calculation of costs will be based on average hourly rate of security officer for minimum of 8 hours per day for late service request and of 4 hours for late cancellations.

1.8 BUILDING SMOKING ENVIRONMENT

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

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 Project Supplementary Conditions

1.2 CASH ALLOWANCES

.1 Include in Contract Price specified cash allowances.

.2 Cash allowances, unless otherwise specified, cover net cost to Contractor of services, products, construction machinery and equipment, freight, handling, unloading, storage, installation and other authorized expenses incurred in performing Work.

.3 Contract Price, and not cash allowance, includes Contractor's overhead and profit in connection with such cash allowance.

.4 Contract Price will be adjusted by written order to provide for excess or deficit to each cash allowance.

.5 Where costs under a cash allowance exceed amount of allowance, Contractor will be compensated for excess incurred and substantiated plus allowance for overhead and profit as set out in Contract Documents.

.6 Include progress payments on accounts of work authorized under cash allowances in Departmental Representatives monthly certificate for payment.

.7 Prepare schedule jointly with Departmental Representative to show when items called for under cash allowances must be authorized by Departmental Representative for ordering purposes so that progress of Work will not be delayed.

.8 Amount of allowance, for Work specified in respective Drawings and Specifications is as follows:

.1 Electrical

.1 Fence Detection System Temporary Removal and Reinstallation

.2 Cash Allowance: $10,000.00

1.3 NOT USED

.1 Not Used.

Part 2 Execution

2.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Schedule and administer Bi-Weekly project meetings throughout the progress of the work.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting four days in advance of meeting date to the Departmental Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.7 Reproduce and distribute copies of minutes within two days after meetings and transmit to meeting participants and, affected parties not in attendance.

.8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

.1 Within 7 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Departmental Representative, Consultant, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Departmental Representative to arrange and chair meeting. Agenda to include:

- .1 Appointment of official representative of participants in the Work.
- .2 Schedule of Work: in accordance with Section 01 32 16.07 – Construction Progress Schedule – Bar (GANTT) Chart.
- .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Requirements for temporary facilities, site sign, offices, storage, fences and utilities in accordance with Section 01 52 00 - Construction Facilities.
- .5 Site security in accordance with Section 01 35 13 Security Requirements.
- .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .7 Products provided by Department Representative.

.8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

.9 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.

.10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.

.11 Monthly progress claims, administrative procedures, photographs, hold backs.

.12 Appointment of inspection and testing agencies or firms.

.13 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

.1 During course of Work and two weeks prior to project completion, schedule progress meetings every two weeks.

.2 Contractor to provide meeting space and make arrangements for meetings.

.3 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.

.4 Notify parties minimum 7 days prior to meetings.

.5 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 2 days after meeting.

.6 Contractor to arrange and chair meeting. Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

.11 Review changes for affect on construction schedule and completion date.

.12 Shop drawing, RFI and CCN logs.

.13 Health and Safety.

.14 Other business.

END OF SECTION

Part 1 General

1.1 GENERAL

.1 Use a project management control system based Bar (GANTT) Chart technique.

.2 Schedule reviews by Departmental Representative shall not mean approval of detail inherent in schedule, responsibility for which lies with Contractor.

.3 Accept sole responsible for coordinating, scheduling of work, and the sequencing of work components and tasks.

1.2 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.3 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

.4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

.5 Notify Departmental Representative about long delivery materials and provide regular updates on the status.

1.4 ACTION AND INFORMATION SUBMITTALS

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

.2 Submit to Departmental Representative within 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

.3 Submit Project Schedule to Departmental Representative within 7 working days of receipt of acceptance of Master Plan.

1.5 PROJECT MILESTONES

.1 Project milestones form interim targets for Project Schedule include:

.1 Initial Detailed Inspection and Assessment;
.2 Shop Drawings / Work Plan;
.3 Site Mobilization;
.4 Demolition, Hoarding;
.5 Work;
.6 Interim Certificate (Substantial Completion) date;
.7 Final Certificate Completion.

1.6 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 Departmental Representative will review and return revised schedules within 7 working days.

.3 Revise impractical schedule and resubmit within 7 working days.

.4 Accepted revised schedule will become the Master Plan and be used as baseline for updates.

1.7 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule includes as a minimum milestone and activity types as follows:

- .1 Award.
- .2 Shop Drawings, Samples.
- .3 Permits.
- .4 Mobilization.
- .5 Selective Demolition
- .6 Interior Repairs.
- .7 Gun Port Installation and Related Work.
- .8 Testing and Commissioning.
- .9 Supplied equipment long delivery items.

1.8 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on bi-weekly basis reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

.3 Weekly Reports should include

- .1 Summary of weekly man hours spent the previous week, forecast of weekly man hours for the next week.
- .2 Schedule forecast on areas of work for the week coming up and any major activities. Identify escort requirements to department representative for scheduling.
- .3 Material section: report on deliveries, forecasted deliveries in the weeks coming up.
- .4 Progress of work that has been completed that last week.
- .5 Commissioning milestones
- .6 Deficient items.
- .7 Forecasted inspections.
- .8 RFI, SI, CCN, CO (forecasted or outstanding).
- .9 Any as-builts or pictures as required.

.4 Communicate daily any deviations from the weekly report.

1.9 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Not Used.

1.2 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are co-ordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.10 Keep one reviewed copy of each submission on site.

.11 Submittals shall be posted to Project Buzzsaw Directory and shall be organized and named by specification section.

.1 Naming convention shall be “Specification Number Shop Drawing Description_Date of Submission”.

.2 Once uploaded, a separate email notification indicating that the submission has been posted shall be sent from the contractor to the Departmental 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, in pdf format.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow 10 days for Departmental Representative review of each submission.

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

.6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.7 Accompany submissions with transmittal letter containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.8 Submissions include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to adjacent work.

.9 After Departmental Representative review, distribute copies.

.10 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.11 Submit electronic copies (pdf) of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit electronic copies (pdf) of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within 3 years of date of contract award for project.

.13 Submit electronic copies (pdf) of certificates for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit electronic copies (pdf) of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.17 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.18 Delete information not applicable to project.

.19 Supplement standard information to provide details applicable to project.

.20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, electronic copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.21 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that the Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

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

1.4 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative.

.3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 MOCK-UPS

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

1.6 PHOTOGRAPHIC DOCUMENTATION

.1 Contractor is required to photo document work areas prior and post completion of work.

.2 Submit electronic copy of colour digital photography in jpg format, fine resolution, monthly with progress statement and as directed by Departmental Representative.

.3 Project identification: name and number of project and date of exposure indicated.

.4 Viewpoints and their location as determined by Departmental Representative.

.5 Frequency of photographic documentation: every two weeks or as directed by Departmental Representative.

1.7 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

.2 Submit transcription of insurance immediately after award of Contract.

END OF SECTION

Part 1 General

1.1 PURPOSE

.1 To ensure that both the construction project and the institutional operations may proceed without undue disruption or hindrance and that the security of the Institution is maintained at all times.

1.2 DEFINITIONS

.1 "Contraband" means:

.1 An intoxicant, including alcoholic beverages, drugs and narcotics.

.2 Tobacco or associated tobacco products.

.3 Recreational Cannabis.

.4 An igniting device, lighter or matches.

.5 A weapon or a component thereof, ammunition for a weapon, and anything that is designed to kill, injure or disable a person or that is altered so as to be capable of killing, injuring or disabling a person, when possessed without prior authorization.

.6 An explosive or a bomb or a component thereof.

.7 currency over $25, when possessed by an inmate without prior authorization; and

.8 Any item not described in paragraphs 1.2.1.1 to 1.2.1.6 that could jeopardize the security of a Penitentiary or the safety of persons, when that item is possessed without prior authorization.

.2 "Unauthorized Smoking and related Items" means all smoking items including, but not limited to, cigarettes, cigars, tobacco, chewing tobacco, cigarette making machines, matches and lighters.

.3 "Commercial Vehicle" means any motor vehicle used for the shipment of material, equipment and tools required for the construction project.

.4 "CSC" means Correctional Service Canada.

.5 "Construction Employees" means persons working for the General Contractor, the sub-contractors, equipment operators, material suppliers, testing and inspection companies and regulatory agencies.

.6 "Departmental Representative" means the project manager from Public Works and Government Services Canada.

.7 "Perimeter" means the fenced or walled area of the Institution that restrains the movement of the inmates.

.8 "Construction Limits" means the Work Area as shown on the contract drawings that the Contractor will be allowed to work. This Work Area may or may not be isolated from the security area of the Institution.

.1 The Contractor is responsible for the safety and security of the Work Area.

.2 The Contractor shall be expected to cooperate with the Institutional personnel in ensuring that security requirements are observed within the Work Area.

.3 Contractors and their employees shall be confined to their Work Area. All other buildings and grounds shall be considered “Out of Bounds”. Contractor’s movement outside of the Work Area shall be escorted by an officer of CSC.

.4 Contractors and their employees shall not contact or attempt to contact or deal in any way with inmates.

1.3 PRELIMINARY PROCEEDINGS

.1 Prior to the commencement of work, the Contractor shall meet with the Departmental Representative or his/her representative to:

.1 Discuss the nature and extent of all activities involved in the Project.

.2 Establish mutually acceptable security procedures in accordance with this instruction and the institution's particular requirements.

.2 Contractor shall:

.1 Ensure that all Construction Employees are aware of the rules of the institution.

.2 Ensure that a copy of the institutional rules is always prominently on display at the job site.

.3 Co-operate with institutional personnel in ensuring that the rules of the institution are observed by all Construction Employees.

1.4 CONSTRUCTION EMPLOYEES

.1 Entry to Institutional Property will be refused to any person there may be reason to believe may be a security risk.

.2 Any person employed on the construction site will be subject to immediate removal from Institutional Property if they:

.1 Appear to be under the influence of alcohol, drugs or narcotics.

.2 Behave in an unusual or disorderly manner.

.3 Are in possession of contraband.

1.5 VEHICLES

.1 All unattended vehicles on CSC property shall have windows closed; doors and trunks shall be locked and keys removed. The keys shall be securely in the possession of the owner or an employee of the company that owns the vehicle.

.1 Failure to comply with the above will result in an immediate shutdown of the job site and stoppage of work for an indefinite period of time at the Contractor’s expense.

.2 The Departmental Representative may limit at any time the number and type of vehicles allowed within the Institution.

.1 No private vehicles allowed within the Institution’s security wall or fence without special permission of the Departmental Representative or designate.

.3 Drivers of delivery vehicles for material required by the project shall require security clearances and must remain with their vehicle the entire time that the vehicle is in the

institution. The director may require that these vehicles be escorted by institutional staff or Commissionaires while in the institution.

.4 If the Departmental Representative permits trailers to be left inside the secure perimeter of the Institution, these trailer doors will be locked at all times. All windows will be securely locked when left unoccupied. All trailer windows shall be covered with expanded metal mesh. All storage trailers inside and outside the perimeter shall be locked when not in use.

1.6 PARKING

.1 The parking area(s) to be used by construction employees will be designated by the Departmental Representative. Parking in other locations will be prohibited and vehicles may be subject to removal.

1.7 SHIPMENTS

.1 All shipments of project material, equipment and tools shall be addressed in the Contractor's name to avoid confusion with the Institution's own shipments. The Contractor must have his/her own employees on site to receive any deliveries or shipments. CSC staff will NOT accept receipt of deliveries or shipments of any material, equipment or tools.

.2 Contractor shall receive and offload all deliveries outside of the security gate. Only after a delivery has been offloaded and received outside of the security gate, may it be brought inside the security fence, for use on the job site.

.3 Security provisions for all tools, assets, equipment & material located in the contractor laydown shall be the responsibility of the contractor.

1.8 TELEPHONES

.1 There will be no installation of telephones, Facsimile machines and computers with Internet connections permitted within the perimeter of the institution unless prior approval of the Departmental Representative is received.

.2 The Departmental Representative will ensure that approved telephones, Facsimile machine and computers with Internet connections are located where they are not accessible to inmates. All computers will have an approved password protection that will stop an Internet connection to unauthorized personnel.

.3 Wireless cellular and digital telephones, including but not limited to devices for telephone messaging, pagers, smartphones, telephone used as two-way radios, are not permitted within the perimeter of the institution unless approved by the Departmental Representative. If wireless cellular telephones are permitted, the user will not permit their use by any inmate. Cellular telephones approved by the Departmental Representative must be signed in and out of the institution.

.4 The Departmental Representative may approve and limit the use of two-way radios.

1.9 WORK HOURS

.1 Work hours within the institution are: 8:00am to 4:00 pm, Monday to Friday.

1.10 OVERTIME WORK

.1 Workers can work during the weekend outside of the building for longer hours subject to approval from the Departmental Representative.

.2 Give a minimum twenty-four (24) hours advance notice when overtime work on the construction project is necessary and approved.

.3 When overtime work, weekend, or statutory holiday work is required and approved by the Departmental Representative, extra staff members may be posted by the Departmental Representative or designate, to maintain the security surveillance. The actual cost of this extra staff may be attributed to the contractor.

1.11 TOOLS AND EQUIPMENT

.1 Tools brought in need to be counted every day and workers need to have a security briefing upon their initial arrival.

.2 Maintain a complete list of all tools and equipment to be used during the construction project. Make this inventory available for inspection when required.

.3 Throughout the construction project maintain up-to-date the list of tools and equipment specified above.

.4 Keep all tools and equipment under constant supervision, particularly power-driven and cartridge-driven tools, cartridges, files, saw blades, rod saws, wire, rope, ladders and any sort of jacking device.

.5 Store all tools and equipment in approved secure locations.

.6 Lock all tool boxes when not in use. Keys to remain in the possession of the employees of the Contractor.

.7 All missing or lost tools or equipment shall be reported immediately to the Departmental Representative or designate.

.8 The Departmental Representative shall ensure that the security staff members carry out checks of the Contractor's tools and equipment against the list provided by the Contractor. These checks may be carried out at the following intervals:

.1 At the beginning and conclusion of every construction project.

.2 Weekly, when the construction project extends longer than a one week period.

.3 The Contractor may be subject to random checks by security staff to ensure proper storage and security of tools throughout the project.

.9 Certain tools/equipment such as cartridges and hacksaw blades are highly controlled items. The contractor will be given at the beginning of the day, a quantity that will permit one day's work. Used blades/cartridges will be returned to the Departmental Representative at the end of each day. The use of explosive-actuated tools is prohibited

on site unless otherwise approved by the Departmental Representative. All broken blades and tools must be accounted for and broken tools are not to be thrown away. Particular attention must be given to power driven tools, files, saw blades, rod saws, wire, rope and ladders. Tool kits must be locked when the area is unattended.

.10 If propane or natural gas is used for heating the construction, the Institution will require that an employee of the Contractor supervise the construction site during non-working hours.

.11 If torches or grinders are required tools to perform Work, Contractor shall complete a Hot Work Permit as supplied by CSC. Completed original form(s) are copied and posted on the work site in a conspicuous location. Original documents are to remain with the Institutional Fire Chief.

.12 Prior to the mobilization of the job box to the project, the following procedure is to be followed:

- .1 Name of responsible foreman/field supervisor for the job box
- .2 Provide a list of tools that will be inside the job box
  - .1 This list must be signed off by the Departmental Representative
- .3 No tools can be added to the job box without a formal revision to the tools list
- .4 For job box, each tool is to have a number affixed to it (unless unsafe to do so and risks damaging the tool thus rendering it unsafe to use), to facilitate the tool inventory.

.13 A laminated tool list or paper copy should be kept with the job box at all times

1.12 PRESCRIPTION DRUGS

.1 Employees of the Contractor who are required to take prescription drugs during the workday shall obtain approval of the Departmental Representative to bring a one day supply only into the Institution.

1.13 SMOKING RESTRICTIONS

.1 Contractors and construction employees are not permitted to smoke inside correctional facilities or outdoors within the perimeter of a correctional facility and must not possess unauthorized smoking items within the perimeter of a correctional facility.

.2 Contractors and construction employees who are in violation of this policy will be requested to immediately cease smoking or dispose of any unauthorized smoking items and, if they persist, will be directed to leave the institution.

.3 Smoking is only permitted outside the perimeter of a correctional facility in an area to be designated by the Departmental Representative.

1.14 CONTRABAND

.1 Weapons, ammunition, explosives, alcoholic beverages, recreational cannabis, drugs and narcotics are prohibited on Institutional Property.

.2 Discovery of Contraband on the construction site and the identification of the person(s) responsible for the Contraband shall be reported immediately to the Departmental Representative.

.3 Contractors shall be vigilant with both their staff and the staff of their sub-contractors and suppliers that the discovery of Contraband may result in removal of the affected employee from the Institution. Serious infractions may result in the removal of the company from the Institution for the duration of the construction.

.4 Presence of arms and ammunition in vehicles of Contractors, sub-contractors and suppliers or employees of these will result in the immediate removal from the Institution of the driver of the vehicle.

.5 Contractor is responsible for ensuring that all persons employed directly or indirectly upon the project are familiar with Correctional and Conditional Release Act section 45. Summary Convictions as follows:

.6 CCRA Summary Conviction Offences 45**.** Every person commits a summary conviction offence who:

.1 Is in possession of contraband beyond the visitor control point in a penitentiary;

.2 Is in possession of anything referred to in paragraph (b) or (c) of the definition "contraband" in section 2 before the visitor control point at a penitentiary;

.3 Delivers contraband to, or receives contraband from, an inmate;

.4 Without prior authorization, delivers jewelry to, or receives jewelry from, an inmate; or

.5 Trespasses at a penitentiary.

.7 Refer to CSC Policy Document regarding the use of Cannabis on site.

1.15 SEARCHES

.1 All vehicles and persons entering Institutional property may be subject to search.

.2 When the Departmental Representative suspects, on reasonable grounds, that an employee of the Contractor is in possession of Contraband or unauthorized items, he/she may order that person to be searched under, Correctional Conditional Release Regulations Section 42.1 Contraband, Sections 43-46, 54.1-2, 55.1 Search and Seizure and Section 57 Seizure, Commissioner's Directives 566-8 section 9-16.

.3 All employees entering the Institution may be subject to screening of personal effects for traces of Contraband drug residue.

1.16 ACCESS TO AND REMOVAL FROM INSTITUTIONAL PROPERTY

.1 Construction personnel and commercial vehicles will not be admitted to the Institution after normal working hours, unless approved by the Departmental Representative.

1.17 MOVEMENT OF VEHICLES

.1 Escorted commercial vehicles will be allowed to enter or leave the institution through the vehicle access gate during the following hours:

.1 8:00 a.m. to 4:00 p.m., Monday to Friday with the following exception:

.1 Vehicles cannot access the sally port from 12:00 p.m. to 1:00 p.m. and 4:30 p.m. to 5:30 p.m.

.2 The Contractor shall advise the Departmental Representative twenty-four (24) hours in advance to the arrival on-site of heavy equipment such as concrete trucks, cranes, etc.

.3 Vehicles being loaded with soil or other debris, or any vehicle considered impossible to search, must be under continuous supervision by CSC staff or Commissionaires working under the authority of the Departmental Representative.

.4 Commercial vehicles will only be allowed access to institutional property when their contents are certified by the Contractor or his representative as being strictly necessary to the execution of the construction project.

.5 Vehicles shall be refused access to institutional property if, in the opinion of the Departmental Representative, they contain any article which may jeopardize the security of the institution.

.6 Private vehicles of construction employees will not be allowed within the security perimeter of medium or maximum security institutions without the authorization of the Departmental Representative. Contractor's employees will park their vehicles in an area outside the perimeter of the institution.

.7 With the approval of the Departmental Representative, certain equipment may be permitted to remain on the construction site overnight or over the weekend. This equipment must be securely locked, with the battery removed. The Departmental Representative may require that the equipment be secured with a chain and padlock to another fixed object.

1.18 MOVEMENT OF CONSTRUCTION EMPLOYEES ON INSTITUTIONAL PROPERTY

.1 Subject to the requirements of good security, the Departmental Representative will permit the Contractor and his/her employees as much freedom of action and movement as is possible.

.2 However, notwithstanding paragraph above, the Departmental Representative may prohibit or restrict access to any part of the Institution.

.3 The Departmental Representative will also require the following:

.1 Workers need to be escorted by Correctional Officers while working inside of the building.

.2 Workers need to be escorted by commissionaires while working outside of the building.

.4 During the lunch and coffee/health breaks, all employees will remain within the construction site. Employees are not permitted to eat in the officer's lounge and dining room.

1.19 SURVEILLANCE AND INPSECTION

.1 Construction activities and all related movement of personnel and vehicles shall be subject to surveillance and inspection by CSC security staff members to ensure that established security requirements are met.

.2 CSC staff members shall ensure that an understanding of the need to carry out surveillance and inspections, as specified above, is established among Construction Employees and maintained throughout the construction project.

1.20 STOPPAGE OF WORK

.1 The Departmental Representative may order at any time that the contractor, his employees, sub-contractors and their employees to not enter or to leave the work site immediately due to a security situation occurring within the institution. The contractor's site supervisor shall note the name of the CSC staff member giving this instruction, the time of the request and obey the order as quickly as possible.

.2 The contractor shall advise the Departmental Representative of this interruption of the work within 24 hours.

1.21 CONTACT WITH INMATES

.1 Unless specifically authorized, it is forbidden to come into contact with inmates, to talk with them, to receive objects from them or to give them objects. Any construction employee doing any of the above without permission will be removed from the site and his/her security clearance revoked.

.2 It is to be noted that cameras are not allowed on CSC property except if required for photographic history of the project. In this case, the contractor will be asked to use a designated memory card for the project.

.3 Notwithstanding the above paragraph, if the Departmental Representative approves of the usage of cameras, it is strictly forbidden to take pictures of inmates, of CSC staff members or of any part of the Institution other than those required as part of this Contract.

1.22 TEMPORARY FENCES

.1 Temporary fencing should be assumed as necessary around work area unless otherwise told by the Departmental Representative.

.2 Refer to Section 01 50 00 - Temporary Barriers and Enclosures for other temporary fence requirements.

1.23 COMPLETION OF CONSTRUCTION PROJECT

.1 Upon completion of the construction project or, when applicable, the takeover of a facility, the Contractor shall remove all remaining construction material, tools and equipment that are not specified to remain in the Institution as part of the construction contract.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 Province of Alberta Occupational Health and Safety Act, R.S.A. – January 2016 or latest Edition.

1.2 SUBMITTALS

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

.2 Submit site-specific Health and Safety Plan: Within 14 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site-specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.3 Submit electronic copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly.

.4 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.

.5 Submit copies of incident and accident reports.

.6 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 7 days after receipt of comments from Departmental Representative.

.7 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.8 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

.9 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 FILING OF NOTICE

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

.2 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project.

1.4 SAFETY ASSESSMENT

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

1.5 MEETINGS

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

1.6 REGULATORY REQUIREMENTS

.1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

1.7 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.8 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.9 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta Reg.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.10 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.11 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:

.1 Have working knowledge of occupational safety and health regulations.

.2 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.3 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.4 Be on site during execution of Work.

1.12 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative.

1.13 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.14 BLASTING

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

1.15 POWDER ACTUATED DEVICES

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

1.16 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832/R-92-005, Storm Water Management for Construction Activities, Chapter 3.

.2 EPA General Construction Permit (GCP).

.2 Canada Federal Halocarbon Regulations, 2003

.3 Canadian Correctional Service Canada

.1 Internal Service Directive 318-4 – Environmental Management of Halocarbons

.4 Environment Canada (EC)

.1 Environmental Code of Practice for the Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems. (2015)

1.2 DEFINITIONS:

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.3 Prior to commencing construction activities or delivery of materials to site, provide Environmental Protection Plan for review and approval by the Departmental Representative.

.4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

.5 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.6 Include in Environmental Protection Plan:

.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.

.2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.

.3 Names and qualifications of persons responsible for training site personnel.

.4 Descriptions of environmental protection personnel training program.

.5 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.

.1 Ensure plan includes measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.

.6 Spill Control Plan including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.7 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.8 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.9 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.10 Wastewater Management Plan identifying methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

1.4 FIRES

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

1.5 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this Contract.

.2 Control emissions from equipment and plant to local authorities' emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.

.1 Provide temporary enclosures where indicated directed by Departmental Representative.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.6 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

.2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.1 Do not take action until after receipt of written approval by Departmental Representative.

.3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Execution

2.1 CLEANING

.1 Clean in accordance with Section 01 74 11 – Cleaning.

.1 Leave Work area clean at end of each day to the Satisfaction of the Departmental Representative.

.2 Bury rubbish and waste materials on site where directed after receipt of written approval from Departmental Representative.

.3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

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

.5 Waste Management: separate waste materials for recycling/reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) 2015 including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Specific design and performance requirements listed in the specifications or indicated on the Drawings may exceed the minimum requirements established by the referenced Building Code; these requirements will govern over the minimum requirements listed in the Building Code

.1 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative immediately.

.2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Departmental Representative immediately.

.3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Departmental Representative immediately.

1.3 BUILDING SMOKING ENVIRONMENT

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

.2 Smoking and vaping are not permitted anywhere in the building.

1.4 QUALITY ASSURANCE

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

.1 Regulatory requirements and fees in force on date of Bid submission; and

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

2.2 EASEMENTS AND NOTICES

.1 Constructor shall give notices required by regulatory requirements.

2.3 PERMITS

.1 Building Permit:

.1 Constructor shall apply for, obtain and pay for building permit on behalf of Department Representative, and other permits required for Work and its various parts.

.2 Constructor will require that specific Subcontractor's obtain and pay for permits required by authorities having jurisdiction, where their Work is affected by Work requiring permits.

.3 Constructor will display building permit and other permits in a conspicuous location at Place of Work.

END OF SECTION

Part 1 General

1.1 INSPECTION

.1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.2 INDEPENDENT INSPECTION AGENCIES

.1 The General Contractor to engage independent Inspection/Testing Agencies for purpose of inspecting and/or testing portions of Work as indicated in the respective technical specification sections. Cost of such services will be borne by the General Contractor.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the Departmental Representative at no cost to Departmental Representative. Pay costs for re-testing and re-inspection.

.5 All material testing required to meet specifications is Quality Control (QC) testing to be conducted by a certified material testing laboratory engaged and paid by the contractor. Deparmental representative may engage independent material testing laboratory for random Quality Assurance (QA) testing and will pay for the cost of such testing.

1.3 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.4 PROCEDURES

.1 Submit quality control procedures, forms and reports to Department Representatives.

.2 Notify appropriate agency Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

.3 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.4 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents. Provide photographs of all corrected work.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Departmental Representative, it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by the Departmental Representative.

1.6 REPORTS

.1 Submit electronic copy of inspection and test reports to Departmental Representative.

.2 Provide copies to subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

1.7 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs for concrete piles, concrete grade beams and road grade asphalt. Refer also to Structural for testing and mix design requirements.

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

1.8 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.

.2 Construct in locations acceptable to Departmental Representative.

.3 Prepare mock-ups for Departmental Representative review with reasonable promptness and in orderly sequence, to not cause delays in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 If requested, Departmental Representative] will assist in preparing schedule fixing dates for preparation.

.6 Mock-ups may remain as part of Work.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

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

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.3 DEWATERING

.1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.4 WATER SUPPLY

.1 Water service throughout the building must be maintained operational throughout the day. All interruptions to water service must be coordinated with the Departmental Representative and should be limited to evenings as required by the facilities.

.2 If the contractor seeks to use the existing water infrastructure on site for their own use, and this does not interrupt or jeopardize institutional operations, contractor may use their own means to tie-into existing water infrastructure and the contractor will not be charged for the use. Contractor to return modified infrastructure to its original condition before project completion.

.3 Any temporary use of institutional infrastructure must be approved by the Departmental Representative before use and can be disallowed at any time for any reason, even after approval is given. All temporary infrastructure connections must be removed at the end of the project; brought back to its original condition.

1.5 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of Work.

.2 Protect Work and products against dampness and cold.

.3 Prevent moisture condensation on surfaces.

.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for safe working environment.

.4 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.

.5 Ventilating:

.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.

.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.

.3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.

.4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.

.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.6 Permanent heating system of building, not to be used when available.

.7 Maintain strict supervision of operation of temporary heating and ventilating equipment to:

.1 Conform with applicable codes and standards.

.2 Enforce safe practices.

.3 Prevent abuse of services.

.4 Prevent damage to finishes.

.5 Vent direct-fired combustion units to outside.

.8 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.6 TEMPORARY POWER AND LIGHT

.1 Departmental Representative will provide temporary power within the institution during construction for temporary lighting and operating of power tools.

.2 Any additional temp power and light is the responsibility of the contractor. If the contractor seeks to use the departmental representative`s existing electrical infrastructure on site for their own use, and this does not interrupt or jeopardize institutional operations, contractor may use their own means to tie-into departmental representatives existing electrical infrastructure and the contractor will not be charged extra for this power use.

.3 Any temporary use of institutional electrical infrastructure must be approved by the Departmental Representative before use and can be disallowed at any time for any reason, even after approval is given. All temporary electrical infrastructure additions must be removed at the end of the project; brought back to its original condition.

.4 Existing lighting may be used during construction but if lighting levels are not adequate, contractor to provide and pay for temporary lighting.

.5 Provide and maintain temporary lighting throughout project. Ensure level of illumination in affected area is not less than 162 lx.

1.7 TEMPORARY COMMUNICATION FACILITIES

.1 If required, provide and pay for temporary telephone, fax, data hook up, lines and/or equipment necessary for own use. Costs to also include installation, maintenance and removal.

.2 The Contractor shall obtain approval from the Departmental Representative for the installation of internet connection. See 01 35 13, 1.8 Telephone.

1.8 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.

.2 CAN/CSA-Z321-[96(R2001)] , Signs and Symbols for the Occupational Environment.

.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 SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

.1 CSC will provide a designated site outside the perimeter fence for contractor use. Contractor to prepare site plan indicating location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation. Contractor will be responsible for hauling all material and equipment from this area to the project work area.

.2 Indicate use of supplemental or other staging area.

.3 Provide construction facilities in order to execute work expeditiously.

.4 Remove from site all such work after use.

1.4 HOISTING

.1 Provide, operate and maintain hoists required for moving materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.

.2 Hoists cranes to be operated by qualified operator.

1.5 ELEVATORS

.1 Elevators are NOT available nor required on this project.

1.6 SITE STORAGE/LOADING

.1 Material storage shall be limited to the General Contractor’s Work Area.

.2 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

.3 Do not load or permit to load any part of Work with weight or force that will endanger Work.

.4 Contractor laydown location To Be Determined.

1.7 CONSTRUCTION PARKING

.1 Refer to Section 01 35 13 – Security Requirements.

1.8 OFFICES

.1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table in location approved by CSC Bowden.

.2 Provide marked and fully stocked first-aid case in a readily available location.

.3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

1.9 SECURITY

.1 Refer to Section 01 35 13 – Special Project Procedures for CSC Security Requirements for security requirements.

1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials. Refer to Section 01 35 13 – Special Project Procedures for CSC Security Requirements for storage facility requirements for tools and equipment.

.2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.11 SANITARY FACILITIES

.1 The Contractor to provide sanitary facilities within the designated fence area outside of perimeter gate.

.1 Contractor must keep facilities in clean working condition.

1.12 CONSTRUCTION SIGNAGE

.1 No construction advertisement signs, other than health and safety, warning and instructional signs, are permitted on site.

.2 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.

.3 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.13 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and temporary relocated roads as necessary to maintain traffic.

.2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.

.3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs.

.4 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.5 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.6 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.7 Dust control: adequate to ensure safe operation at all times.

1.14 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

END OF SECTION

Part 1 General

1.1 GENERAL

.1 Enclose and shelter the work areas as required to protect the existing building, the existing building components, building occupants and contents, as well as the work in progress from damage.

1.2 REFERENCE STANDARDS

.1 Correctional Services Canada (CSC) Technical Criteria for Correctional Institutions Section SP -SITE.

1.3 DEFINITIONS

.1 Fence Type 2: Fence is used in restricted and highly controlled inmate areas such as where routine vehicle movement takes place for deliveries at medium and higher level institutions and therefore where breach concerns should not be elevated. This fence therefore serves to prevent unauthorized access for similar reasons as above and as such the fence type is also as above. Construction truck traffic is via the main entrance vehicle Sally port where it is inspected for contraband. Type 2 Fence shall also be used where construction duration is short term as for a repair of replacement of existing systems or where the work site shifts by phase from building to building. The institution in this case will schedule inmate movement and activities so as to mitigate risk of breach. Truck traffic to the site will be escorted from the main entrance.

1.4 INSTALLATION AND REMOVAL

.1 Provide temporary measures in order to execute Work expeditiously and prevent damage to the work and/to to the Building.

.2 Remove from site all such work after use.

1.5 GUARD RAILS AND BARRICADES

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

.2 Provide as required by governing authorities.

1.6 TEMPORARY FENCING

.1 Performance Criteria:

.1 This fence shall be a self-supporting welded mesh sectional fence typically available by rental (‘Modu-loc’ or similar).

.2 The height of the fence shall be 2400mm.

.3 This fence must not come in contact with the perimeter fence nor be closer than 12m to the perimeter fence so as not to interfere with PIDS camera viewing on the interior side of the institution

.4 The temporary construction fence shall be removed from the institution gy the contractor after construction is completed.

1.7 DUST TIGHT SCREENS

.1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers and finished areas of Work.

.2 Maintain and relocate protection until such work is complete.

1.8 ACCESS TO SITE

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

1.9 PUBLIC TRAFFIC FLOW

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

1.10 FIRE ROUTES

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

1.11 EXIT ROUTES

.1 Maintain access to exit for use by occupants and workers during construction.

1.12 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.13 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Departmental Representative locations and installation schedule prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

1.14 WASTE MANAGEMENT AND DISPOSAL

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards.

.2 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves the right to have such products or systems tested to prove or disprove conformance.

.4 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.2 QUALITY

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Should disputes arise as to quality or fitness of products, decision rests strictly with the Departmental Representative based upon requirements of Contract Documents.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 AVAILABILITY

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

1.4 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

.9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

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

1.6 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with the Departmental Representative, whose decision is final.

1.8 CO-ORDINATION

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.9 CONCEALMENT

.1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.10 REMEDIAL WORK

.1 Refer to Section 01 73 00 – Execution Requirements.

.2 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.

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

1.11 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

.7 Fasteners in inmate accessible areas must have tamper resistant fastenings

1.12 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service as indicated on drawings.

1.13 PROTECTION OF WORK IN PROGRESS

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

1.14 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.

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

END OF SECTION

Part 1 General

1.1 QUALIFICATIONS OF SURVEYOR

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

1.2 SURVEY REFERENCE POINTS

.1 Existing base horizontal and vertical control points are designated on drawings.

.2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.3 Make no changes or relocations without prior written notice to Departmental Representative.

.4 Report to Departmental Representative when reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.

.5 Require surveyor to replace control points in accordance with original survey control.

1.3 SURVEY REQUIREMENTS

.1 Establish two permanent benchmarks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents. Construction Layout and as-built survey is contractors' responsibility. Contractor to provide as-built drawings in AutoCAD format.

.2 Establish lines and levels, locate and lay out, by instrumentation.

.3 Stake batter boards for foundations.

.4 Establish foundation pile locations and ground elevations.

1.4 EXISTING SERVICES

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

1.5 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Departmental Representative of impending installation and obtain approval for actual location.

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

1.6 RECORDS

.1 Maintain a complete, accurate log of control and survey work as it progresses.

.2 Record locations of maintained, re-routed and abandoned service lines

END OF SECTION

Part 1 General

1.1 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 Department Representative or separate contractor.

.3 Include in request:

- .1 Identification of project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Department Representative or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.

1.2 MATERIALS

.1 Required for original installation.

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

.3 Match existing style and color and finishes for flashings and trim work where practical.

1.3 PREPARATION

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

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas to be exposed by uncovering work; maintain excavations free of water.

.6 Contractor must protect existing equipment in operation from dust/debris/or-other-incidental- damage resulting from construction activities, including newly commissioned units in operation and equipment/material on site but not yet installed

1.4 EXECUTION

.1 Execute cutting, fitting, and patching to complete Work.

.2 Fit several parts together, to integrate with other Work.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

.1 Provide temporary secure closures to openings in secure walls.

.6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.7 Employ manufacturer authorized 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 Contract Documents requirements.

.10 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

1.5 WASTE MANAGEMENT AND DISPOSAL

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

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.

.3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.4 Provide on-site containers for collection of waste materials and debris. Containers to be secured and locked at all times when not in use.

.5 Work areas must be cleaned to the satisfaction of the Departmental Representative at the end of each work day. Remove waste material and debris from site and deposit in waste container at end of each working day.

.6 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.7 Dispose of waste materials and debris off site.

.8 Clean interior areas prior to start of finishing work and maintain areas free of dust and other contaminants during finishing operations.

.9 Store volatile waste in covered metal containers and remove from premises at end of each working day.

.10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

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

.12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove 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 waste products and debris to the Satisfaction of the Departmental Representative.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors and ceilings.

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

.9 Clean lighting reflectors, lenses, and other lighting surfaces.

.10 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.11 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds affected by the Work.

.12 Remove dirt and other disfiguration from exterior surfaces.

.13 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

.14 Clean and sweep roofs, areaways and clean drainage system.

.15 Sweep and wash clean paved areas affected by the Work.

.16 Remove snow and ice from access to building affected by the Work.

END OF SECTION

Part 1 General

1.1 WASTE MANAGEMENT GOALS

.1 Canadian Construction Association (CCA)

.1 CCA 81-2001: A Best Practices Guide to Solid Waste Reduction.

.2 Public Works and Government Services Canada (PSPC)

.1 2002 National Construction, Renovation and Demolition Non-Hazardous Solid

.3 Prior to start of Work conduct meeting with Departmental Representative to review and discuss waste management goals.

1.2 DEFINITIONS

.1 Approved/Authorized recycling facility: waste recycler approved by applicable provincial authority or other users of material for recycling approved by the Departmental Representative.

.2 Class III: non-hazardous waste - construction renovation and demolition waste.

.3 Construction, Renovation and/or Demolition (CRD) Waste: Class III solid, non-hazardous waste materials generated during construction, demolition, and/or renovation activities

.4 Inert Fill: inert waste - exclusively asphalt and concrete.

.5 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

.6 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.7 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.8 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

.2 Returning reusable items including pallets or unused products to vendors.

.9 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.10 Separate Condition: refers to waste sorted into individual types.

.11 Source Separation: act of keeping different types of waste materials separate beginning rom the point they became waste.

1.3 USE OF SITE AND FACILITIES

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

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

1.4 WASTE PROCESSING SITES

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

.2 Province of: Alberta

.1 Name: Alberta Environment Construction, Renovation and Demolition Waste Reduction Recycling Branch Phone: (780) 427-6982 or 1-800-463-6326

1.5 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.

.2 Unless specified otherwise, materials for removal become Contractor's property.

.3 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

.4 Protect structural components not removed for demolition from movement or damage.

.5 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.

.6 Protect surface drainage, mechanical and electrical from damage and blockage.

.7 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials. Containers to be secured and locked at all times when not in use.

.8 Separate & store materials produced during dismantling of structures in designated areas.

.9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.

.1 On-site source separation is recommended.

.2 Remove co-mingled materials to off-site processing facility for separation.

.3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.

.4 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.

1.6 DISPOSAL OF WASTE

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner into waterways, storm, or sanitary sewers.

.3 Keep records of construction waste including:

.1 Number and size of bins.

.2 Waste type of each bin.

.3 Total tonnage generated.

.4 Tonnage reused or recycled.

.5 Reused or recycled waste destination.

.4 Remove materials on-site as Work progresses.

.5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.7 USE OF SITE FACILITIES

.1 Execute Work with least possible interference or disturbance to normal use of premises.

1.8 SCHEDULING

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

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 Contractor's Inspection: Contractor and subcontractors: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.

.2 Request Departmental Representative inspection.

.2 Departmental Representative Inspection:

.1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.

.2 Contractor to correct Work as directed.

.3 Completion Tasks: submit certificates that tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Equipment and systems have been tested, adjusted and are fully operational.

.4 Operation of systems: Training to Departmental Representative's personnel.

.5 Work: complete and ready for final inspection.

.1 Completion must be signed off by two Authorized Department Representatives.

.4 Final Inspection:

1. When items noted above are completed, request final inspection of Work by Departmental Representative, and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.

.6 Commencement of Warranty Periods: date of Departmental Representative 's acceptance of submitted declaration of Substantial Performance to be dated for commencement for warranty period.

.7 Final Payment:

.1 When Departmental Representative consider final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.2 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.3 Copy will be returned with Departmental Representative’s comments.

.4 Revise content of documents as required prior to final submittal

.5 Provide spare parts, maintenance materials and special tools that are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.6 Provide evidence, if requested, for type, source and quality of products supplied.

.7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.8 Pay costs of transportation.

1.2 ELECTRONIC SUBMITTALS

.1 Submit number of hard copies specified for each type and format of submittal and in also submit in electronic format as pdf files and also in MS Word, Excel, Project as may be appropriate and in Autocad DWG files all on CD R/W or USB.

1.3 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings.

.1 Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by component under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab.

.1 Bind in with text; fold larger drawings to size of text pages.

.2 Provide drawings in pdf and dwg formats.

1.4 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Label CD/DVD, binders “CSC Bowden Sally Port Gate Replacement”. Include name of Contractor and date of submission.

.2 Table of Contents for Each Volume: provide title of project;

.1 Date of submission; names.

.2 Addresses, and telephone numbers of Consultants, Contractor, Sub-contractors and material suppliers with name of responsible parties.

.3 Schedule of products and systems, indexed to content of volume.

.4 Bookmark electronic copies of Project Record Documents with digital bookmarks.

.3 Organize files into National Master Specification format (current edition) numbering system. Ensure all content is clearly legible.

.4 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.5 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.6 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.1 Provide typewritten text as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

.7 Submit copies of executed guarantees and bonds.

.8 Submit copies of approved shop drawings.

.9 Submit copies of all Consultant Field Reports and all material and product Field Test Reports.

.10 Training: refer to Section 01 79 00 - Demonstration and Training.

1.5 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative, one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field Test Report, System Components List c/w Commissioning Verification Forms and Check Sheets and Commissioning Issues/Resolution Log.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction.

.1 Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.

.1 Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition.

.1 Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Departmental Representative.

.6 Departmental Representative may furnish additional drawings and specifications to clarify Work.

.1 Such documents become part of Contract Document.

.2 Include such documents in As Built submission.

.7 Submit to Departmental Representative one copy of drawings and specifications for review prior to final submission.

1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on a full-sized copy of the contract drawings on set of black line opaque drawings, and in copy of Project Manual.

.2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress.

.1 Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:

.1 Field changes of dimension and detail.

.2 Changes made by change orders.

.3 Details not on original Contract Drawings.

.4 Referenced Standards to related shop drawings and modifications.

.5 Provide dwg files for all modified shop drawings to show as-fabricated/constructed conditions.

.5 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

.7 Provide digital photos, if requested, for site records.

1.7 MATERIALS AND FINISHES

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional requirements: as specified in individual specifications sections.

1.8 MAINTENANCE MATERIALS

.1 Spare Parts:

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to location as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to Departmental Representative.

.2 Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

.2 Extra Stock Materials:

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to location as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to Departmental Representative.

.2 Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

.3 Special Tools:

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to location as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to Departmental Representative.

.2 Include approved listings in Maintenance Manual.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and for review by Departmental Representative.

1.10 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.1 Contractor shall respond to maintenance issues within 3 hours of notification.

.2 Submit Manufacturer’s warranty certificate indicating warranty coverage for a period of 12 months following Substantial Completion as certified by Departmental Representative.

.3 Verify that documents are in proper form, contain full information and are notarized.

.4 Respond in timely manner to oral or written notification of required construction warranty repair work.

.5 Develop warranty management plan to contain information relevant to Warranties Manufacturers’ Guarantees and Bonds.

.6 Submit warranty management plan, 60 days before planned pre-warranty conference, to Departmental Representative approval.

.1 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.

.2 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.7 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.

.8 Assemble approved information in binder and submit upon acceptance of work. Organize binder as follows:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties, manufacturers' guarantees and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within 10 days after completion of applicable item of work.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittal.

.9 Except for items put into use with Department Representative's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.10 Conduct joint 4 month and 9 month warranty inspection, measured from time of acceptance, by Departmental Representative.

.11 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Listing and status of delivery of Certificates of Warranty for extended warranty items.

.12 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected for various warranted equipment.

.13 Contractor's plans for attendance at various required post-construction warranty inspections.

.14 Procedure and status of tagging of equipment covered by extended warranties.

.15 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.13 Respond in a timely manner to oral or written notification of required construction warranty repair work.

.14 Written verification to follow oral instructions.

.1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.11 PRE-WARRANTY CONFERENCE

.1 Meet with Departmental Representative, to develop understanding of requirements of this section. Schedule meeting prior to contract completion, and at time designated by Departmental Representative.

.2 Departmental Representative will establish communication procedures for:

.1 Notification of construction warranty defects.

.2 Determine priorities for type of defect.

.3 Determine reasonable time for response.

.3 Provide name, telephone number and address of licensed and bonded company that is authorized to initiate and pursue construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Demonstrate operation and maintenance of equipment and systems to Departmental Representative two weeks prior to date of substantial completion.

.2 The Departmental Representative will provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.

.3 Preparation:

- .1 Verify conditions for demonstration and instructions comply with requirements.
- .2 Verify designated personnel are present.
- .3 Ensure testing, adjusting, and balancing has been performed and equipment and systems are fully operational.

.4 Demonstration and Instructions:

- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times and location.
- .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
- .3 Review contents of manual in detail to explain aspects of operation & maintenance.
- .4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Departmental Representative's approval.

.3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

.4 Give time and date of each demonstration, with list of persons present.

.5 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.3 QUALITY ASSURANCE

.1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:

- .1 Instruct Department Representative.
- .2 Provide written report that demonstration and instructions have been completed.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 General requirements relating to commissioning of project's components and systems, specifying general requirements to PV of components, equipment, sub-systems, systems, and integrated systems.

.2 Acronyms:

.1 AFD - Alternate Forms of Delivery, service provider.

.2 BMM - Building Management Manual.

.3 Cx - Commissioning.

.4 EMCS - Energy Monitoring and Control Systems.

.5 O&M - Operation and Maintenance.

.6 PI - Product Information.

.7 PV - Performance Verification.

1.2 GENERAL

.1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:

.1 Verify installed equipment, systems and integrated systems operate in accordance with Contract Documents and design criteria and intent.

.2 Ensure appropriate documentation is compiled into the BMM.

.3 Effectively train O&M staff.

.2 Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.

.1 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.

.3 Design Criteria: as per contract documents or determined by Departmental Representative’s. To meet Project functional and operational requirements.

1.3 COMMISSIONING OVERVIEW

.1 Section 01 91 13.13- Commissioning (Cx) Plan .

.2 For Cx responsibilities refer to Section 01 91 13.13- Commissioning (Cx) Plan .

.3 Cx to be a line item of Contractor's cost breakdown.

.4 Cx activities supplement field quality and testing procedures described in relevant technical sections.

.5 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the work is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities includes transfer of critical knowledge to facility operational personnel.

.6 Departmental Representative will issue Interim Acceptance Certificate when:

.1 Completed Cx documentation has been received, reviewed for suitability and approved by Departmental Representative .

.2 Equipment, components and systems have been commissioned and functional as per design intent to meet project functional requirements and to meet all requiremens of the Authority Having Jurisdiction..

.3 Final O&M and training manual have been completed, submitted and approved by the Departmental Representative for suitability.

.4 Completion of Training session to all Operational and Maintenance staffs.

1.4 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

.1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the unfunctional system, including related systems as deemed required by Departmental Representative, to ensure effective performance.

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

1.5 PRE-CX REVIEW

.1 Before Construction:

.1 Review Contract Documents, confirm by writing to Departmental Representative.

.1 Adequacy of provisions for Cx.

.2 Aspects of design and installation pertinent to success of Cx.

.2 During Construction:

.1 Co-ordinate provision, location and installation of provisions for Cx.

.3 Before start of Cx:

.1 Have completed Cx Plan up-to-date.

.2 Ensure installation of related components is complete.

.3 Fully understand Cx requirements and procedures.

.4 Have Cx documentation shelf-ready.

.5 Understand completely design criteria and intent and special features.

.6 Submit complete start-up documentation to Departmental Representative.

.7 Have Cx schedules up-to-date.

.8 Ensure systems have been cleaned thoroughly.

.9 Ensure "As-Built" system schematics are available.

.4 Inform Departmental Representative in writing of discrepancies and deficiencies on finished works.

1.6 CONFLICTS

.1 Report conflicts between requirements of this section and other sections to Departmental Representative before start-up and obtain clarification.

.2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00- Submittal Procedures.

.1 Submit no later than 4 weeks after award of Contract:

.1 Name of Contractor's Cx agent.

.2 Draft Cx documentation.

.3 Preliminary Cx schedule.

.2 Request in writing to Departmental Representative for changes to submittals and obtain written approval at least 8 weeks prior to start of Cx.

.3 Submit proposed Cx procedures to Departmental Representative where not specified and obtain written approval at least 8 weeks prior to start of Cx.

.4 Provide additional documentation relating to Cx process required by Departmental Representative.

1.8 COMMISSIONING DOCUMENTATION

.1 Refer to Section 01 91 13.16- Commissioning (Cx) Forms.

.2 Departmental Representative to review and approve Cx documentation.

.3 Provide completed and approved Cx documentation to Departmental Representative .

1.9 COMMISSIONING SCHEDULE

.1 Provide detailed Cx schedule as part of construction schedule in accordance with Section 01 32 16.07- Construction Progress Schedules - Bar (GANTT) Chart .

.2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:

.1 Approval of Cx reports.

.2 Verification of reported results.

.3 Repairs, retesting, re-commissioning, re-verification.

.4 Training.

1.10 COMMISSIONING MEETINGS

.1 Convene Cx meetings following project meetings: Section 01 32 16.07- Construction Progress Schedules - Bar (GANTT) Chart and as specified herein.

.2 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to Cx.

.3 Continue Cx meetings on regular basis until commissioning deliverables have been addressed.

.4 At 60% construction completion stage. Section 01 32 16.07- Construction Progress Schedules - Bar (GANTT) Chart, Departmental Representative to call a separate Cx scope meeting to review progress, discuss schedule of equipment start-up activities and prepare for Cx. Issues at meeting to include:

.1 Review duties and responsibilities of Contractor and subcontractors, addressing delays and potential problems.

.2 Determine the degree of involvement of trades and manufacturer's representatives in the commissioning process.

.5 Thereafter Cx meetings to be held until project completion and as required during equipment start-up and functional testing period.

.6 Meeting will be chaired by Departmental Representative, who will record and distribute minutes.

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

1.11 STARTING AND TESTING

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

1.12 PROCEDURES

.1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.

.2 Conduct start-up and testing in following distinct phases:

.1 Included in delivery and installation:

.1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.

.2 Visual inspection of quality of installation.

.2 Start-up: follow accepted start-up procedures.

.3 Operational testing: document equipment performance.

.4 System PV: include repetition of tests after correcting deficiencies.

.5 Post-substantial performance verification: to include fine-tuning.

.3 Correct deficiencies and obtain approval from Departmental Representative after distinct phases have been completed and before commencing next phase.

.4 Document require tests on approved PV forms.

.5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Departmental Representative.

1.13 START-UP DOCUMENTATION

.1 Assemble start-up documentation and submit to Departmental Representative for approval before commencement of commissioning.

.2 Start-up documentation to include:

.1 Factory and on-site test certificates for specified equipment.

.2 Pre-start-up inspection reports.

.3 Signed installation/start-up check lists.

.4 Start-up reports,

.5 Step-by-step description of complete start-up procedures, to permit Departmental Representative to repeat start-up at any time.

1.14 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS

.1 After start-up, operate and maintain equipment and systems as directed by equipment manufacturer.

.2 With assistance of manufacturer develop written maintenance program and submit Departmental Representative for approval before implementation.

1.15 TEST RESULTS

.1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.

.2 Provide manpower and materials, assume costs for re-commissioning.

1.16 START OF COMMISSIONING

.1 Notify Departmental Representative at least 21 days prior to start of Cx.

.2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

1.17 COMMISSIONING PERFORMANCE VERIFICATION

.1 Carry out Cx:

.1 Under accepted simulated operating conditions, over entire operating range, in all modes.

.2 On independent systems and interacting systems.

.2 Cx procedures to be repeatable and reported results are to be verifiable.

.3 Follow equipment manufacturer's operating instructions.

.4 EMCS trending to be available as supporting documentation for performance verification.

1.18 WITNESSING COMMISSIONING

.1 Departmental Representative to witness activities and verify results.

1.19 EXTENT OF VERIFICATION

.1 Provide manpower and instrumentation to verify all reported results, unless specified otherwise in other sections.

.2 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, instrumentation.

.3 Review and repeat commissioning of systems if inconsistencies found any of reported results.

.4 Perform additional commissioning until results are acceptable to Departmental Representative.

1.20 REPEAT VERIFICATIONS

.1 Assume costs incurred by Departmental Representative for third and subsequent verifications where:

.1 Verification of reported results fail to receive Departmental Representative approval.

.2 Repetition of second verification again fails to receive approval.

.3 Departmental Representative deems Contractor's request for second verification was premature.

1.21 SUNDRY CHECKS AND ADJUSTMENTS

.1 Make adjustments and changes which become apparent as Cx proceeds.

.2 Perform static and operational checks as applicable and as required.

1.22 DEFICIENCIES, FAULTS, DEFECTS

.1 Correct deficiencies found during start-up and Cx to satisfaction of Departmental Representative .

.2 Report problems, faults or defects affecting Cx to Departmental Representative in writing. Stop Cx until problems are rectified. Proceed with written approval from Departmental Representative.

1.23 COMPLETION OF COMMISSIONING

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

.2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.

.3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Departmental Representative.

1.24 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

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

1.25 OCCUPANCY

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

1.26 OWNER'S PERFORMANCE TESTING

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Description of overall structure of Plan and roles and responsibilities of commissioning team.

1.2 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA)

.1 CSA Z320-11 Building Commissioning Standard.

1.3 GENERAL

.1 Provide fully functional equipment:

.1 Equipment and components meet user's functional requirements before date of acceptance, and operate consistently.

.2 O&M personnel have been fully trained in aspects of installed systems.

.3 Optimized life cycle costs.

.4 Complete documentation relating to installed equipment and systems.

.2 Term "Cx" in this section means "Commissioning".

.3 Use this Cx Plan as master planning document for Cx:

.1 Outlines organization, scheduling, allocation of resources, documentation, pertaining to implementation of Cx.

.2 Communicates responsibilities of team members involved in Cx Scheduling, documentation requirements, and verification procedures.

.3 Sets out deliverables relating to O&M, process and administration of Cx.

.4 Describes process of verification of how built works meet Departmental Representative’s requirements.

.5 Produces a complete functional system prior to issuance of Certificate of Occupancy.

.6 Management tool that sets out scope, standards, roles and responsibilities, expectations, deliverables, and provides:

.1 Overview of Cx.

.2 General description of elements that make up Cx Plan.

.3 Process and methodology for successful Cx.

.4 Acronyms:

.1 Cx - Commissioning.

.2 BMM - Building Management Manual.

.3 EMCS - Energy Monitoring and Control Systems.

.4 MSDS - Material Safety Data Sheets.

.5 PI - Product Information.

.6 PV - Performance Verification.

.7 WHMIS - Workplace Hazardous Materials Information System.

.5 Commissioning terms used in this Section:

.1 Bumping: short term start-up to prove ability to start and prove correct rotation.

.2 Deferred Cx - Cx activities delayed for reasons beyond Contractor's control due to lack of occupancy, weather conditions, need for heating/cooling loads.

1.4 DEVELOPMENT OF 100% CX PLAN

.1 Cx Plan to be 95% completed before added into Project Specifications.

.2 Cx Plan to be 100% completed within 8 weeks of award of contract to take into account:

.1 Approved shop drawings and product data.

.2 Approved changes to contract.

.3 Contractor's project schedule.

.4 Cx schedule.

.5 Contractor's, sub-contractor's, suppliers' requirements.

.6 Project construction team's and Cx team's requirements.

.3 Submit completed Cx Plan to Departmental Representative and obtain written approval.

1.5 REFINEMENT OF CX PLAN

.1 During construction phase, revise, refine and update Cx Plan to include:

.1 Changes resulting from Client program modifications.

.2 Approved design and construction changes.

.2 Revise, refine and update during construction phase. At each revision, indicate revision number and date.

.3 Submit each revised Cx Plan to Departmental Representative for review and obtain written approval.

.4 Include testing parameters at full range of operating conditions and check responses of equipment and systems.

1.6 COMPOSITION, ROLES AND RESPONSIBILITIES OF CX TEAM

.1 Departmental Representative to maintain overall responsibility for project and is sole point of contact between members of commissioning team.

.2 Project Manager will select Cx Team consisting of following members:

.1 Departmental Representative’s Design Quality Review Team: during construction, will conduct periodic site reviews to observe general progress.

.2 Departmental Representative's Quality Assurance Commissioning Manager: ensures Cx activities are carried out to ensure delivery of a fully operational project including:

.1 Review of Cx documentation from operational perspective.

.2 Review for performance, reliability, durability of operation, accessibility, maintainability, operational efficiency under conditions of operation.

.3 Protection of health, safety and comfort of occupants and O&M personnel.

.4 Monitoring of Cx activities, training, development of Cx documentation.

.5 Work closely with members of Cx Team.

.3 Departmental Representative is responsible for:

.1 Organizing Cx.

.2 Monitoring operations Cx activities.

.3 Witnessing, certifying accuracy of reported results.

.4 Witnessing and certifying other tests.

.5 Developing BMM.

.6 Ensuring implementation of final Cx Plan.

.7 Performing verification of performance of installed systems and equipment.

.8 Implementation of Training Plan.

.4 Construction Team: contractor, subcontractors, suppliers and support disciplines, is responsible for construction/installation in accordance with Contract Documents, including:

.1 Testing.

.2 Performance of Cx activities.

.3 Delivery of training and Cx documentation.

.4 Assigning one person as point of contact with Consultant and PWGSC Cx Manager for administrative and coordination purposes.

.5 Contractor's Cx agent implements specified Cx activities including:

.1 Demonstrations.

.2 Training.

.3 Testing.

.4 Preparation, submission of test reports.

.6 Property Manager: represents lead role in Operation Phase and onwards and is responsible for:

.1 Receiving facility.

.2 Day-To-Day operation and maintenance of facility.

1.7 CX PARTICIPANTS

.1 Employ the following Cx participants to verify performance of equipment and systems:

.1 Installation contractor/subcontractor:

.2 Equipment manufacturer

.3 CSC representatives as determined by Departmental Representative.

.2 Ensure that Cx participant:

.1 Could complete work within scheduled time frame.

.2 Available for emergency and troubleshooting service during first year of occupancy by user for adjustments and modifications outside responsibility of O&M personnel:

.3 Provide names of participants to Departmental Representative and details of instruments and procedures to be followed for Cx 3 months prior to starting date of Cx for review and approval.

1.8 EXTENT OF CX

.1 Cx Architectural Systems:

.1 Sally Port Gate F2 & F3

.2 Gate P5 (existing to be relocated)

.2 Cx Electrical Systems:

.1 Hardware – Gates and Controllers (to be commissioned by Gate Supplier/contractor)

.2 Exterior Fence Mounted Junction Box

.3 Exterior Weatherproof Pushbutton

.4 Exterior Teck Cable and Tray

.5 Circuit Breakers

1.9 DELIVERABLES RELATING TO O&M PERSPECTIVES

.1 General requirements:

.1 Compile English documentation.

.2 Documentation to be computer-compatible format ready for inputting for data management.

.2 Provide deliverables:

.1 Warranties.

.2 Project record documentation.

.3 Inventory of spare parts, special tools and maintenance materials.

.4 Maintenance Management System (MMS) identification system used.

.5 WHMIS information.

.6 MSDS data sheets.

.7 Preventative Maintenance Program.

.8 Standard Operating Procedures (SOP).

.9 Contractor's and Sub-Contractors' as built drawings

1.10 DELIVERABLES RELATING TO THE CX PROCESS

.1 General:

.1 Start-up, testing and Cx requirements, conditions for acceptance and specifications form part of relevant technical sections of these specifications.

.2 Definitions:

.1 Cx as used in this section includes:

.1 Cx of components, equipment, systems, subsystems, and integrated systems.

.2 Factory inspections and performance verification tests.

.3 Deliverables: provide:

.1 Cx Specifications.

.2 Startup, pre-Cx activities and documentation for systems, and equipment.

.3 Completed installation checklists (ICL).

.4 Completed product information (PI) report forms.

.5 Completed performance verification (PV) report forms.

.6 Results of Performance Verification Tests and Inspections.

.7 Description of Cx activities and documentation.

.8 Description of Cx of integrated systems and documentation.

.9 Tests witnessed by PWGSC Design Quality Review Team:

.10 Training Plans.

.11 Cx Reports.

.12 Prescribed activities during warranty period.

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

.5 Departmental Representative to participate.

1.11 PRE-CX ACTIVITIES AND RELATED DOCUMENTATION

.1 Items listed in this Cx Plan include the following:

.1 Pre-Start-Up inspections: by Departmental Representative prior to permission to rectification of deficiencies to Departmental Representative satisfaction.

.2 Departmental Representative to use approved check lists.

.3 Departmental Representative will monitor all of these pre-start-up inspections.

.4 Include completed documentation with Cx report.

.5 Departmental Representative will monitor some of these inspections.

.6 Include completed documentation in Cx report.

.2 Pre-Cx activities - ARCHITECTURAL:

.1 Gates: conduct test to ensure gates open and close properly.

.3 Pre-Cx activities - ELECTRICAL:

.1 Gate Operator: conduct test to ensure gates open and close properly.

.2 Gate Controller: conduct test to ensure controller allows for activation of gate operator.

1.12 START-UP

.1 Start up components, equipment and systems.

.2 Departmental Representative to monitor all of these start-up activities.

.1 Rectify start-up deficiencies to satisfaction of Departmental Representative.

.3 Performance Verification (PV):

.1 Approved Cx Agent to perform.

.1 Repeat when necessary until results are acceptable to Departmental Representative.

.2 Use procedures modified generic procedures to suit project requirements.

.3 Departmental Representative to witness and certify reported results using approved PI and PV forms.

.4 Departmental Representative to approve completed PV reports and provide to Departmental Representative.

.5 Departmental Representative will verify up to 100 % of reported results.

1.13 CX ACTIVITIES AND RELATED DOCUMENTATION

.1 Perform Cx using procedures approved by Departmental Representative.

.2 Departmental Representative to monitor Cx activities.

.3 Upon satisfactory completion, Cx agency performing tests to prepare Cx Report using approved PV forms.

.4 Departmental Representative to witness, certify reported results of, Cx activities.

1.14 INSTALLATION CHECK LISTS (ICL)

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

1.15 PRODUCT INFORMATION (PI) REPORT FORMS

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

1.16 PERFORMANCE VERIFICATION (PV) REPORT

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

1.17 CX SCHEDULES

.1 Prepare detailed critical path Cx Schedule and submit to Departmental Representative for review and approval same time as project Construction Schedule. Include:

.1 Milestones, testing, documentation, training and Cx activities of components, equipment, subsystems, systems and integrated systems, including:

.1 Design criteria, design intents.

.2 Cx agents' credentials: 60 days before start of Cx.

.3 Cx procedures: 3 months after award of contract.

.4 Cx Report format: 3 months after contract award.

.5 Notification of intention to start Cx: 14 days before start of Cx.

.6 Identification of deferred Cx.

.7 Implementation of training plans.

.8 Cx reports: immediately upon successful completion of Cx.

.2 Detailed training schedule to demonstrate no conflicts with testing, completion of project and hand-over.

.2 After approval, incorporate Cx Schedule into Construction Schedule.

.3 Consultant, Contractor, Contractor's Cx agent, and Departmental Representative will monitor progress of Cx against this schedule.

1.18 CX REPORTS

.1 Submit reports of tests, witnessed and certified by Departmental Representative to Departmental Representative who will verify reported results.

.2 Include completed and certified PV reports in properly formatted Cx Reports.

.3 Before reports are accepted, reported results to be subject to verification by Departmental Representative.

1.19 TESTS TO BE PERFORMED BY OWNER/USER

.1 None is anticipated on this project .

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Commissioning forms to be completed for equipment.

1.2 INSTALLATION/START-UP CHECK LISTS

.1 Include the following data:

.1 Product manufacturer's installation instructions and recommended checks.

.2 Special procedures as specified in relevant technical sections.

.3 Items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.

.2 Use check lists for equipment installation. Document check list verifying checks have been made, indicate deficiencies and corrective action taken.

.3 Installer to sign check lists upon completion, certifying stated checks and inspections have been performed. Return completed check lists to Departmental Representative. Check lists will be required during Commissioning and will be included in Building Maintenance Manual (BMM) at completion of project.

.4 Use of check lists will not be considered part of commissioning process but will be stringently used for equipment pre-start and start-up procedures.

1.3 PRODUCT INFORMATION (PI) REPORT FORMS

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

.2 Prior to Performance Verification (PV) of systems complete items on PI forms related to systems and obtain Departmental Representative's approval.

1.4 PERFORMANCE VERIFICATION (PV) FORMS

.1 PV forms to be used for checks, running dynamic tests and adjustments carried out on equipment and systems to ensure correct operation, efficiently and function independently and interactively with other systems as intended with project requirements.

.2 PV report forms include those developed by Contractor records measured data and readings taken during functional testing and Performance Verification procedures.

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

1.5 SAMPLES OF COMMISSIONING FORMS

.1 Departmental Representative will develop and provide to Contractor required project-specific Commissioning forms in electronic format complete with specification data.

.1 Construction Checklists

.2 Performance Verification Forms

.3 Commissioining Issue/Resolution Log

.4 Design Review Tracker

.2 Samples of Commissioning Forms follow this section.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 LOCATIONS

.1 Commissioning Forms are required for the following locations. (Refer to drawings for additional information):

.1 Sally Port Gate F2

.2 Sally Port Gate F3

.3 Gate P5

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section includes the following:

- .1 Demolition and removal of structures
- .2 Demolition and removal of site improvements adjacent to a building or structure being demolished
- .3 Demolition and removal of concrete foundations
- .4 Abandoning in place and/or removing below grade construction
- .5 Disconnecting, capping or sealing, and removing site utilities

1.2 RELATED REQUIREMENTS

.1 Section 02 41 13- Selective Site Demolition

.2 Section 02 41 13.13 Paving Removal

1.3 REFERENCE STANDARDS

.1 CSA Group (CSA)

- .1 CSA S350-M1980 (R2003) , Code of Practice for Safety in Demolition of Structures.

.2 Department of Justice Canada (Jus)

- .1 Canadian Environmental Assessment Act (CEAA), 2012
- .2 Canadian Environmental Protection Act (CEPA), 2012
  - .1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
  - .2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations
  - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34
  - .4 Motor Vehicle Safety Act (MVSA), 1995
  - .5 Hazardous Materials Information Review Act, 1985

.3 National Fire Protection Association (NFPA)

- .1 NFPA 241 - 96, Standard for Safeguarding Construction, Alteration, and Demolition Operations

.4 National Research Council Canada (NRC)

- .1 National Building Code of Canada 2015 (NBC).
- .2 National Fire Code of Canada 2015 (NFC).

1.4 DEFINITIONS

.1 Demolition: rapid destruction of building following removal of hazardous materials.

.2 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's

poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate with Departmental Representative for the material ownership including but not limited to:

.1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Departmental Representative's property, demolished materials shall become Contractor ’s property and shall be removed from Project site.

.2 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to the Departmental Representative that may be encountered during demolition remain Departmental Representative 's property.

.2 Pre-Demolition Meetings:

.1 Convene pre-installation meeting 1week prior to beginning work of this Section, with Departmental Representative in accordance with Section 01 31 19- Project Meetings.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures and 01 74 19 - Construction Waste Management and Disposal.

.2 Schedule of Demolition Activities: Coordinate with Section 01 32 16.07- Construction Progress Schedules - Bar (GANTT) Chart.

.2 Informational Submittals: Provide the following submittals when requested by the Consultant:

.1 Qualification Data: Submit information for companies and personnel indicating their capabilities and experience to perform work of this Section including; but not limited to, lists of completed projects with project names and addresses, names and addresses of Consultants, for work of similar complexity and extent.

1.7 QUALITY ASSURANCE

.1 Regulatory Requirements: Ensure Work is performed in compliance with applicable Provincial/Territorial and Municipal regulations.

.2 Comply with hauling and disposal regulations of Authority Having Jurisdiction.

1.8 SITE CONDITIONS

.1 Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

.1 Review "Designated Substance Report" and take precautions to protect environment.

.2 If material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.

.3 Proceed only after receipt of written instructions have been received from Departmental Representative.

.2 Notify Departmental Representative before disrupting building access or services.

.3 Environmental protection:

.1 Ensure Work is done in accordance with Section 01 35 43- Environmental Procedures.

1.9 EXISTING CONDITIONS

.1 Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

.1 Hazardous materials will be as defined in the Hazardous Materials Act.

.2 Hazardous materials will be removed by Departmental Representative before start of the Work.

Part 2 Products

.1 Equipment:

.1 Equipment and heavy machinery:

.1 Machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 EXAMINATION

.1 Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.

.2 Review Project Record Documents of existing construction provided by Deparmental Representative.

.3 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, salvage and items to remain.

.4 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.5 Departmental Representative does not guaranty that existing conditions are the same as those indicated in Project Record Documents.

.6 Inventory and record the condition of items being removed and salvaged.

.7 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element.

.8 Promptly submit a written report to Departmental Representative.

.9 Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during demolition operations.

.10 Verify that hazardous materials have been remediated before proceeding with demolition operations.

3.2 PREPARATION

.1 Protection of In-Place Conditions:

.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

.5 Do Work in accordance with Section 01 35 29.06 – Health and Safety Requirements.

.2 Demolition/Removal:

.1 Demolish in an orderly and careful manner. Protect existing supporting structural members and non-loadbearing assemblies.

.2 Demolish parts of structures as indicated.

.3 Protect underlying and adjacent granular materials.

.4 Trim edges of partially demolished elements to tolerances as defined by Departmental Representative to suit future use.

.5 Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.

.6 Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.

.7 Remove temporary Work.

.8 Contractor must protect existing equipment in operation from dust/debris or other incidental damage resulting from construction activities.

.3 Remove the following materials and equipment, store, protect, and leave ready for installation by other sections of work using qualified tradesmen:

.1 Gate P5 (gate, gate hardware, gate frame, cross bracing, lock, mag lock.

.2 Miscellaneous Signage

3.3 SITE RESTORATION & REPAIRS

.1 Below Grade Areas: Rough grade below grade areas ready for further excavation or new construction.

.2 Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes.

.3 Provide a smooth transition between adjacent existing grades and new grades.

.4 General: Promptly repair damage to adjacent construction caused by demolition operations.

.5 Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

.6 Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.

.1 Leave Work area clean at end of each day.

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

.3 Refer to demolition drawings and specifications for items to be salvaged for reuse.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section includes descriptions for demolishing, salvaging, recycling and removing site work items identified for removal in whole or in part, and for backfilling trenches and excavations resulting from site demolition activities.

1.2 RELATED REQUIREMENTS

.1 Section 02 41 13.13–Paving Removal

.2 Section 31 23 33.01– Excavating, Trenching and Backfilling

1.3 REFERENCE STANDARDS

.1 Department of Justice Canada (Jus)

- .1 Canadian Environmental Assessment Act (CEAA), 2012
- .2 Canadian Environmental Protection Act (CEPA), 2012
  - .1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations
  - .2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations
  - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34
  - .4 Motor Vehicle Safety Act (MVSA), 1995
  - .5 Hazardous Materials Information Review Act, 1985

1.4 DEFINITIONS

.1 Selective Demolition: Sequencing demolition activities to allow separation and sorting of selected site materials.

.2 Hazardous Substances: dangerous substances, dangerous goods, hazardous commodities and hazardous products, including but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.

.3 Draft Construction Waste Management Plan (Draft CWM Plan): Detailed inventory of materials in building indicating estimated quantities of reuse, recycling and landfill, prepared in accordance with Section 01 74 19- Construction Waste Management and Disposal and as follows:

- .1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project.

.4 Waste Management Coordinator (WMC): contractor ’s representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

.5 Construction Waste Management Plan (CWM Plan): Written plan addressing opportunities for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19- Waste Management and Disposal.

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

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate with Departmental Representative for the material ownership including the following:

.1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain, demolished materials shall become Contractor ’s property and shall be removed from Project site.

.2 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Representative that may be encountered during demolition remain Representative’s property:

.1 Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Representative.

.2 Coordinate with Representative, who will establish special procedures for removal and salvage operations.

.2 Pre-Demolition Meetings.

.1 Convene pre-installation meeting 1 week before beginning work of this Section, with Departmental Representative in accordance with Section 01 31 19- Project Meetings to:

.1 Verify project requirements.

.2 Verify existing site conditions adjacent to demolition work

.3 Coordinate with other construction sub trades

.4 Examine existing site conditions adjacent to demolition work, prior to start of Work

.5 Waste reporting requirements

.2 Hold project meetings bi-weekly.

.3 Ensure subcontractor representatives key personnel, project manager, WMC and site supervisor attend.

.4 WMC will provide written report on status of waste diversion activity at each meeting.

.5 Departmental Representative will provide written notification of change of meeting schedule established upon contract award 24 hours prior to scheduled meeting.

.3 Scheduling:

.1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.

.2 In event of unforeseen delay notify Consultant in writing.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Proposed Dust Control Measures: Submit statement or drawing that indicates measures proposed for use, proposed locations, and proposed time frame for their operation.

.2 Informational Submittals: Provide the following submittals when requested by the Consultant:

.1 Qualification Data: Submit information for companies and personnel indicating their capabilities and experience to perform work of this Section including; but not limited to, lists of completed projects with project names and addresses for work of similar complexity and extent.

1.7 QUALITY ASSURANCE

.1 Regulatory Requirements: ensure Work is performed in compliance with applicable Provincial/Territorial regulations.

.2 Comply with hauling and disposal regulations of Authority Having Jurisdiction.

1.8 SITE CONDITIONS

.1 Environmental protection:

.1 Ensure Work is done in accordance with Section 01 35 43- Environmental Procedures .

.2 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.3 Fires and burning of waste or materials is not permitted on site.

.4 Burying of rubbish waste materials is not permitted.

.5 Disposal of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers, is not permitted.

.6 Ensure proper disposal procedures are maintained throughout the project.

.2 Pumping of water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties, is not permitted.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction.

.4 Protect trees, plants and foliage on site and adjacent properties where indicated.

.5 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

.6 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

.7 Institution will occupy another building immediately adjacent to demolition area.

.8 Conduct selective site demolition so Instituitions 's operations will not be disrupted:

.1 Provide not less than 72 hours' notice to Departmental Representative of activities that will affect operations.

.2 Maintain access to existing walkways, exits, and other adjacent occupied or used facilities:

.1 Closing or obstructing walkways, exits, or other occupied or used facilities without written permission from Departmental Representative is not permitted.

.9 Departmental Representative assumes no responsibility for Selective Site elements being demolished:

.1 Conditions existing at time of inspection for bidding purpose will be maintained by Departmental Representative as far as practical.

.2 Before selective site demolition, remove, protect and store salvaged items as directed by Departmental Representative:

.1 Salvage items as identified by Consultant.

.2 Deliver to Departmental Representative as directed.

1.9 EXISTING CONDITIONS

.1 Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work:

.1 Hazardous materials will be as defined in the Hazardous Materials Act.

.2 Hazardous materials will be removed by Departmental Representative before start of the Work.

.2 If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Departmental Representative and Consultant . Hazardous materials will be removed by Departmental Representative under a separate contract or as a change to the Work.

.3 If material resembling spray or trowel applied asbestos or other designated substance listed as hazardous be encountered in course of demolition, stop work, take preventative measures, and notify Departmental Representative immediately. Proceed only after receipt of written instructions have been received from Departmental Representative.

.4 Site elements that will be demolished are based on their condition on date that tender is accepted.

Part 2 Products

2.1 EQUIPMENT

.1 Equipment and Heavy Machinery:

.1 Machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 EXAMINATION

.1 Survey existing conditions and correlate with requirements indicated to determine extent of selective site demolition required.

.2 Departmental Representative does not guaranty that existing conditions are the same as those indicated in Project Record Documents.

.3 Inventory and record the condition of items being removed and salvaged.

.4 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to Departmental Representative and Consultant.

.5 Verify that hazardous materials have been remediated before proceeding with site demolition operations.

3.2 PREPARATION

.1 Protection of in-place conditions:

.1 Work in accordance with Section 01 35 43- Environmental Procedures.

.2 Prevent movement, settlement or damage of adjacent structures, services , walks , paving, trees, landscaping , adjacent grades.

.1 Provide bracing, shoring and underpinning as required.

.2 Repair damage caused by demolition as directed by Departmental Representative.

.3 Support affected site elements and, if safety of site element being demolished or services or adjacent structures appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.

.4 Prevent debris from blocking surface drainage system, mechanical and electrical systems which must remain in operation.

.2 Surface Preparation:

.1 Disconnect and re-route electrical and service lines within the site to be demolished.

.1 Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of selective site demolition.

.2 Disruption of active or energized utilities designated to remain undisturbed is not permitted.

3.3 REMOVAL AND DEMOLITION OPERATIONS

.1 Remove items as indicated on drawings.

.2 Disruption of items designated to remain in place is not permitted.

.3 Removal of pavements:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular materials .

.4 Prevent contamination with base course aggregates, when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving, in accordance with Section 02 41 13.13 .

.4 Disposal of Material:

.1 Dispose of materials not designated for salvage or reuse on site at authorized facilities approved in Waste Reduction Workplan.

.2 Trim disposal areas to approval of Departmental Representative.

.5 Backfill: Backfill in areas as indicated and in accordance with Section 31 23 33.01- Excavating, Trenching and Backfilling.

3.4 STOCKPILING

.1 Label stockpiles, indicating material type and quantity.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.

3.5 REMOVAL FROM SITE

.1 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project.

.2 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.6 RESTORATION

.1 Restore areas and existing works outside areas of demolition to match conditions that existed prior to beginning of Work .

.2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.7 CLEANING

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

.1 Leave Work area clean at end of each day.

.2 Remove debris, trim surfaces and leave work site clean, upon completion of Work

.3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning.

.3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19- Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section includes descriptions for demolishing, salvaging, recycling and removing of asphalt paving identified in whole or in part, and for backfilling trenches and excavations resulting from site demolition activities a required by scope of work.

1.2 RELATED REQUIREMENTS

.1 Section 02 41 13– Selective Site Demolition

.2 Section 02 41 00.08– Demolition - Minor Works

1.3 REFERENCE STANDARDS

.1 Department of Justice Canada (Jus)

.1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.

.2 Canadian Environmental Protection Act, 1999 (CEPA), c. 33.

1.4 DEFINITIONS

.1 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.

.2 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed, removed and salvaged, or removed and reinstalled

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate requirements for Waste Management and Disposal for materials being re used or recycled in accordance with Section 01 45 16.19:

.1 Divert excess materials from landfill

.2 Separate materials identified for recycling place in identified areas in accordance with Waste Management Plan

.3 Label location of salvaged material's storage areas and provide barriers and security devices

.4 Remove materials that cannot be salvaged for re use or recycling and dispose of in accordance with applicable codes at licensed facilities

.2 Pre Construction Meeting: Arrange a pre construction meeting in accordance with Section 01 31 19– Project Meetings ; attended by Contractor’s key personnel and Departmental Representative to discuss the following:

.1 Verify project requirements.

.2 Review site conditions.

.3 Coordination with other Subcontractor ’s affected by work of this Section.

.4 Examine existing site conditions adjacent to demolition work, prior to start of Work.

.5 Waste reporting requirements.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Informational Submittals: Provide following submittals during course of work:

.1 Certificates: Submit copies of certified weigh bills, bills of lading or receipts from authorized disposal sites and re use and recycling facilities for material removed from site on monthly basis.

1.7 QUALITY ASSURANCE

.1 Regulatory Requirements: ensure Work is performed in compliance with applicable Provincial/Territorial regulations.

.2 Comply with hauling and disposal regulations of Authority Having Jurisdiction.

1.8 SITE CONDITIONS

.1 Protect existing site features to remain or identified for salvage or re use; make repairs and restore to a similar condition to existing where damage to these items occurs as directed by Departmental Representative and at no cost to Departmental Representative:

.1 Remove and store salvaged materials to prevent contamination.

.2 Store and protect salvaged materials as required for maximum preservation of material.

.3 Handle salvaged materials same as new materials.

.2 Perform pavement removal work to prevent adverse effects to adjacent watercourses, groundwater and wildlife, and to prevent excess air and noise pollution:

.1 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.

.2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Authorities Having Jurisdiction.

.3 Protect existing site features and structures, trees, plants and foliage on site and adjacent properties.

Part 2 Products

2.1 EQUIPMENT

.1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated.

Part 3 Execution

3.1 PREPARATION

.1 Verify extent and location of asphalt identified for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities, preserve active utilities traversing site in operating condition.

.3 Prior to beginning removal operation, inspect and verify with Departmental Representative areas, depths and lines of asphalt pavement to be removed.

.4 Protection: protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.2 REMOVAL

.1 Remove existing asphalt pavement to lines and grades as indicated.

.2 Demolition of pavements:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method acceptable to Departmental Representative on site .

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular materials where they are exposed and identified to remain.

.4 Prevent contamination with base course aggregates, when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving.

.3 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.

.4 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.

.5 Suppress dust generated by removal process.

3.3 FINISH TOLERANCES

.1 Finished surfaces in areas where asphalt pavement has been removed within +/-5 mm of grade specified but not uniformly high or low.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning .

.1 Leave Work area clean at end of each day.

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

.3 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.

.4 Waste Management: separate waste materials in accordance with Section 01 74 19- Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.2 Removed asphalt pavement which is to be recycled in hot mix asphalt concrete under this contract may be stockpiled at designated asphalt plant site.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 20 00: Concrete Reinforcing.

.2 Section 03 30 00: Cast-in-Place Concrete.

1.2 REFERENCES

.1 All referenced standards to be the current edition or the edition referenced by the applicable Building Code in force at the time of building permit application, as noted on Structural Drawings.

.2 Canadian Standards Association (CSA International):

.1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA O86, Engineering Design in Wood.

.3 CSA O121, Douglas Fir Plywood.

.4 CSA 0141, Softwood Lumber.

.5 CSA O151, Canadian Softwood Plywood.

.6 CSA O153, Poplar Plywood.

.7 CSA O325.0, Construction Sheathing.

.8 CSA O437 Series, Standards for OSB and Waferboard.

.9 CSA S269.1, Falsework and Formwork

.3 American Concrete Institute (ACI):

.1 ACI 117, Specification for Tolerances for Concrete Construction and Materials.

.2 ACI 347, Guide to Formwork for Concrete.

1.3 QUALITY ASSURANCE

.1 Qualifications

.1 Engage a Professional Engineer licensed in the place where the project is located to be responsible for design, installation and site review of all formwork, falsework and re-shoring.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings:

.1 Provide shop drawings for formwork and falsework stamped and signed by the Professional Engineer responsible for their design.

.2 Show on drawings:

.1 Formwork design data: permissible rate of concrete placement and temperature of concrete in forms.

.2 Erection sequence.

.3 Stripping and re-shoring procedure.

.4 Camber.

.5 Locations of all construction and control joints in slabs and walls.

.6 Equipment and procedure details when slip forming and / or flying forms are used.

.7 Shoring of existing construction where required to carry construction loads.

Part 2 Products

2.1 DESIGN REQUIREMENTS

.1 Design in accordance with CSA S269.1.

.2 For multi-storey construction, ensure that sufficient re-shoring is provided to prevent overloading of the structure while constructing the work above.

.3 Design formwork and falsework supporting Post-Tensioned Concrete to account for the differences in load distribution before and after prestressing. Design supports under beams and at flat slab columns for the additional load which will be attracted from tributary slab areas after prestressing. Where cast concrete will move relative to the formwork during stressing, design and detail the contact face of the formwork to accommodate the movement.

.4 Departmental Representative accepts no responsibility for structural adequacy of formwork, falsework and re-shoring and will not review its design.

2.2 MATERIALS

.1 Formwork materials: to CSA S269.1.

.1 For concrete without special architectural features, use wood and wood product formwork materials to CSA O121, CSA 0141, CSA O437 or CSA-O153.

.2 Stay forms: expanded hot dip galvanized sheet steel, with min. 20 mm (3/4”) deep V- shaped ribs and perforations suitable to carry through reinforcing steel.

.3 Key-creating stay form: hot dip galvanized prefabricated sheet steel box min. 30 mm (1-1/8”) deep, with removable cover and dimpled back casing carrying pre-installed bent dowels.

.4 Form ties:

.1 Removable or internally disconnecting tie rods with or without spreader tubes, or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm (1”) diameter in concrete surface.

.2 Form ties to be designed to act as ties and spreaders and to have a minimum working strength of 13 kN (3000 pounds).

.3 Snap ties to snap cleanly at least 25 mm (1") from concrete surface without damage to the concrete.

.4 Snap ties in Architectural concrete, to be internally disconnecting type which snaps cleanly at least 38 mm (1½") from concrete surface without damage to the concrete.

.5 Form liner: high density overlay plywood to CSA O121 or other special materials to achieve the required concrete finish.

.6 Form stripping agent: colourless mineral oil, non-toxic, low VOC, free of kerosene, with viscosity between 15 to 24 mm²/s (70 and 110s Saybolt Universal) at 40°C, flashpoint minimum 150°C, open cup.

.7 Grooves, reglets and chamfers: White pine selected for straightness and accurately dressed to size.

.2 Falsework materials: to CSA S269.1.

.3 Void Form: Cellular cardboard with minimum compressive strength of 62 kPa (9 psi) designed to carry weight of wet concrete and loads associated with placing concrete and also designed to disintegrate and create an air space below the fully hardened concrete.

Part 3 Execution

3.1 FABRICATION AND ERECTION

.1 Confirm to CSA A23.1.

.2 Fabricate and erect falsework in accordance with CSA S269.1.

.3 Do not place shores and mud sills on frozen ground.

.4 Provide site drainage to prevent washout of soil supporting mud sills and shores.

.5 Fabricate and erect formwork in accordance with CSA S269.1 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA A23.1/A23.2.

.6 Make formwork tight and flush faced to prevent the leakage of mortar and the creation of unspecified fins or panel outlines.

.7 Form sides of footings unless Structural Drawings and Geotechnical report allow use of earth forms.

.8 See drawings for any camber required in hardened concrete. Measure cambers relative to member supports.

.9 Obtain Departmental Representative approval for formed openings, slots and chases not indicated on Structural Drawings.

.10 Do not permit loads from formwork to be transmitted to adjacent existing structure.

.11 Apply a form coating and release agent uniformly to the contact surface of formwork panels before reuse.

.12 Use 25 mm (1") chamfer strips on external corners and 25 mm (1") fillets at interior corners, unless specified otherwise.

.13 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated on Architectural and Structural drawings.

.14 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.

.15 Anchors and inserts not to protrude beyond surfaces designated to receive applied finishes, including painting.

.16 Clean formwork in accordance with CSA A23.1/A23.2, before placing concrete.

.17 Build top form on sloping concrete where required to prevent concrete from flowing out of the form. Provide vents to allow air and bleed water to escape.

.18 Do not close wall forms before reinforcing steel has been reviewed by Departmental Representative.

.19 Where removable tie rods are used for form ties, plug and seal tie holes to maintain the fire resistance, gas impermeability, soundproofing and waterproofing of the adjacent concrete.

.20 Void form:

.1 Conform to manufacturer's recommendations.

.2 Place on sand leveling bed.

.3 Protect from moisture until concrete is about to be placed.

.4 Protect from excessive construction loads. Overlay with max. 3 mm (1/8") thick fibreboard if required to protect it from damage during construction.

.5 If void form collapses during construction, remove and replace affected area.

3.2 REMOVAL AND RESHORING

.1 Conform to CSA A23.1 and to ACI 347.

.2 Survey top of formwork and slab elevations before concrete placement, prior and after falsework removal, refer to drawing notes for detailed requirements. Submit survey data for Departmental Representative record.

.3 Use pullout tests, on-site cured cylinders (kept beside and treated as the concrete in the structure they represent) or maturity tests to determine in-situ strength of concrete prior to removal of falsework. Do not locate pullout inserts on concrete surfaces exposed to view. Retain a testing company to supply, locate and test the inserts in accordance with ASTM C900.

.4 Maintain falsework supporting beams and slabs until concrete has reached at least 75% of its specified strength.

.5 Maintain falsework for columns and walls until non-architectural concrete reaches at least 10 MPa and until architectural concrete reaches at least 15 MPa, but not less than 1 day.

.6 Keep falsework or reshoring in place until concrete reaches the specified design strength, but not less than 28 days. If reshoring is installed to replace falsework, strip and re-shore simultaneously so that no more than 9 m2 of soffit is left unsupported by either formwork or reshoring at any time.

.7 Install reshores tight to structure above and below so that they do not shorten under load. Do not pre-load or lift the structure above by overtightening.

.8 Re-use formwork and falsework subject to requirements of CSA A23.1/A23.2.

3.3 FIELD QUALITY CONTROL

.1 Refer to Section 01 45 00 - Quality Control.

.2 Obtain field review of falsework and reshoring by the Professional Engineer responsible for that work prior to each pour. Departmental Representative will not field review the formwork, falsework or reshoring.

.3 An independent Inspection and Testing Agency will be appointed to inspect all features of formwork affecting appearance of finished architectural concrete surfaces for conformance with Contract documents.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 10 00: Concrete Forming and Accessories.

.2 Section 03 30 00: Cast-in-Place Concrete.

1.2 REFERENCES

.1 All referenced standards to be the current edition or the edition referenced by the applicable Building Code in force at the time of building permit application, as noted on Structural Drawings.

.2 Canadian Standards Association (CSA International):

- .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .2 CSA A23.3, Design of Concrete Structures.
- .3 CSA G30.18, Carbon Steel Bars for Concrete Reinforcement.
- .4 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .5 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.

.3 Reinforcing Steel Institute of Canada (RSIC):

- .1 Reinforcing Steel Manual of Standard Practice.

.4 American Concrete Institute (ACI):

- .1 SP-66, ACI Detailing Manual.

.5 ASTM International Inc.:

- .1 ASTM A1064/A1064M, Standard Specification for Carbon Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- .2 ASTM A775/A775M, Standard Specification for Epoxy-Coated Reinforcing Steel.
- .3 ASTM D3963 / D3963M, Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars.
- .4 ASTM A1044 / A1044M, Standard Specification for Steel Stud Assemblies for Shear Reinforcement of Concrete.

1.3 QUALITY ASSURANCE

.1 Qualifications

- .1 Welding of reinforcing steel to be performed by welders certified under CSA W186.
- .2 Shear stud reinforcing to be fabricated in an ICC ES approved facility.

1.4 QUALITY CONTROL

.1 Submit in accordance with Section 01 45 00 - Quality Control.

.2 Source Quality Control Submittals:

.1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis.

.2 Upon request, inform Departmental Representative of proposed source of reinforcement material to be supplied.

.3 Upon request, provide Departmental Representative with a copy of plant certificate by the Concrete Reinforcing Steel Institute for epoxy coating of reinforcement.

.4 Upon request, provide Departmental Representative with a copy of manufacturer's instructions for patching factory applied epoxy coating.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's data sheets for mechanical rebar splices.

.3 Shop Drawings:

.1 Prepare shop drawings in accordance with RSIC Manual of Standard Practice unless the Contract Documents contain a more stringent requirement. Conform to ACI SP 66 Detailing Manual whenever a detail condition is not covered by any of the above.

.2 Submit plans, elevations, sections and details necessary to fabricate, place and review reinforcement without reference to structural drawings, including masonry wall reinforcement. Draw to scale not smaller than 1:50 (¼" = 1'-0").

.3 Show on drawings:

.1 Sizes, spacings and locations of reinforcement, with identifying labels.

.2 Bar bending details.

.3 Lengths and locations of all lap splices.

.4 Types and locations of mechanical splices.

.5 Placing sequence.

.6 Large scale details at areas of steel concentration (such as column / beam / wall intersections), and around cast-ins.

.7 Bar lists.

.8 Quantities of reinforcement (including all rebar added to accommodate installation).

.9 Construction joint, control joint and pour gap locations.

.10 Strip dimensions for flat slab and flat plate.

.11 Concrete cover.

.4 Do not release for fabrication reinforcing bars whose length may be affected by field conditions, such as the final elevation of footings, until obtaining the required field measurements.

Part 2 Products

2.1 Materials

.1 Reinforcing steel: carbon steel, deformed bars to CSA G30.18 Grade 400R., unless indicated otherwise.

.2 Weldable Reinforcing steel: weldable low alloy steel deformed bars to CSA G30.18.

.3 Stainless Reinforcing steel: deformed bars to ASTM A955/A955M.

.4 Cold-drawn annealed steel wire ties: to ASTM A1064/A1064M.

.5 Welded steel wire fabric: to ASTM A1064/A1064M. Provide in flat sheets only.

.6 Epoxy Coating of reinforcement: to ASTM A775/A775M.

.7 Chairs, bolsters, bar supports, spacers: to CSA A23.1/A23.2.

.8 Mechanical splices: to concentrically align bars and develop specified tensile strength of rebar. Threaded couplers to have plastic internal coupler thread protectors.

.9 Rebar terminators: oversized taper-threaded couplings capable to develop specified tensile strength of rebar; area to be not less than 5 times the rebar area.

.10 Plain round bars: to CSA G40.20/G40.21.

.11 Expansion cap for dowels at expansion / contraction joints: plastic, tight fitting, with internal pin to locate dowel and create void for expansion.

Part 3 Execution

3.1 Fabrication and Erection

.1 Fabricate reinforcing steel in accordance with CSA A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice.

.2 Fabricate epoxy coated reinforcing steel in accordance with ASTM D3963/D3963M. Plants to be certified by the CRSI for epoxy coated steel. Provide colour to contrast sharply with reinforcing steel and rust colour.

.3 Stagger mechanical splices 750 mm (2’-6”) unless otherwise noted on drawings.

.4 Weld reinforcement in accordance with CSA W186 where indicated.

.5 Fabricate shear stud reinforcing according to CSA W59. Weld studs to rail to develop.

.6 Ship bundles of bar reinforcement, clearly identified in accordance with bar lists.

.7 Provide standard hooks at ends of all hooked bars.

.8 Substitute different size bars only if permitted in writing by Departmental Representative.

3.2 Field Bending

.1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.

.2 When field bending is authorized, bend without heat, applying slow and steady pressure. Use tools which will limit bend radii to the values given in CSA A23.1.

.3 Where key-creating stay form with pre-installed blind dowels is used, bend the dowels out using special tools approved by the stay form manufacturer.

.4 Replace bars which develop cracks or splits.

3.3 Placing Reinforcement

.1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CSA A23.1/A23.2.

.2 Remove all loose scale, dirt, oil or other coatings which would reduce bond.

.3 Ensure cover to reinforcement is maintained during concrete pour.

.4 Turn ends of tie wire towards the interior of concrete.

.5 Support bars, chairs and spacers:

.6 Provide sufficient support bars, chairs, carriers and side form spacers as necessary to secure against displacement of reinforcement and maintain concrete cover before and during concrete placement. Support devices contacting surfaces exposed to the exterior to be non-corroding. Bars which are not shown on Structural Drawings and whose only function is supporting other reinforcing in lieu of other supporting devices to be considered accessories.

.7 Use bar supports for beams and slabs.

.8 Use side form spacers for walls and columns.

.9 Use plastic or plastic tipped bar supports and spacer with colour to match concrete for exposed concrete surfaces.

.10 Use plastic bar supports, epoxy coated support bars and plastic coated tie wire for epoxy coated reinforcement.

.11 Use precast concrete chairs where supports rest on the ground. Where welded wire fabric is used in slabs-on- grade, place precast concrete chairs at 600 mm (2’-0”) on centre each way. Do not attempt to position welded wire fabric by lifting it after concrete is poured.

.12 Do not splice reinforcing at locations other than shown on placing or structural drawings without Departmental Representative written approval.

.13 Do not cut reinforcement without Departmental Representative written approval.

.14 Unless otherwise noted on drawings, stagger alternate mechanical couplers 750 mm (2'-6") apart.

.15 Install end bearing compression splices so that bearing ends are fitted to within 3 degrees of full bearing after splice installed.

.16 Do not field weld reinforcement except where indicated or authorized by Departmental Representative.

.17 Do not weld epoxy coated reinforcement.

.18 Obtain Departmental Representative field review of all reinforcing materials and placement before pouring concrete.

3.4 Field Touch-Up

.1 Touch up damaged and cut ends of epoxy coated reinforcing steel with compatible finish to provide continuous coating.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 10 00: Concrete Forming and Accessories.

.2 Section 03 20 00: Concrete Reinforcing.

.3 Section 05 12 23: Structural Steel for Buildings.

1.2 REFERENCES

.1 All referenced standards to be the current edition or the edition referenced by the applicable Building Code in force at the time of building permit application, as noted on Structural Drawings.

.2 Canadian Standards Association (CSA International):

.1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA A283, Qualification Code for Concrete Testing Laboratories.

.3 CSA A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.3 ASTM International Inc.:

.1 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.2 ASTM C920 – Standard Specification for Elastomeric Joint Sealants

.3 ASTM D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.4 ASTM E1155M Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Number (Metric).

.4 Canadian General Standards Board (CGSB)

.1 CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction

1.3 QUALITY ASSURANCE

.1 Qualifications

.1 Concrete supplier to have a valid “Certificate of Ready Mixed Concrete Production Facilities” issued by the relevant Ready Mixed Concrete Association.

1.4 QUALITY CONTROL

.1 Submit in accordance with Section 01 45 00 - Quality Control.

.2 Minimum two weeks prior to starting concrete work, provide valid certificate from plant delivering concrete.

.1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.

.3 For concrete with high volume of supplementary cementing materials (HVSCM concrete, as defined in CSA A23.1), perform trial mixes to ensure that the required properties are achieved.

.4 Minimum four weeks prior to starting concrete work, provide proposed quality control procedures on following items:

.1 Hot weather concrete.
.2 Cold weather concrete.
.3 Finishing.
.4 Protection.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meeting: convene pre-installation meeting one week prior to beginning concrete works. Ensure key personnel to attend.

.2 Batch Logs: keep record of each batch delivered to site.

.3 Concrete Delivery Slips: Keep all concrete delivery slips (“driver’s tickets”) on site until building is completed. Record on delivery slip where concrete was placed, including time and date.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Minimum 2 weeks prior to starting concrete work, submit all concrete mix designs, and indicate where each concrete mix is to be used.

.3 Minimum 2 weeks prior to placing concrete, submit drawings showing proposed locations of all construction and control joints (including wall and slab on grade control joints) for Departmental Representative review and approval.

.4 Provide composite sleeving drawings showing sleeves required by all trades.

.5 Provide composite layout drawings showing all cast in place pipes and conduits.

.6 Minimum submission requirements for each concrete mix design shall include the following:

.1 Minimum specified compressive strength at 28 days (or at the time specified on drawings).
.2 Maximum aggregate size.
.3 Aggregate type (if not normal density).
.4 Concrete density range, wet and dry (if not normal density).
.5 CSA exposure class.
.6 Cement type (if not type GU).

.7 Percentage and type of supplemental cementing materials.

.8 Maximum water/cementitious materials ratio.

.9 Assumed method of placement of concrete.

.10 Corrosion inhibitor (name and quantity, if applicable).

.11 Plastic or steel fibres (type, name and quantity, if applicable).

.12 Alkali-aggregate resistance.

.13 Architectural requirements (colour of cement and aggregate, if applicable).

.14 Maximum time from batching to placing concrete (if retarding admixtures are used).

.7 Concrete pours: provide accurate records of all concrete pours marked on a set of Structural Drawings.

.8 Flatness and levelness: when requested, submit measurements of slab tolerances for each concrete pour.

.9 On completion of the works, provide written report to Departmental Representative certifying that the concrete in place meets performance requirements established in **Part 2 - Products.**

Part 2 Products

2.1 DESIGN CRITERIA

.1 To CSA A23.1/A23.2, Alternative 1 – Performance, and as described under Mixes and on Structural Drawings.

2.2 PERFORMANCE CRITERIA

.1 Concrete supplier to meet the concrete performance criteria established by Departmental Representative and to provide verification of compliance.

2.3 MATERIALS

.1 Portland cement: to CSA A3001.

.2 Cementitious hydraulic slag: to CSA A3000.

.3 Fly ash: to CSA A3001, Type CI.

.4 Water: to CSA A23.1.

.5 Aggregates: to CSA A23.1/A23.2. Do not use recycled concrete as aggregate.

.6 Admixtures: not to contain chlorides.

.7 Corrosion-inhibiting admixture: calcium nitrite solution.

.8 Plastic fibre additive: fibrillated polypropylene fibres at least 19 mm (3/4”) in length.

.9 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA A23.1/A23.2. Minimum compressive strength: 40 MPa at 28 days.

.10 Non premixed dry pack grout: composition of non metallic aggregate and Portland cement with sufficient water for mixture to retain its shape when made into ball by hand and capable of developing compressive strength of 40 MPa at 28 days.

.11 Curing/sealing compound: to CSA A23.1/A23.2 and ASTM C309, Type 1, Class B, water based acrylic, compatible with surface hardener where hardener is used.

.12 Pre-moulded joint fillers: min.12 (1/2") bituminous impregnated fiber board to ASTM D1751.

.13 Joint Sealants: to AST C920, class 100/50.

.14 Weep hole tubes: plastic.

.15 Evaporation reducer: water based polymer liquid forming continuous monomolecular temporary film on fresh concrete surface.

.16 Penetrating sealer: water based, clear water repellent, at least equivalent to AT&U Type 1b as specified in Alberta Infrastructure and Transportation Publication B388.

.17 Bonding adhesive: synthetic latex.

.18 Rigid insulation: extruded polystyrene boards per ASTM C578, structural grade, compressive strength 40 psi (275 kPa).

.19 Control joint filler: semi-rigid two component epoxy or polyurea with 100% solids, Shore A hardness (per ASTM D2240) min. 85, tensile strength at 7 days (per ASTM D638) min 5.0 MPa.

.1 For sawcuts in exterior slabs and in slabs in vehicle accessible areas use only polyurea fillers.

.20 Pre-formed control joint: two piece pre-assembled "T" shaped plastic; detachable top segment, minimum depth of horizontal segment equal to ¼ of slab thickness.

2.4 CONCRETE MIXES

.1 Use ready-mix concrete. Proportion concrete in accordance with CSA A23.1, Alternative 1 - Performance Method for Specifying Concrete.

.2 Set performance characteristics of concrete in plastic state in coordination with all trades involved.

.3 Meet performance criteria of concrete in hardened state as shown on Structural Drawings and provide verification of compliance.

.4 Do not use admixtures containing chlorides.

.5 Perimeter and exterior grade beams and pile caps:

.1 Exposure class: c1

.2 Minimum compressive strength at 28 days: 35 MPa

.3 Nominal size of coarse aggregate: 20 (3/4")

.6 Supplementary cementing materials (SCM):

.1 Conform to CSA A23.1.

.2 Follow slag and fly ash manufacturers' directions for proportioning and mixing of concrete.

.3 Do not use concrete with more than 40% of SCM when ambient temperature is forecast to be below +10ºC at the time of concrete pour and during the seven days after the pour, except for footings, walls and columns.

.4 Reduce W/C ratio to 0.45 where using more than 40% of SCM in concrete for slabs and other horizontal finished surfaces, in order to reduce bleed water and to increase rate or strength gain.

Part 3 Execution

3.1 PREPARATION

.1 Provide advanced notice as indicated on drawings to allow Departmental Representative field review of reinforcing prior to placing of concrete/closing of wall forms.

.2 Obtain Departmental Representative written approval before placing concrete.

.3 Obtain written approval of each foundation bearing surface by the Geotechnical Consultant before placing concrete.

.4 Remove water and disturbed soil from excavations before placing concrete.

.5 Before placing slab-on-grade, confirm that subgrade and backfill meet specifications and are free of frost and surface water.

.6 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.

3.2 INSTALLATION/APPLICATION

.1 Set sleeves, conduits, pipe hangers, weep hole tubes, drains and other inserts and openings as indicated or specified elsewhere.

.2 Refer to Typical Details and Drawing Notes for placing guidelines, maximum size and minimum spacing of sleeves, embedded pipes and conduits.

.3 Check locations and sizes of sleeves and openings shown on Structural Drawings with Architectural, Mechanical and Electrical Drawings. Notify Departmental Representative of any discrepancies.

.4 Obtain Departmental Representative approval for any required sleeves and openings which are not shown on Structural Drawings or reviewed sleeving drawings.

.5 Set special inserts for strength testing as required for non destructive method of testing concrete.

.6 Set anchor rods using templates under supervision of appropriate trade prior to placing concrete. Locate each anchor rod group to within 6 mm (1/4”) of required location.

.7 Refer to Section 03 10 00 for construction joint requirements.

3.3 PLACING CONCRETE

.1 Place concrete in accordance with CSA A23.1.

.2 Delivery and place concrete with minimum re-handling.

.3 If concrete is pumped or placed pneumatically, control discharge velocity to prevent separation or scattering of concrete mix ingredients.

.4 Place concrete in a continuous operation without cold joints. If cold joints develop inadvertently, notify Departmental Representative to obtain instructions for required remedial work.

.5 Where higher strength concrete needs to be puddled in slabs above columns and walls, place adjacent lower strength slab concrete within 30 minutes of pouring the puddled concrete.

.6 Do not overload forms.

.7 Use rubber tipped vibrators for concrete containing epoxy coated reinforcement.

.8 Cast slabs and beams at least two hours after casting the supporting columns and walls.

.9 Cast slabs with a top surface that is level or sloping as required by the Drawings. Allow for cambering where required.

.10 Where steel beams are used, ensure that slab thickness is as specified. Measure from top of steel to control thickness.

.11 Concrete exposed to view:

.12 Exposed surfaces to be dense, even, uniform in colour, texture and distribution of exposed aggregate.

.13 Defects such as honeycombing, voids, loss of fines, visible flow lines, cold joints or excessive bug holes may be cause for rejection at the discretion of the Architect.

.14 Maintain accurate records of all poured concrete including extent, date and location of each pour, concrete mix used, ambient air temperature, test samples taken and falsework removal date and mark on a set of Structural Drawings.

3.4 FINISHING CONCRETE

.1 Finish concrete to CSA A23.1/A23.2.

.2 Cooperate with any trade applying finishes to concrete surfaces and provide surfaces which will ensure adequate bond. Provide chases and reglets where required.

3.5 CONCRETE CURING AND PROTECTION

.1 At a minimum cure and protect concrete in accordance with CSA A23.1

.2 Extend curing and protection period until concrete has reached following strength levels for structural safety:

.3 Piers and footings: 50% of specified 28 day strength

.4 For concrete containing supplementary cementing materials, curing and protection times may need to be extended beyond those outlined by CSA A23.1 to achieve the required structural properties.

.5 Cure slab surfaces immediately after finishing is completed. Unless otherwise noted or required, use a curing compound compatible with applied finishes.

.6 Do not use curing compound on parking garage slabs and where bonded topping is to be applied. Cover slab surfaces with absorptive mat or fabric and keep continuously wet.

.7 Do not load concrete until sufficient strength is developed.

3.6 INSPECTION AND TESTING

.1 An independent Inspection and Testing Agency (certified under CSA A283 with category to suit testing provided) will be appointed to carry out inspection and testing of concrete and concrete materials and check conformance with applicable Standards and Contract documents.

.2 Assist the Inspection and Testing Agency in its work. Notify as to the Work Schedule and provide safe access to the work area as required. Provide concrete samples.

.3 The Agency will submit reports covering the work inspected and the testing performed. The reports will include the Supplier’s mix design numbers, locations in structure to which the tests relate and comments on abnormal results and conditions. The reports will be provided not later than five working days after the testing is completed.

.4 Sampling, storing, curing and testing of concrete will be in accordance with CSA A23.1/A23.2.

.5 The Agency will review all submittals pertaining to concrete mix designs and certification of plant, equipment and materials

.6 Compressive Strength Testing:

.1 One test is required for each 100 cubic meters of placed concrete, but not less than one test for each concrete mix placed each day. At least 3 tests are required for each class of concrete used.

.2 A group of three cylinders for each test will be provided, Location of concrete placement will be recorded for each cylinder set. One specimens will be tested at 7 and one at 28 days. The third specimen will be tested at 56 days if the required strength at 28 days is not achieved.

.3 If the final concrete strength is specified at 56, 90 or 120 days, a group of four cylinders will be provided. One specimen will be tested at 7 and one at 28 days,

with the third specimen tested at the time the final concrete strength is specified. If the required strength is not achieved at the time specified, the fourth specimen will be tested 28 days later.

.4 One additional cylinder will be provided for each concrete mix during cold weather concreting. The specimens will be cured on site adjacent to and under the same conditions as the work they represent, and will be tested prior to form removal.

.5 If standard on site cured cylinders are used to determine concrete strength prior to removal of formwork, they will be kept adjacent to and under the same conditions as the work they represent.

.6 If pull out tests are used to determine concrete strength prior to removal of formwork, the Inspection and Testing Agency will supply, locate and test pull out inserts. The inserts not to be located on surfaces exposed to view.

.7 If maturity tests are used to determine concrete strength prior to removal of formwork, the Inspection and Testing Agency will develop strength-maturity relationship curves, provide and install temperature sensors into fresh concrete and interpret readings in accordance with ASTM 1074.

.7 Inspection and testing by the Agency will not augment or replace the Contractor’s quality control nor relieve him of his contractual responsibility

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 30 00: Cast in Place Concrete.

.2 Section 09 91 00: Painting for Minor Works.

1.2 REFERENCES

.1 All referenced standards to be the current edition or the edition referenced by the applicable Building Code in force at the time of building permit application, as noted on Structural Drawings.

.2 Canadian Standards Association (CSA International):

.1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CSA S16, Limit States Design of Steel Structures.

.3 CSA S136, North American Specifications for the Design of Cold Formed Steel Structural Members.

.4 CSA W47.1, Certification of Companies for Fusion Welding of Steel.

.5 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.

.6 CSA W55, Certification of Companies for Resistance Welding of Steel and Aluminum.

.7 CSA W59, Welded Steel Construction (Metal Arc Welding).

.8 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.

.3 ASTM International Inc.:

.1 ASTM A123/A123M, Standard Specification for Zinc (Hot Dip Galvanized) coating on Iron and Steel Products.

.2 ASTM A36/A36M, Standard Specification for Carbon Structural Steel.

.3 ASTM F3125/F3125M, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPA) Minimum Tensile Strength, Inch and Metric dimensions

.4 ASTM A500, Specification for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

.5 ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc-Coated, Welded and Seamless

.6 ASTM A1011/A1011M, Standard Specifications for Steel, Sheet and Strip, Hot Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability and Ultra High Strength.

.7 ASTM A1085/A1085M, Standard Specification for Cold Formed Welded Carbon Steel Hollow Structural Sections (HSS)

.8 ASTM A992, Standard Specifications for Structural Steel Shapes.

.9 ASTM F1554, Standard Specification for Anchor Bolts, Steel 36, 55 and 105 ksi Yield Strength.

.4 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturers Association (CPMA):

.1 CISC Handbook of Steel Construction.

.2 CISC/CPMA Standard 1-73a, A Quick-drying One-coat Paint for Use on Structural Steel.

.3 CISC/CPMA Standard 2-75, Quick-drying Primer for Use on Structural Steel.

.5 The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers (NACE) International:

.1 SSPC-SP 1, Solvent Cleaning.

.2 NACE No. 3 / SSPC-SP 6, Commercial Blast Cleaning.

.3 NACE No.4 / SSPC-SP 7, Brush Off Blast Cleaning.

.4 NACE No.2 / SSPC-SP 10, Near White Blast Cleaning.

.5 SSPC Technology Guide No.14 – Guide for the Repair of Imperfections in Galvanized, Organic or Inorganic Zinc-Coated Steel Using Organic Zinc Rich Coating.

.6 SSPC Paint Specification No. 20 – Zinc Rich Coating, Type I – Inorganic and Type II – Organic.

1.3 QUALITY ASSURANCE

.1 Qualifications

.1 Structural steel fabricator and erector to be certified by the Canadian Welding Bureau under the requirements of CSA W47.1, Division 1 or 2 for fusion welding and/or CSA W55.3 for resistance welding of structural steel components, and to have CWB approved procedure for welding rebar (Grade 400W) to structural steel.

.2 Welders to be CWB approved, working under supervision of a CWB approved firm.

.3 Engage a Professional Engineer licensed in the place where the project is located to be responsible for design, detailing and installation of all connections related to structural steel work.

.4 The Professional Engineer designing connections to hold a Certificate of Authorization, and to carry min. $1,000,000.00 in liability insurance (per occurrence).

1.4 QUALITY CONTROL

.1 Submit in accordance with Section 01 45 00 - Quality Control.

.2 Source Quality Control Submittals:

.1 Provide all submittals 4 weeks prior to starting fabrication of structural steel.

.2 Mill test reports:

.1 Mill test reports to include ladle analysis and physical test results, and to show chemical and physical properties and other details of steel to be incorporated in project.

.2 The reports to be correlated to the materials or products to which they pertain

.3 In addition to mill testing, each batch of structural steel (including bolts) manufactured outside United States, Canada, Great Britain and EU countries must also be tested in Canada by an ISO 17025 certified testing laboratory. In addition to compliance with all the relevant CSA and ASTM requirements, the testing must show that the maximum boron content in structural steel does not exceed 0.0008%.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings:

.1 Provide drawings stamped and signed by the Professional Engineer responsible for steel connections.

.2 Before submitting shop drawings, provide a letter signed and sealed by that Engineer stating that he has been engaged to undertake the responsibility for the above. Also submit a copy of that Engineer's Certificate of Authorization, and proof of his liability insurance.

.3 If additional information is required from Departmental Representative, allow a minimum of five working days for Departmental Representative to review and respond to the request for information.

.4 It is advisable to submit erection diagrams for review before preparing shop details. Copies of plans and section details developed by Departmental Representative will not be accepted as erection diagrams.

.3 Erection drawings:

.1 Submit erection drawings indicating details and information necessary for assembly and erection purposes including:

.1 Description of erection methods.

.2 Sequence of erection.

.3 Temporary bracings.

.4 Beam sizes (in addition to beam marks).

.5 Connections where threads must be excluded from shear plane.

.6 Details of all field welded connections

.7 Sliding bearing assemblies.

.8 Provide setting drawings showing dimensions and details for placing steel assemblies which are set in concrete,

.4 Fabrication drawings:

.1 Submit fabrication drawings showing designed assemblies, member sizes, components and connections. Show on drawings:

.1 Material specifications.

.2 Surface preparation.

.3 Shop painting / galvanizing.

.4 Section splices.

.5 Types of shop and field connections.

.6 Net weld lengths.

.7 Precautions which will be taken to exclude threads from shear planes of bearing type bolted connections (where applicable).

.8 Protected zones.

.9 Vent holes required for galvanizing process.

.10 Camber.

.11 Architectural clearance lines and finishes where connections could encroach other works.

.12 Beam and column web holes required for services and reinforcing around them.

.2 Show details by which steel assemblies, which are set in concrete, are to be connected to the formwork.

.3 Substitution of alternative sections will only be allowed provided the new members have equal or greater capacity and stiffness and their dimensions are approved by DEPARTMENTAL REPRESENTATIVE.

.5 When requested, submit sketches and design calculations stamped and signed by the Professional Engineer responsible for connection design.

.6 Provide technical specifications for all sliding bearing assemblies.

.7 On completion of erection, submit a letter signed and sealed by the Professional Engineer responsible for structural steel connections certifying that the work has been completed in accordance with all contract documents**.**

Part 2 Products

2.1 DESIGN AND DETAILING REQUIREMENTS

.1 Design details and connections in accordance with requirements of CSA S16 and CSA S136 to resist forces and to allow for movements indicated. Consider load effects due to fabrication, erection and handling.

.2 Connection design to include consideration of all pass-through forces, including tension, compression, moment and shear. Provide local reinforcement at connection or joint as required.

.3 Follow conceptual connection details if shown on structural drawings. Do not change without Departmental Representative written approval. If welds are defined on drawings, the sizes shown are minimum requirements which might need to be increased to suit connection design.

.4 Increase specified section thickness at no extra cost if required for fabrication (bending) or galvanizing. Alternatively, build up curved sections from plates.

.5 Assume that bolt threads are intercepted by shear plane, unless special measures are indicated on shop drawings to exclude threads from shear plane.

.6 Beams:

.1 Select beam end connections from CISC "Handbook of Steel Construction" when connection for shear only (standard connection) is required.

.2 Typical beam to spandrel beam and beam to column connections to be two sided or end plate connections.

.3 Select or design beam end connections for factored shear indicated on plans.

.4 When shears are not indicated, select or design non- composite beam end connections to resist reaction due to maximum uniformly distributed load capacity of the beam in bending.

.5 When shears are not indicated, select or design composite beam end connections to resist one and a half times the reaction due to maximum uniformly distributed load capacity of the non- composite beam section in bending.

.6 Except within moment frames, where axial forces occur in beams framing to opposite sides of a supporting member, design connections for a pass-through force equal to the smaller of the two axial forces. If beam sizes differ, assume the axial force is centred in the smaller beam.

.7 Where axial forces occur in beams within moment frames, connect both ends of beams to columns e for the axial force shown.

.8 Where no axial force is shown for beam to column connection, design to resist horizontal tension / compression equivalent to 2% of the factored axial force in column, in addition to all other loads.

.9 Seated beam connections to have top clip angles.

.10 End bearing connections of inclined members to have horizontal bearing plane at supported member.

.11 Extend beams bearing on walls for the full length of bearing plates.

.12 For beams continuous over supports and for beams supporting columns, provide min. 6 mm (1/4”) stiffener plates at each side of web at point of concentrated load, unless thicker stiffeners are required by connection design or different details are shown on drawings.

.13 Provide all spandrel beams and all floor beams not fully braced by floor construction with top and bottom flange connections for torsional restraint.

.14 Where studs for composite action are connected to composite beams indirectly (i.e. through a plate attached to beam top flange), connect plate to beam to transfer the full shear capacity of all studs.

.7 Holes:

.1 Where holes for services are required through webs of beams or columns, coordinate size and location with Architectural, Mechanical and Electrical drawings, and show on fabrication drawings. Reinforce in accordance with Typical Detail. Alternatively, design reinforcing in accordance with the procedure set forth in the CISC Handbook of Steel Construction, and provide calculations for Departmental Representative review.

.8 Do not oversize anchor rod holes for site tolerances. Use hole sizes suggested in the CISC Handbook of Steel Construction.

.9 Connect new steel members to existing concrete using drilled concrete anchors, refer to Post Installed Anchors and Dowels notes on drawings. Do not field weld at connections with adhesive anchors.

2.2 MATERIALS

.1 Structural steel:

.1 Rolled shapes: to CSA G40.21 or ASTM A992, Grade 350W.

.2 Anchor rods: CSA G40.21, or ASTM 1554, Grade 300W; or ASTM F1554 Grade 36.

.3 Bolts, nuts and washers: to ASTM F3125, Grade A325.

.4 Checker plate: to CSA G40.21, Grade 300W. Plate with rolled-in embossments to provide non-slip surface.

.5 Welding materials: to CSA W48 and CSA W59, certified by Canadian Welding Bureau. For members in seismic force resisting system, refer to additional brittleness requirements in CSA S16.

.6 Hot dip galvanizing: to ASTM A123/A123M, minimum zinc coating of 600 g/m².

.7 Epoxy coating: pre-mixed, 2 components, high-solids (volume of solids 87 ±3%), self-priming,

.8 Headed studs: to CSA W59, Type B, min. Fy=350 MPa

.9 Joint filler for exposed steelwork: Epoxy resin.

2.3 FABRICATION

.1 Fabricate structural steel in accordance with CSA S16 and with reviewed shop drawings.

.2 Install shear studs in accordance with CSA W59.

.3 Continuously seal hollow members exposed to weather by intermittent welds and plastic filler unless continuous welds are indicated on drawings.

.4 Position beams having permissible mill camber so that the camber is up.

.5 Install stud anchors for cast in plates and similar elements in shop with end welds in accordance with the recommendations of the stud manufacturer. Lengths of studs given on drawings are the lengths after welding. Replace studs that crack in the weld or shank.

.6 Mill column bearing plates as required to provide full contact bearing and develop column bearing strength.

.7 Complete welded shop connections prior to galvanizing.

.8 Mark materials in accordance with CSA G40.20/G40.21. Do not use die stamping. When steel is to be left unpainted, place marking at locations not visible from exterior.

.9 Match marking: shop mark bearing assemblies and splices for fit and match.

.10 Where shop inspection is required, do not ship material to the site before it has been inspected.

.11 Fabricate in stages complex members for which steel inspection is impossible or difficult once completed, and arrange for the Inspection and Testing Agency to do intermediate shop inspections.

Part 3 Execution

3.1 GENERAL

.1 Structural steel work: in accordance with CSA S16.

.2 Welding: in accordance with CSA W59.

3.2 CONNECTION TO EXISTING WORK

.1 Verify dimensions and condition of existing works prior to start of fabrication. Report discrepancies, modify connection details if required and submit to Departmental Representative for review. Determine any potential interference with existing services and report problem areas to Departmental Representative for direction before commencing work.

.2 Take precautions to protect existing works from damage. Provide temporary shoring as required. Repair damage to adjacent materials caused by structural steel installation.

3.3 MODIFICATION/REMOVAL OF EXISTING STEEL WORK

.1 A set of Structural Drawings of the existing building may be viewed at the offices of the Architect or Departmental Representative.

.2 Dismantle and cut existing structural steel as required. Provide temporary shoring and bracing required for these operations. Retain a Professional Engineer to design the temporary shoring and to review this work on site.

.3 Clean existing structural steel, which is affected by the work and is to remain in place, down to bare metal, prior to its inspection so that its condition may be ascertained. Notify Departmental Representative when members are ready for inspection.

.4 Remove from site existing steel which is dismantled but not designated for re-use.

3.4 ERECTION

.1 Erect structural steel in accordance with CSA S16 and reviewed erection drawings.

.2 Do not field cut or alter any members without Departmental Representative approval.

.3 Make adequate provision for all loads acting on the structure during erection. Provide erection bracing to keep the structure stable, plumb and in true alignment during construction. Bracing members or connections shown on Structural Drawings are those required for the completed structure, and may not be sufficient for erection purposes.

.4 Steel framing to be plumb at temperature of 20°C. If erection is carried out at temperatures greatly differing from 20°C, make adequate provisions; some members may

need to be +erected out of plumb in order to become plumb when the temperature stabilizes at 20°C.

.5 Do not make permanent connections until structure has been properly aligned.

.6 Install bolts which are not pre-tensioned to be snug tight.

.7 Install bolts in pre-tensioned connections using turn-of-nut method.

.8 Where slotted connections are shown on structural drawings, finger tighten bolts to a snug fit and burr threads to prevent nuts from working loose.

.9 Apply dry lubricant to threads of all galvanized bolts prior to installation.

.10 Weld beams to bearing plates unless otherwise noted on drawings.

.11 Adjust and finalize connections at wall supporting elements affected by floor beam deflections after concrete is poured.

.12 Provide dissimilar metal separators at connections between aluminum members and structural steel.

.13 Report ill fitting connections to Departmental Representative before taking corrective measures.

.14 When welding after galvanizing is in place, grind away galvanizing at areas to be welded.

.15 Do not weld in an ambient temperature below 17ºC. Preheat material adjacent to welding areas when ambient temperature is between 17ºC and +4ºC.

.16 Remove slag from all completed welds so that they may be visually inspected.

.17 Seal members by continuous welds where indicated.

.18 Remove field connection aids from all surfaces which will be exposed to view and where interfering with clearances required by other trades.

3.5 FIELD PAINTING

.1 Paint in accordance with Section 09 91 00 - Painting for Minor Works

.2 Touch up damaged surfaces with the same paint as the shop coat.

.3 Repair any galvanized or zinc rich painted surfaces which have been damaged or field welded in accordance with SSPC Technology Guide No.14.

.4 Clean and prepare surfaces of bolts, which will receive a finished coat of paint in the same manner as the connected steelwork.

3.6 INSPECTION AND TESTING

.1 An Inspection and Testing Agency (certified to CSA W178.1 & 2) will be appointed to carry inspection and testing of all structural steel.

.2 Do not commence fabrication until details of inspection have been worked out with the Agency.

.3 Assist the Inspection and Testing Agency in its work. Notify as to the Work Schedule and provide safe access to the work area as required.

.4 The Inspection Agency will submit reports to DEPARTMENTAL REPRESENTATIVE, Contractor and Municipal Authorities covering the Work inspected and provide details of errors or deficiencies observed.

.5 Work will be inspected in shop and when erected. Store fabricated members in shop so that they are accessible for inspection.

.6 Provide Inspection and Testing Agency with a copy of reviewed shop drawings.

.7 Welding inspection:

.1 Welding inspection will be conducted in shop and in field.

.2 The Inspector will check welders' CWB certification.

.3 The Inspector will review welding procedures for conformance with CWB requirements, manufacturers' requirements and standard practice.

.4 Arrange for the Inspector to be present during welding of 10% of moment connections and 10% of butt welds in direct tension.

.5 The inspector will visually check all for:

.1 Size, length and profile

.2 Joint preparation, including cleaning and removal of any paint.

.3 Fit up and alignment.

.4 Penetration and fusion.

.5 Slag removal.

.6 Distortion.

.7 Porosity.

.8 Cracks.

.6 Non destructive testing will be conducted on the following connections:

.1 All shop and field welded splices.

.2 A representative 10% of all other welded connections.

.3 Test results will be evaluated in accordance with CSA W59.

.8 Shop inspection will include:

.1 Confirming that all materials meet specifications.

.2 Reviewing mill test reports for conformance with specified material grades.

.3 Checking that mill test reports and producer's certificates are properly correlated to materials and products supplied for the project and that legible markings were made on the material and products by the producers in accordance with the applicable standards. Where this is not possible, Departmental Representative may request sample testing to be carried out as described below.

.4 Checking fabricator's qualification under the requirement of CSA W47

.5 Sampling fabrication procedures for general conformity with Contract requirements.

.6 Reviewing cambering procedure for effect on member capacity.

.7 Checking surface preparation for members to be painted.

.8 Checking shop painting and galvanizing.

.9 General checking:

.1 Dimensions and cross sections in relation to specified member sizes.

.2 Allowable mill sweep and camber.

.3 Locations of all holes, cuts and fittings.

.4 Reinforcement of openings.

.5 Milling of ends for bearing.

.6 Base plate orientation.

.7 Items to be cast in concrete.

.8 Fabrication tolerances.

.9 Surface preparation prior to shop painting.

.10 Sample testing: When requested, test coupons will be taken and tested in accordance with CSA G40.20 to establish identification. Cut samples from member locations selected by Departmental Representative and provide to the Inspection and Testing Agency. Make good the locations if requested, at no extra cost, by adding new plates and welds acceptable to Departmental Representative. The Agency will have the samples tested for mechanical properties and for chemical composition and will classify the steel as to specification.

.9 Field inspection:

.1 Arrange for the Inspector to start field inspection as soon as each section of the Work is completed, plumbed, bolts tightened and field welding finished.

.2 The Inspector will sample erection procedures for general conformity with Contract requirements.

.3 The Inspector will check general fit-up and tolerances and report any apparent distortions and misalignments.

.4 Minimum 10% of columns and 10% of beams will be checked by instruments for plumbness, alignment and elevation.

.5 Field inspection will include:

.1 Checking individual frame members for twisting, sweep and local damage.

.2 Checking levelness of leveling plates.

.3 Inspection of grouting under base plates and bearing plates.

.4 Checking column bearings on cast in plates.

.5 Checking bearings on steel.

.6 Inspection of bolting, shear studs and post installed anchors as described below.

.7 Checking that column connections are adjusted to keep the columns plumb after supported structure has deflected due to dead loads applied.

.8 Checking that all adjustable connections have been finalized after concrete is poured.

.9 Inspection of field painting.

.10 Inspection of field touch-up.

.6 Shear stud inspection:

.1 The Inspector will visually check all stud shear connectors on composite steel beams.

.2 Bent studs that show no sign of failure will be accepted and shall remain in the bent position. Studs that crack in weld, base metal or shank will be rejected. Studs with end welds covering less than 85% of the perimeter will be rejected even if they pass the bend test.

.7 Post installed anchor inspection:

.1 The Inspector will sample check drilled concrete anchors.

.2 The Inspector will provide full time inspection during installation of post installed adhesive anchors subject to sustained tension loads.

.3 The Inspector will randomly select and pull test 5% of all types and sizes of post installed anchors installed on a weekly basis, but not less than one anchor of each type, size and orientation. Pull test to twice the allowable tensile load, or 1.5 times the factored resistance of the anchor given by the manufacturer. Chose anchor locations where proximity to concrete edge does not affect anchor capacity, or use reduced anchor loads per manufacturer’s recommendation. Submit reports to Departmental Representative within one week of testing. Reports to indicate each anchor location, test load and mode of failure, if applicable. Notify Departmental Representative immediately if any anchor fails the pull test

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - current edition .

.2 Maintenance Repainting Manual - current 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 for paint and coating products and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06- Health and Safety Requirements and 01 35 43- Environmental Procedures .

.3 Samples:

.1 Submit for review and acceptance of each unit.

.2 Samples will be returned for inclusion into work.

.3 Submit 200 x 300 duplicate mm sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards.

.4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions and 01 61 00- Common Product Requirements.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Provide and maintain dry, temperature controlled, secure storage.

.2 Store painting materials and supplies away from heat generating devices.

.3 Store materials and equipment in well ventilated area within temperature as recommended by manufacturer.

.4 Fire Safety Requirements:

.1 Supply 9 kg Type ABC fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada (NFC) requirements.

1.4 SITE CONDITIONS

.1 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Apply paint finishes when ambient air and substrate temperatures at location of installation can be satisfactorily maintained during application and drying process, within MPI and paint manufacturer's prescribed limits.

.2 Test concrete, masonry and plaster surfaces for alkalinity as required.

.3 Apply paint to adequately prepared surfaces, when moisture content is below paint manufacturer's prescribed limits.

.2 Additional application requirements:

.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

.2 Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

1.5 QUALITY ASSURANCE

.1 Mock-Up:

.1 Provide a site mock-up for the painting of the existing structure to remain indicating methods and materials, and procedures proposed to achieve final results in accordance with Section 01 45 00– Quality Control, and to comply with following requirements, using materials indicated for completed work:

.1 Build full mock-ups as directed by Departmental Representative.

.2 Obtain Departmental Representative's acceptance of mock-ups before starting construction; mock-up used throughout construction period as standard of acceptance for subsequent work.

.3 Mock-up can remain as part of work.

Part 2 Products

2.1 MATERIALS

.1 Supply paint materials for paint systems from single manufacturer.

.2 Conform to latest MPI requirements for painting work including preparation and priming.

.3 Materials in accordance with MPI - Architectural Painting Specification Manual

.4 Colours:

.1 Colours to match existing. Submit proposed Colour Schedule Departmental Representative for review.

.2 Base colour schedule on selection of 3 base colours.

.5 Mixing and tinting:

.1 Perform colour tinting operations prior to delivery of paint to site, in accordance with manufacturer's written recommendations. Obtain written approval from Departmental Representative for tinting of painting materials.

.2 Use and add thinner in accordance with paint manufacturer's recommendations.

.1 Do not use kerosene or similar organic solvents to thin water-based paints.

.3 Thin paint for spraying in accordance with paint manufacturer's written recommendations.

.4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

.6 Gloss/sheen ratings:

.1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

Gloss Level-Category	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish	Max. 5	Max. 10
Gloss Level 2 - Velvet	Max.10	10 to 35
Gloss Level 3 - Eggshell	10 to 25	10 to 35
Gloss Level 4 - Satin	20 to 35	min. 35
Gloss Level 5 - Semi-Gloss	35 to 70	
Gloss Level 6 - Gloss	70 to 85	
Gloss Level 7 - High Gloss	More than 85	

.2 Gloss level ratings of painted surfaces as indicated.

.7 Exterior painting and repainting:

.1 Structural Steel and Metal Fabrications including Galvanized Metal: columns, beams, joists and miscellaneous metal.

.1 EXT 5.3J - Alkyd Gloss Level 5 finish.

.2 Primer: W.B. Galvanized Primer 134

.3 Paint: W.B. Light industrial Coating (2 coats) 163

.4 Passivation treatment must be removed with a product intended for this purpose (mineral solvents and spirits are not permitted).

Part 3 Execution

3.1 GENERAL

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

.2 Perform preparation and operations for painting in accordance with MPI - Architectural Painting Specifications Manual and MPI - Maintenance Repainting Manual except where specified otherwise.

3.2 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

3.3 PREPARATION

.1 Protection of in-place conditions:

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative .

.2 Protect factory finished products and equipment.

.2 Surface Preparation:

.1 Remove electrical cover plates, surface hardware on doors, and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.

.2 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.

.3 Clean and prepare surfaces in accordance with MPI - Maintenance Repainting Manual and MPI - Architectural Painting Specification Manual specific requirements and coating manufacturer's recommendations.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.5 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

.3 Metal surfaces to be repainted:

.1 Clean surfaces by removing loose, cracked, brittle or non-adherent paint, rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with following.

.1 Commercial blast cleaning: to SSPC-SP 6.

.2 Brush-off blast cleaning: to SSPC-SP 7.

.3 Solvent cleaning: to SSPC-SP 1.

.4 Hand tool cleaning: to SSPC-SP 2.

.5 Power tool cleaning: to SSPC-SP 3.

.2 Commercial blast clean rusted and bare metal surfaces where existing paint system has failed.

.3 Brush-off blast clean remaining metal surfaces to be painted.

.4 Scrape edges of old paint back to sound material where remaining paint is thick and sound, feather exposed edges.

.5 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements.

.6 Touch up of shop primers with primer as specified.

3.4 APPLICATION

.1 Paint only after prepared surfaces have been accepted by Departmental Representative.

.2 Use method of application approved by Departmental Representative.

.1 Conform to manufacturer's application recommendations.

.3 Apply coats of paint in continuous film of uniform thickness.

.1 Repaint thin spots or bare areas before next coat of paint is applied.

.4 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.5 Sand and dust between coats to remove visible defects.

3.5 CLEANING

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

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning .

.3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19- Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.4 Place paint and primer defined as hazardous or toxic waste, including tubes and containers, in containers or areas designated for hazardous waste.

END OF SECTION

Part 1 GENERAL

1.1 WORK INCLUDED

.1 Supply of standard products.

1.2 SUBMITTALS

.1 Submit shop drawings in accordance with Section 01 33 00 Submittals.

.2 Product Data:

.1 Submit manufacturer′s instructions, printed product literature and data sheets for accessories specified, and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop drawings:

.1 Provide shop drawings clearly indicating all sizes, connections, anchorage, shapes and accessories.

.2 Shop drawings must be submitted prior to ordering materials.

1.3 FABRICATION

.1 Verify all dimensions on site prior to fabrication.

.2 Fabricate items in accordance with sizes, profiles, and finishes required.

1.4 MAINTENANCE DATA

.1 Provide maintenance data on all miscellaneous specialty items, including cleaning instructions, and incorporate into O & M manuals.

Part 2 PRODUCTS

2.1 BOLLARD COVERS

.1 Post Guard polyethylene plastic pipe sleeves for steel pipe bollards.

.1 Performance Requirements:

.1 High molecular weight material: Designed for optimum balance of density, molecular weight and molecular weight distribution demonstrating maximum property advantages for large products that require high impact resistance.

.2 Ultraviolet Protection Additive: Six (6) Year UV stabilizer package. Warranty 6 Years.

.3 Thickness: Nominal wall thickness will be 0.125 inch.

.4 Abrasion Resistant.

.5 Environmental Stress Cracks Resistant

6. Reflective Tape: Each Post Guard has 2 strips of Reflective tape recessed on the part 5.875 inches apart.

.7 Flexural Modulus: 200,000 psi.

.8 Tensile Strength: 4,000 psi.

.9 Installation: include all materials required for installation.

.10 Size: 225 mm (8 7/8”) Diameter x 1525 mm (60”) high.
.11 Refer to drawings for locations.
.12 Coordinate with Structural.

Part 3 EXECUTION

3.1 ERECTION

.1 Install specialties square, plumb, straight, and true, at proper elevations and alignment with other Work, accurately fitted and adjusted by experienced workmen, in accordance with the manufacturer’s instructions.

.2 Provide suitable means of anchorage, such as foam tape, dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles as recommended by manufacturers.

.3 Supply items to be built-in by others, to appropriate trades in adequate time for incorporation into the Work.

.4 Touch-up fastenings and scratched or otherwise damaged surfaces, after completion of installation, to match finish.

3.2 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning. Leave Work area clean at end of each day.

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

3.3 PROTECTION

.1 Protect installed products and components from damage during construction. Repair damage to adjacent materials caused by site furnishings installation.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Not Used.

1.2 WORK INCLUDED

.1 Complete and operational electrical system as required by the drawings and as herein specified.

1.3 REFERENCE STANDARDS

.1 Within the text of these specifications, reference may be made to the following standards:

CSA	-	Canadian Standards Association
EEMAC	-	Electrical and Electronic Manufacturers Association of Canada
CEMA	-	Canadian Electrical Manufacturers Association
IEEE	-	Institute of Electrical and Electronic Engineers
IPCEA	-	Insulated Power Cable Engineers Association
ULC	-	Underwriters Laboratory of Canada
CEC	–	Canadian Electrical Code 2018 Edition, C22.1-18

.2 Electrical materials, products and equipment shall be CSA approved and conform with EEMAC standards. Where necessary, obtain local CSA approval.

.3 Equipment, wiring and wiring devices shall meet the requirements of the Current Edition of the Canadian Electrical Code, Part 1, including all bulletins in force at the time of tender submission.

1.4 DRAWINGS AND SPECIFICATIONS

.1 The General Conditions, Supplementary Conditions and Division 01 are a part of this specification and shall apply to this Division.

.2 The intent of the drawings and specifications is to include all labour, products and services necessary for complete work, tested and ready for operation.

.3 Symbols used to represent various electrical devices often occupy more space on the drawing than the actual device does when installed. In such instances, do not scale locations of devices from electrical symbols. Install these devices with primary regard for usage of wall space, convenience of operation and grouping of devices.

.4 Electrical drawings indicate general location and route to be followed by conduits and/or wire and do not show all structural details. Follow structural drawings for details of this work and install Electrical conduit, boxes, and fittings to coordinate with structural work and details. Conflicts or additional work beyond work covered by the drawings and specifications is to be brought to the attention of the general contractor or engineer.

.5 Do not cut or drill Structural members without the consent of the Structural engineer. Provide own forces and equipment for all necessary cutting, channeling, coring, sleeving, etc. required for the installation of the Electrical equipment.

.6 These specifications and the drawings and specifications of all other divisions shall be considered as an integral part of the accompanying drawings. Any item or subject omitted from either the specifications or the drawings, but which is mentioned or reasonably specified in and by the others, shall be considered as properly and sufficiently specified and shall be provided.

.7 Provide all minor items and work not shown or specified but which are reasonably necessary to complete the Work.

.8 If discrepancies or omissions in the drawings or specifications are found, or if the intent or meaning is not clear, advise the Consultant for clarification before submitting tender.

.9 Responsibility to determine which Division provides various products and work rests with the General Contractor. Additional compensation will not be considered because of differences in interpretation of specifications.

1.5 SALVAGE MATERIALS

.1 All redundant materials from the renovated space indicated on the drawings to be offered to the Owner. If declined, remove from site.

.2 All abandoned wiring and accessible conduits are to be removed. Riser conduits can remain, but wire must be removed, and conduits tagged at each floor.

1.6 FIRE WATCH

.1 Twenty-four (24) hour fire watch in areas that are not protected by Fire Alarm system is to be provided by the contractor. Provision for Fire watch is to be confirmed by contractor prior to commencement of work on this project.

1.7 QUALITY ASSURANCES

.1 Codes, Rules, Permits and Fees:

.1 Comply with all laws, ordinances, rules, regulations, codes and orders of all authorities having jurisdiction relating to this work.

.2 Comply with all rules of the Canadian Electrical Code, CSA Standard C22.1-18 and the applicable building codes.

.3 Quality of work specified and/or shown on the drawings shall not be reduced by the foregoing requirements.

.4 Immediately after award of contract and prior to installation, verify location, arrangement and point of attachment for service and service entrance equipment with supply authority and inspection departments. Failure to do so will render this Division responsible for any corrections necessary without additional compensation.

.5 Give all required notices, submit drawings, obtain all permits, licenses and certificates and pay all fees required for this work.

.6 Furnish a Certificate of Final Inspection and approvals from inspection authority to the Consultant.

.2 Standards of Workmanship

.1 Execute all work in a competent manner and to present an acceptable appearance when completed.

.2 Trade contractor to obtain all permits required before and after completion of the work, furnish to the consultant a certificate of final inspection and approval from the electrical inspection authority when work is complete.

.3 All utility charges permit and fees for the execution of this work are the responsibility of the Electrical contractor.

.4 Employ a competent supervisor and a sufficient number of licensed tradesmen to complete the Work in the required time.

.5 Trades contractor

.6 Arrange and install products to fit properly into designated building spaces.

.7 Unless otherwise specified or shown, install products in accordance with recommendations and ratings of manufacturers.

.8 The work shall be executed to the satisfaction of the Consultant. The Electrical Contractor shall, at all times, keep a competent foreman in charge of the work and this foreman shall facilitate the inspection of the work as directed by the Consultant; there shall be no charges for this. The Electrical Contractor shall complete his work as quickly as possible, and immediately make any changes or modifications requested by the Consultant during specific or routine inspections; whether requested to do so verbally or in writing.

1.8 SHOP DRAWINGS

.1 Within thirty (30) days of award of contract, the contractor shall submit a completed equipment procurement schedule which lists the manufacturer and model of equipment, indicating the projected ordering, shop drawing submittal date and delivery dates of all products to meet the required construction schedule.

.2 Submit samples as required where specified in Divisions 26.

.3 Prior to delivery of any products to job site and sufficiently in advance of requirements to allow ample time for checking, submit shop drawings for review as specified in Division 01. Submit shop drawings for all equipment as required in each section of this specification.

.4 Prior to submitting the shop drawings to the Consultant, the Contractor shall review the shop drawings to determine that the equipment complies with the requirements of the specifications and drawings.

.5 The term "shop drawing" means drawings, diagrams, illustrations, schedules, performance characteristics, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the Work.

.6 Indicate materials, methods of construction and attachment of support wiring, diagrams, connections, recommended installation details, explanatory notes and other information necessary for completion of Work. Where equipment is connected to other equipment, indicate that such items have been coordinated, regardless of the section under which the adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.7 Adjustments made on shop drawings by the Consultant are not intended to change the contract price. If adjustments affect the value of the work state such in writing to the Consultant prior to proceeding with the Work.

.8 Manufacturer of products shall conform to revised shop drawings.

.9 Keep one (1) complete set of shop drawings at job site during construction.

.10 Submittals shall be coordinated with Division 01, and contain the following information:

.1 Date and revision dates;

.2 PROJECT TITLE AND NUMBER (MUST appear on ALL copies of ALL shop drawings submitted for approval);

.3 Applicable name of Electrical, Contractor, Subcontractor, Supplier, Manufacturer and separate details when pertinent;

.4 Identification of product or materials;

.5 Applicable standards, such as CSA or CGSB numbers;

.6 ELECTRICAL CONTRACTOR'S STAMP, INITIALED OR SIGNED, certifying to review of submittal, verification of field measurements and compliance with Contract Documents.

.11 The Electrical Contractor shall review each shop drawing before submitting it to determine that it is acceptable in terms of the means, methods, techniques, sequences and operations of construction, safety precautions and programs incidental thereto, all of which are the Electrical Contractor's responsibility.

1.9 RECORD DRAWINGS

.1 The Contractor shall keep one complete set of white prints at the site office, including all addendums, change orders, site instructions, clarifications and revisions for the purpose of record drawings. As the work on site proceeds, the Contractor shall clearly record in Red Pencil all as-built conditions which deviate from the original contract documents. Record drawings to include circuiting of all devices, conduit and feeder runs (complete with conductor size and number) and locations of all electrical equipment.

.2 The Consultant to create electronic AutoCAD record drawings from the red-line drawings from the Contractor. There is no cost from the Consultant to provide this work.

1.10 OPERATION AND MAINTENANCE MANUALS

.1 Within thirty (30) days prior to substantial performance, the Contractor shall submit a draft copy of the proposed contents of each maintenance manual to the Consultant for review. Once the draft copy is approved, the Contractor will supply four (4) copies, each complete with an index and tabbed title sheets for each section for insertion in the existing Operation and Maintenance Manuals. Final copies of manuals to be received by Consultant not less than fourteen (14) days prior to substantial performance.

.2 Each new section of the manual shall contain the following information:

.1 Systems Descriptions. A brief synopsis of each system typed and inserted at the beginning of each section. Include sketches and diagrams where appropriate.

.2 Descriptive and technical data.

.3 Maintenance and operating instructions for all electrical equipment and controls. (These operating instructions need not be manufacturer's data but may be typewritten instructions in simple language to guide the Owner in the proper operation and maintenance of his installation.)

.4 Lubricating and servicing intervals recommended.

.5 A copy of all wiring diagrams complete with wire coding.

.6 List of spare parts of all electrical equipment complete with names and addresses of sales, service representatives and suppliers.

.7 Copy of test data.

.8 A motor list showing each motor number, name, horsepower, full load amps, overload settings, nameplate, current rating, heater size and type, and current being drawn, in a neatly tabulated printed format.

.9 Include type and accuracy of instruments used to obtain test data.

.10 Copy of final inspection certificate.

.11 Copy of the purchase order, showing equipment make and model numbers issued to the manufacturer complete with all addendums. All cost details may be hidden.

.12 Copy of all warranty certificates.

.13 Set of final reviewed Shop Drawings.

.14 Names, addresses, phone numbers and facsimile numbers of Contractor, Consultants, sub-contractors and suppliers used on the Work together with a specification reference of the portion of the Work they undertook.

1.11 PRODUCT HANDLING

.1 Use all means necessary to protect the products of this Division before, during and after installation and to protect products and installed work of all other trades.

.2 Immediately make good any damage by repair or replacement at no additional cost to the Owner and to the approval of the Consultant.

.3 Remove advertising labels from all electrical equipment. Do not remove identification of certification labels.

.4 Remove dirt, rubbish, grease, etc. resulting from this work from all surfaces, including the inside of all cabinets, equipment enclosures, panel board tubs, etc.

1.12 ALTERNATE AND SEPARATE PRICES

.1 Coordinate with Division 01

1.13 GUARANTEE

.1 Coordinate with Division 01

.2 Furnish a written guarantee to the Owner prior to final contract payment, which will be in effect for one year from the date of final acceptance of the complete work. Replace or repair at no cost to the Owner any defective material or workmanship except where, in the opinion of the Consultant, such defects are due to the misuse or neglect by the Owner.

.3 This general guarantee shall not act as a waiver of any specified or special equipment guarantees which cover a greater length of time.

1.14 PROGRESS CLAIMS

.1 Coordinate with Division 01

.2 Within thirty (30) days after award of contract, a breakdown of material and equipment items including labour and expense components shall be compiled in format to Consultant's approval. Subsequent requests for payment shall be documented accordingly.

1.15 SELECTED PRODUCTS

.1 Products and materials provided shall be new and free from all defects. Defective products or materials will be rejected, regardless of previous inspections. The Contractor shall be responsible to remove and replace defective products at their expense and shall be responsible for any resulting delays and associated expenses which result from defective products being rejected. Related materials shall be of the same manufacturer throughout the project.

.2 Products and materials referred to in the specifications by trade names, manufacturer's name and catalogue reference are those which shall be used as the basis for the Tender.

.3 The design has been based on the use of the specified product.

1.16 QUALITY OF PRODUCTS

.1 All products provided shall be CSA Approved, Canadian Underwriters' Laboratory approved where applicable, and new, unless otherwise specified.

.2 If products specified are not CSA approved, obtain special approval from the local regulatory authority. Pay all applicable charges levied and make all modifications required for approval.

.3 Products provided, if not specified, shall be new, of a quality best suited to the purpose required and their use subject to approval by the Consultant.

1.17 UNIFORMITY OF MANUFACTURE

.1 Unless otherwise specifically called for in the Specifications, uniformity of manufacture shall be maintained for similar products throughout the work.

1.18 PRODUCT FINISHES

.1 Apply primer on all items which are to be finished on the job.

.2 Touch up all damaged painted finishes with matching lacquer, or, if required by the Consultant, completely repaint damaged surface.

1.19 USE OF PRODUCTS DURING CONSTRUCTION

.1 Any equipment used for temporary or construction purposes shall be approved by the Construction Manager and in accordance with the General Conditions, "Use of Premises". Clean and restore to "as new" condition all equipment prior to the time of substantial completion.

.2 The warranty period shall not begin until the date of substantial performance of the work.

Part 2 Execution

2.1 SITE EXAMINATION

.1 Examine the site of work and become familiar with all features and characteristics affecting this work before submitting tender.

.2 No additional compensation will be given for extra work due to existing conditions which such examination should have disclosed.

.3 Report to the Consultant any unsatisfactory conditions which may adversely affect the proper completion of this work.

2.2 COORDINATION ALL DETAILS WITH OTHER DIVISIONS

.1 Examine the drawings and specifications of all divisions and become fully familiar with their work. Before commencing work, obtain a ruling from the Consultant if any conflict exists, otherwise no additional compensation will be made for any necessary adjustments.

.2 Lay out the work and equipment with due regard to architectural, structural and mechanical features. Architectural and structural drawings take precedence over electrical drawings regarding locations of walls, doors and equipment.

.3 Do not cut structural members without approval of the Consultant.

.4 Coordinate with all Division installing equipment and services and ensure that there are no conflicts.

.5 Install anchors, bolts, pipe sleeves, hanger inserts, etc. in ample time to prevent delays.

.6 Examine previously constructed work and notify the Consultant of any conditions which prejudice the proper completion of this work. Commencement of this work without such notification shall constitute acceptance of other work.

2.3 LOCATION OF OUTLETS AND LUMINAIRES

.1 Electrical drawings are, unless otherwise indicated, drawn to scale and approximate distances and dimensions may be obtained by scaling. Figured dimensions shall govern over scaled dimensions. Where exact dimensions and details are required, refer to Architectural and Structural drawings.

.2 Outlet and equipment locations shown on the drawings are approximate. Locations may be revised up to 3 meters to suit construction and equipment arrangements without additional cost to the Owner, provided that the Contractor is notified prior to the installation of the outlets, or equipment.

.3 Unless otherwise specified or shown, install products in accordance with recommendations and ratings of manufacturers.

2.4 SEPARATION OF SERVICES

.1 Maintain separation between electrical wiring system and building piping, ductwork, etc. so that wiring system is isolated (except at approved connections to such systems) to prevent galvanic corrosion.

.2 In particular, contact between dissimilar metals, such as copper and aluminum, in damp or wet locations is not permitted.

2.5 EQUIPMENT IDENTIFICATION

.1 Electrical Contractor is to ensure that identification of any new Electrical components is to match the format of existing labelling.

.2 Three (3) mm thick plastic lamacoid name plates, black face, white core, mechanically attached with self tapping screws, 6 mm high lettering, to be attached to the front face of the following equipment:

- Starters, contactors, disconnects (Designation, voltage, load controlled)

- Panel board (Designation, voltage, Bus Capacity)
- Terminal cabinets and pull boxes (system, voltage)
- Transformers (designation, capacity, primary and secondary voltage).

.3 Colour code exposed conduits (including conduits above T-bar ceilings), junction and pull boxes, and metallic sheathed cables with paint or plastic tape (25 mm wide band) at 15-meter intervals.

.4 Provide neatly typed circuit directories in panel boards to indicate the area or equipment controlled by each branch circuit.

.5 All conductors shall be identifiable by coloured insulation and permanent markers at every terminal and accessible points throughout its entire run.

Conductors:

Equipment Grounding - Green

Neutral Conductor - White

600 Volt System	120/208 Volt System
Phase A – Orange	Phase A - Red
Phase B - Brown	Phase B – Black
Phase C - Yellow	Phase C - Blue

.6 Low Voltage Wiring: per manufacturer's standard, i.e. CGE low voltage relay switching system.

2.6 WIRING TO EQUIPMENT SUPPLIED BY OTHERS

.1 Equipment supplied by the Owner or under other Division will be moved to the installation site by others. However, the electrical connection to the equipment shall be done by this Division.

2.7 TESTING

.1 Refer to Section 26 05 07 – Testing, Adjusting and Balancing of Electrical Equipment and Systems.

2.8 INSTRUCTIONS TO OWNER'S PERSONNEL

.1 Refer to Section 26 05 08 – Demonstration and Instruction.

2.9 ACCESS PANELS

.1 Where electrical equipment, junction boxes, remote ballasts or the like are concealed, access panels shall be supplied. Panels shall be of adequate size for servicing of the electrical work and complete with necessary frames and hinged doors held closed with captive fasteners. Coordinate type and size of panels with the Consultant.

2.10 SEALING OF WALL AND FLOOR OPENINGS

.1 All conduit and cable entries through outside walls of buildings, through partition walls separating electrical rooms from other areas, through fire separations, and through floors above grade shall be sealed to prevent passage of moisture, dust, gasses, flame, or to maintain pressurization.

.2 Openings shall be sealed when all wiring entries shown on the drawings have been completed.

.3 Sealing material shall be fire resistant and shall not contain any compounds which will chemically affect conduits, cable wiring jacket or insulating material.

2.11 SPRINKLER PROOF EQUIPMENT

.1 Electrical equipment installed where sprinklers are also installed shall be constructed so that water from the sprinkler heads shall not impair the effectiveness of the equipment. This will include, but not be limited to: Distribution Centres, Equipment Enclosures, Cabinets, Transformer enclosures, Panel boards.

.2 A separate and complete roof shall be provided on free-standing or surface mounted equipment. An overhang at the front, rear and sides shall prevent the entrance of water either at the top or through projecting face plates, meters, etc.

.3 Where conduits or cables are required to penetrate sprinkler proof roofs, rain tight connectors shall be used in conjunction with T & B 5260 Series sealing rings. Connectors shall be equal to:

.1 Rigid Conduit - T & B Bullet Hubs

.2 EMT - T & B 5123 Series (steel)

2.12 SLEEVES

.1 Provide sleeves of galvanized steel pipe with machine cut ends of ample size to accommodate conduits passing through walls, partitions, ceilings, floors, etc.

.2 For wall, partitions and ceilings the ends shall be flush with the finish on both sides but for floors they shall extend 4" above finished floor level.

.3 The space between the sleeve and the conduit shall be filled with Dow Corning silicone RTV foam for fire stop and caulked around the top and bottom with approved permanently resilient, non-flammable and weatherproof silicone base compound and ensure that the seal is compatible with the floor and ceiling finishes.

.4 Locate and position sleeves exactly prior to construction of walls, floors.

.5 Failure to comply with the above requirements shall be remedied at this Division's expense.

2.13 INSULATION RESISTANCE TESTING

.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.

.2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.

.3 Check resistance to ground before energizing.

.4 Carryout tests in presence of Client Representative.

.5 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.6 Submit test results for Consultant's review.

2.14 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 two (2%) percent of rated voltage of equipment.

.3 Submit, at completion of work, report listing phase and neutral currents on panel boards, dry-core transformers and motor control centres, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

2.15 CLEANING

.1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

2.16 COST ALLOWANCES

.1 Electrical contractor is to carry the following cash allowance to be provided to other consultants who’s work, and expertise will be required for the successful completion of this project

Services of security systems contractor $10,000.00

END OF SECTION

Part 1 General

.1 This section of the specification forms a part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 RELATED SECTIONS

.1 Not Required.

1.3 EXISTING CONDITIONS

.1 Examine site during mandatory pre-bid meeting and be responsible for ascertaining all conditions which will affect this trade whether shown on the drawings or not and to take all the necessary measurements.

.2 Investigate and confirm the locations, the method of connections and routes of existing and new electrical facilities. Report at once any discrepancy between drawings, specifications and existing conditions.

.3 Absorb any costs incurred by failure to carry out this investigation and examination.

1.4 GENERAL REQUIREMENTS

.1 Provide and be responsible for the removal, relocation, reconnection, etc., of electrical devices, equipment, material, etc., as indicated on the drawings and/or as required by renovations to existing building and the installation of new.

.2 All electrical devices and equipment which are disconnected, removed from service, etc., and which are not reused on the job and not required are to be offered to the Owner. If refused, remove from site at Contractors expense.

.3 Continuity of power and communication shall be maintained or restored promptly where services to other portions of a site are affected by renovation or demolition that is outlined on drawings or specifications.

1.5 MOP PLANNING/SHUTDOWNS

.1 Method of Procedure (MOP) plan to be provided by the contractor to the Owner and Consultant team for review and approval. Provide an MOP two (2) weeks in advance of the power shutdown. Shutdown planning meetings on site to be attended by the Electrical Foreman, User group, Owner, Electrical Consultant, and other required personnel. The general outline of the plan to be submitted as follows:

.1 List all loads to be shut down.

.1 Panels.
.2 Circuits.

.2 Schedule.

.1 Date and time of each activity.
.2 Length of each activity.
.3 Date and time required for User group and/or Owner to issue work order.

.3 Back out plan.

.4 Monitoring plan.

.5 List of personnel and contact information.

.1 Electrical contractor foreman and required personnel.
.2 User group and/or Owner.

.2 Refer to table at the end of this section for Sample MOP.

Part 2 Products

.1 Material and equipment added shall match existing wherever possible unless otherwise noted.

Part 3 Execution

3.1 GENERAL

.1 Disconnection, relocation, reconnection, etc. of existing facilities will be required to accommodate phasing of the work and the installation of new facilities including work of other divisions. Be aware of all requirements and make all allowances to accommodate these requirements.

.2 Existing facilities shall remain operational during construction period. When installation is complete, all facilities shall be checked and tested and shall be left in a proper working order and to the satisfaction of Consultant and Owner.

.3 Refer to Division 01 for work restrictions.

3.2 EXISTING SYSTEMS & SHUTDOWNS

.1 Where the work of the Contract requires a shutdown, or will otherwise affect an existing electrical system, Contractor is to obtain written permission/confirmation of coordination with owner two (2) weeks in advance.

.2 Shutdowns for tie into existing systems will be required after normal working hours (nights) to maintain facility operation. Coordinate with Owner/Consultant.

.3 All costs related to non-coordinated nuisance alarms or the fire alarm system caused by this Contractor will be borne by this contractor (i.e. false charges by Fire Department). Contractor will pay costs associated with clearing the building.

3.3 DEMOLITION OF EXISTING CONDUIT & WIRING

.1 Remove all existing obsolete conduit and wire where possible.

Part 1 General

1.1 PRODUCTS

.1 MATERIALS AND EQUIPMENT

.1 Materials and equipment for patching and extending work: As specified in individual Sections.

Part 2 Execution

2.1 EXAMINATION

.1 Verify field measurements and circuiting arrangements are as shown on Drawings.

.2 Verify that abandoned wiring and equipment serve only abandoned facilities.

.3 Demolition Drawings are based on field observation and existing record documents. Report discrepancies to Owner and Architect/Engineer before disturbing existing installation.

.4 Beginning of demolition means installer accepts existing conditions.

2.2 PREPARATION

.1 Disconnect electrical systems scheduled for removal.

.2 Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

.3 Existing Electrical Service

1. Maintain existing system in service.

2. Disable system only to make switchovers and connections. Obtain permission from Owner at least 48 hours before partially or completely disabling system. Minimize outage duration.

3. Make temporary connections to maintain service in areas adjacent to work area.

2.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

.1 Demolish and extend existing electrical work as indicated on Drawings.

.2 Remove, relocate, and extend existing installations to accommodate new construction.

.3 Remove abandoned wiring to source of supply. This includes but is not limited to power conductors, data cables, and control wiring unless noted otherwise.

.4 Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces to match existing adjacent finishes.

.5 Disconnect abandoned outlets and remove devices. Remove abandoned outlet boxes if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlet boxes and flush junction boxes that are not removed.

.6 Disconnect and remove electrical devices and equipment serving gate equipment that has been removed.

.7 Repair adjacent construction and finishes damaged during demolition and extension work to match existing.

.8 Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

.9 Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

2.4 CLEANING AND REPAIR

.1 Clean and repair existing materials and equipment that remain or are to be reused.

2.5 INSTALLATION

.1 Install relocated materials and equipment as indicated in other specification Sections and on the Drawings.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Electrical General Requirements Section 26 05 00.

1.2 INTENT

.1 Except where otherwise specified, arrange and pay for testing, adjusting, balancing and related requirements specified herein.

.2 If test results do not conform with applicable requirements, repair, replace, adjust or balance equipment and systems. Repeat testing as necessary until acceptable results are achieved.

.3 Provide all labor, materials, instruments and equipment necessary to perform the tests specified.

.4 All tests shall be witnessed by persons designated by the Owner, who shall also sign the test documentation.

.5 Submit procedures proposed in writing for approval two (2) weeks prior to test.

1.3 RELATED WORK

.1 If requested, submit copies of production test records for production tests required by EEMAC and CSA standards for manufactured electrical equipment Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

1.4 MANUFACTURER'S PRODUCTION TEST RECORDS

.1 If requested, submit copies of production test records for production tests required by EEMAC and CSA standards for manufactured electrical equipment

1.5 SITE TESTING REPORTS

.1 Log and tabulate test results on appropriate test report forms.

.2 Submit forms to Consultant for approval prior to use.

.3 Submit completed test report forms as specified, immediately after tests are performed.

1.6 REFERENCE DOCUMENTS

.1 Perform tests in accordance with:

.1 The Contract Documents

.2 Requirements of authorities having jurisdiction

.3 Manufacturer's published instructions

.4 Applicable CSA, IEEE, IPCEA, EEMAC and ASTM standards.

.2 If requirements of any of the foregoing conflict, notify Consultant before proceeding with test and obtain clarification.

1.7 MANUFACTURER'S SITE SERVICES

.1 Arrange and pay for the site services of approximately qualified manufacturer's representatives where site testing, adjusting, or balancing of electrical equipment or systems performed by Manufacturer's representatives is:

.1 Specified, or

.2 Otherwise required to ensure that electrical equipment and systems are operational in full compliance with the Contract Documents

1.8 SEQUENCING AND SCHEDULING

.1 Except where otherwise specified, perform all testing, adjusting, balancing and related requirements specified herein prior to Interim Acceptance of the Work.

.2 Perform voltage testing and adjusting after user occupancy or utilization of facility.

Part 2 Products

2.1 TEST EQUIPMENT

.1 Provide all equipment and tools necessary to perform testing, adjusting and balancing specified herein and as otherwise required.

Part 3 Execution

3.1 TESTING OF WIRING AND WIRING DEVICES

.1 All power wiring #2 AWG and larger shall be tested for insulation resistance value with a 1000-volt megger. Resistance values shall be as recommended by cable manufacturer. Test results shall be properly tabulated, signed, dated and submitted with maintenance manuals.

.2 Test all wiring devices for correct operation.

.3 Test all receptacles for proper polarity and circuitry.

3.2 LOAD BALANCE TESTING

.1 Perform load tests when as many loads as possible, prior to Interim Acceptance of the Work, are operable.

.2 Turn on all possible loads.

.3 Test load balance on all feeders at distribution centres, motor control centre and panel boards.

.4 If load balance exceeds 15%, reconnect circuits to balance loads.

3.3 VOLTAGE TESTING AND ADJUSTING

.1 Test voltage at all panel boards.

3.4 COORDINATION AND SHORT CIRCUIT STUDY

.1 As part of the shop drawings, the panel/circuit breaker manufacturer shall demonstrate that the new circuit breakers are coordinated with the existing electrical panel.

.2 Contractor to provide approximate feeder length and feeder type to the manufacturer if requested.

.3 A list of all loads and shop drawings for loads on the existing Electrical panel.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not Required

1.2 INTENT

.1 Provide demonstration and instruction sessions to familiarize Owner's operation and maintenance personnel with electrical systems and their operation and maintenance.

.2 Submit system sign off sheets for each system listed prior to substantial completion.

.3 All sign off and survey sheets shall be typewritten.

1.3 MANUFACTURER'S SITE SERVICES

.1 Arrange and pay for appropriately qualified manufacturer's representatives to provide or assist in providing electrical equipment and system demonstration and instruction as specified herein.

1.4 CONTRACTOR/OWNER COORDINATION

.1 Contractor will chair demonstration and instruction sessions.

.2 Establish agendas for demonstration and instruction sessions in conjunction with Owner. Coordinate scheduling of sessions with Owner.

Part 2 Products – Not Applicable

Part 3 Execution

3.1 SYSTEMS DEMONSTRATION

.1 Demonstrate operation of following systems:

.1 600 Volt Electrical System Normal

.2 208/120 Volt System Normal

.3 Newly installed gate controllers

.4 Grounding System

.5 Future Connection Points and integration with building security system.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 CSA International CAN/CSA-C22.2 No.18, Outlet Boxes, Conduit Boxes and Fittings.

.1 CAN/CSA-C22.2 No.65, Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).

.2 National Electrical Manufacturers Association (NEMA)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for wire and box connectors and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: submit operation and maintenance data for wire and box connectors for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written 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 indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect wire and box connectors from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove packaging materials in accordance with Section 01 74 21 – Construction Demolition Waste.

Part 2 Products

2.1 MATERIALS

.1 Pressure type wire connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.

.2 Fixture type splicing connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

.3 Clamps or connectors for armored cable, TECK cable aluminum sheathed cable, flexible conduit, as required to: CAN/CSA-C22.2 No.18.

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 wire and box connectors installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Remove insulation carefully from ends of conductors and cables and:

.1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.

.2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No.65.

.3 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65. Replace insulating cap.

.4 Install bushing stud connectors in accordance with EEMAC 1Y-2.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

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

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction Demolition Waste.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 CSA C22.2 No. 0.3, Test Methods for Electrical Wires and Cables.

.2 Canadian Electrical Code – Latest Edition.

.3 Install and rate power cables in accordance with the Canadian Electrical Code requirements.

1.2 PRODUCT DATA

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

1.3 DELIVERY, STORAGE AND HANDLING

.1 Packaging Waste Management: remove packaging materials in accordance with Section 01 74 21 – Construction Demolition Waste.

Part 2 Products

2.1 BUILDING WIRES

.1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, with 600/1000 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE.

.3 Copper conductors: size as indicated, with thermoplastic insulation type T90 Nylon rated at 600 V.

2.2 TECK 90 CABLE

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

.2 Conductors:

- .1 Grounding conductor: copper.
- .2 Circuit conductors: copper, size as indicated.

.3 Insulation:

- .1 Cross-linked polyethylene XLPE.
- .2 600/1000 V.

.4 Inner jacket: polyvinyl chloride material.

.5 Armor: interlocking aluminum.

.6 Overall covering: thermoplastic polyvinyl chloride, rated -40 deg. C.

.7 Fastenings:

.1 One-hole steel straps to secure surface cables 50 mm and smaller. Two-hole steel straps for cables larger than 50 mm.

.2 Channel type supports for two or more cables at 1.5 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 Armor: interlocking type fabricated from aluminum strip.

.4 Type: PVC jacket over thermoplastic armor and compliant to applicable Building Code classification for this project.

.5 Connectors: anti short connectors.

2.4 CONTROL CABLES

.1 Type: LVT: 2 soft annealed copper conductors, sized as indicated:

.1 Insulation: thermoplastic.

.2 Sheath: thermoplastic jacket.

.2 Type: low energy 300 V control cable: stranded annealed copper conductors sized as indicated LVT: 2 soft annealed copper conductors, sized as indicated:

.1 Insulation: thermoplastic.

.2 Shielding: wire over each conductor pair.

.3 Overall covering: PVC jackets.

Part 3 Execution

3.1 FIELD QUALITY CONTROL

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

.2 Perform tests before energizing electrical system.

3.2 GENERAL CABLE INSTALLATION

.1 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).

.2 Cable Color Coding: to Section 26 05 00 - Common Work Results for Electrical.

.3 Conductor length for parallel feeders to be identical.

.4 Lace or clip groups of feeder cables at distribution centers, pull boxes, and termination points.

.5 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.

.6 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

3.3 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:

.1 In wireways and auxiliary gutters in accordance with Canadian Electrical Code Requirements.

3.4 INSTALLATION OF TECK90 CABLE (0 -1000 V)

.1 Group cables wherever possible on channels.

.2 Install cable securely supported by straps.

3.5 INSTALLATION OF ARMOURED CABLES

.1 Group cables wherever possible on channels.

3.6 INSTALLATION OF CONTROL CABLES

.1 Install control cables in conduit.

.2 Ground control cable shield.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for connectors and terminations.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 – Construction Demolition Waste.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.2 No.41, Grounding and Bonding Equipment.

1.4 PRODUCT DATA

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

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction Demolition Waste.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.

Part 2 Products

2.1 CONNECTORS AND TERMINATIONS

.1 Copper compression connectors to CSA C22.2 as required sized for conductors.

.2 Contact aid for aluminum cables where applicable.

Part 3 Execution

3.1 INSTALLATION

.1 Bond and ground as required to CSA C22.2No.41.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 74 21 – Construction Demolition Waste

.2 Section 26 05 07 – Testing, Adjusting and Balancing of Electrical Equipment

1.2 REFERENCES

.1 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

.1 ANSI/IEEE 837-1989(R1996), Qualifying Permanent Connections Used in Substation Grounding.

.2 Canadian Standards Association, (CSA International)

.1 CSA C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction Demolition Waste.

Part 2 Products

2.1 EQUIPMENT

.1 Grounding conductors: bare stranded copper, tinned, soft annealed, size as required by CEC.

.2 Insulated grounding conductors: green, size as required by CEC.

.3 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:

.1 Grounding and bonding bushings.

.2 Protective type clamps.

.3 Bolted type conductor connectors.

.4 Bonding jumpers, straps.

.5 Pressure wire connectors.

Part 3 Execution

3.1 INSTALLATION GENERAL

.1 Install complete permanent, continuous grounding system including conductors, and connectors. Where EMT is used, run ground wire in conduit.

.2 Tie into existing grounding bus bar. Equipment fed distribution panel shall be grounded by grounding conductors sized in accordance with the Canadian Electrical Code. The ground wire shall be terminated at each end with an appropriate grounding lug which shall be connected to the equipment ground bus. Ground wire to be green. Use mechanical connectors for grounding connections to equipment provided with lugs.

.3 All bolted connections must be accessible. Soldered joints not permitted.

.4 Install connectors in accordance with manufacturer's instructions.

.5 Protect exposed grounding conductors from mechanical injury.

.6 Use mechanical connectors for grounding connections to equipment provided with lugs.

.7 Install bonding wire for flexible conduit, connected at one end to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

.8 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

.9 Bond single conductor, metallic armoured cables to cabinet at supply end.

3.2 SYSTEM AND CIRCUIT GROUNDING

.1 Install grounding system to CEC.

3.3 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, duct systems, frames of motors, starters, control panels, building steel work, elevators, distribution panels.

3.4 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 07 – Testing, Adjusting and Balancing of Electrical Equipment.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Consultant and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

END OF SECTION

Part 1 General

1.1 WORK INCLUDED

.1 Supply and install all hangers, supports and inserts for the installation shown on the drawings and specified herein, as necessary to fasten electrical equipment securely to the building and fence structure.

1.2 RELATED WORK

Part 2 Product

2.1 FRAMING AND SUPPORT SYSTEM

.1 Materials:

.1 Intermediate duty supporting structures shall employ P1000 Unistrut or equal together with the manufactures connecting components and fasteners for a complete system.

.2 Heavy duty supporting structures to be fabricated and welded from steel structural members and prime painted before installation.

.2 Finishes:

.1 Outdoors, wet locations: Hot dipped galvanized.

.2 Indoors, dry locations: Galvanized when available, prime painted if not available.

.3 Nuts, bolts, machine screws: Cadmium plated.

.3 Unistrut:

.1 Section P1000, P3300 or as required for load and span, with mounting screws, or approved. P1000 or equal is a minimum standard for supporting conduits 50 mm and larger.

2.2 CONCRETE AND MASONRY ANCHORS

.1 Materials: Hardened steel inserts, zinc plated for corrosion resistance. All anchor bolts must be galvanized.

.2 Components: Non-drilling anchors for use in predrilled holes, sized to safely support the applied load with a minimum safety factor of four.

.3 Manufacturer: Hilti (Canada) Limited or approved equal.

2.3 NON-METALLIC ANCHORS

.1 Material: Plastic anchors for sheet metal screws.

.2 Manufacturer: Fischer.

2.4 CONDUIT SUPPORTS

.1 Unistrut support racks : Unistrut conduit clamps.

2.5 CABLE SUPPORTS AND CLAMPS

.1 General: As per conduit supports, except that for single conductor cables, suitable non-ferrous, or approved stainless steel or aluminum clamps shall be used.

Part 3 Execution

3.1 GENERAL

.1 Do not cut or drill beams, joists or structural steel unless written permission of the Consultants is obtained.

.2 Distance between conduit or cable supports not to exceed code requirements.

.3 Supports to be suitable for the real loads imposed by equipment.

.4 Supports to be securely fastened, free from vibration and excessive deflection or rotation. Maximum deflections are 4 mm over a 1-meter span and 8 mm over a 2-meter span.

.5 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

.6 Provide conduit rack with 25% spare capacity for multiple runs.

.7 Provide channel support with fittings for vertical runs of conduit and cables.

3.2 INSTALLATION

.1 Support two (2) or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.

.2 Use plastic anchors for light loads only. Use metal anchors for all other loads.

.3 Shot driven pins may only be used with written approval of the structural engineer.

.4 Use round or pan head screws for fastening straps, boxes, etc.

.5 Support outlet boxes, junction boxes, panel tubs, etc., independent of conduits running to them. Support conduits within 600 mm of outlet boxes. Support surface mounted panel tubs with a minimum of four 6 mm fasteners.

.6 For surface mounting of two (2) or more conduits use channels at 1.5 m spacing.

.7 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.8 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.9 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of the Consultant.

END OF SECTION

Part 1 General

1.1 RELATED REQIREMENTS

.1 Section 26 05 00 – Electrical General Requirements

1.2 WORK INCLUDED

.1 Provide a complete system of splitters boxes and cabinets for the installation of wiring and equipment.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data for cabinets in accordance with Section 26 05 00 – Electrical General Requirements.

Part 2 Products

2.1 JUNCTION BOXES AND PULL BOXES

.1 Materials:

.1 Code gauge sheet steel, welded construction, phosphatized and factory paint finish.

.2 Lockable, weatherproof and corrosion resistant when installed outdoors.

.2 Components:

.1 Boxes 200 mm x 200 mm and larger are to be complete with hinged covers. Hinged covers are to be constructed using pin style or piano hinges. Formed steel hinge assemblies are not acceptable.

.2 For flush mounting, covers to overlap box by 25 mm minimum all around with quarter turn latch.

.3 Use rolled edges for surface boxes.

2.2 CABINETS

.1 Materials:

.1 Cabinets: Code gauge sheet steel, welded construction, phosphatized and factory paint finish, suitable for field painting.

.2 Locks: to match panelboards.

.2 Components:

.1 With hinged door and return flange overlapping sides, with handle, lock and catch for surface mounting, size as indicated or to suit.

Part 3 Execution

3.1 INSTALLATION

.1 Junction Boxes and Pull Boxes:

.1 Supply all pull boxes and junction boxes shown on the drawings or required for the installation.

.2 Install in inconspicuous but accessible locations, above removable ceilings or in electrical rooms, utility rooms or storage areas.

.3 Identify with system name and circuit designation as applicable.

.4 Size in accordance with the Canadian Electrical Code, as a minimum.

.2 Cabinets:

.1 Mount cabinets with top not greater than 1980 mm above finished floor, coordinated with masonry, panelboards, fire hose cabinets and similar items. Securely fasten backboards to cabinet interiors.

.2 Install terminal block where indicated.

.3 Identification

.1 Provide equipment identification in accordance with Section 26 05 00 – Electrical General Requirements.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1-15, Canadian Electrical Code, Part 1, 23rd Edition.

1.2 SUBMITTALS

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

1.3 DELIVERY, STORAGE AND HANDLING

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

.2 Waste Management and Disposal:

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

Part 2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.1.

.2 102mm square or larger outlet boxes as required.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 GALVANIZED STEEL OUTLET BOXES

.1 One-piece electro-galvanized construction.

.2 Single and multi-gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

.3 Utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.

2.3 MASONRY BOXES

.1 Electro-galvanized steel masonry boxes for devices flush mounted in exposed block walls.

2.4 CONCRETE BOXES

.1 Electro-galvanized sheet steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.

2.5 CONDUIT BOXES

.1 Cast FS boxes with factory-threaded hubs and mounting feet for surface wiring of devices.

2.6 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 35 mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

Part 3 Execution

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Provide correct size of openings in boxes for conduit, mineral insulated and armored cable connections. Do not install reducing washers.

.3 Identify systems for outlet boxes as required.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Not Required

1.2 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CAN/CSA C22.2 No. 18-98, Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware.

.2 CSA C22.2 No. 45-M1981(R1992), Rigid Metal Conduit.

.3 CSA C22.2 No. 56-1977(R1999), Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.

.4 CSA C22.2 No. 83-M1985(R1999), Electrical Metallic Tubing.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction Demolition Waste.

Part 2 Products

2.1 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, hot dipped galvanized steel threaded.

.2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings and with expanded ends.

.3 Flexible metal conduit: to CSA C22.2 No. 56, aluminum and liquid-tight flexible metal.

.4 Color coding to match existing on site.

2.2 CONDUIT FASTENINGS

.1 One-hole malleable iron 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 Channel type supports for two or more conduits at 1.5m oc.

.4 Threaded rods, 6 mm dia. to support suspended channels.

2.3 CONDUIT FITTINGS

.1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.

.2 Factory "L" where 90-degree bends are required for 25 mm and larger conduits.

.3 Steel couplings/connectors for conduits.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.

.2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.

.3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.5 FISH CORD

.1 Polypropylene.

Part 3 Execution

3.1 INSTALLATION

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Conceal conduits except in mechanical and electrical service rooms.

.3 Use rigid hot dipped galvanized steel threaded conduit where exposed to mechanical damage.

.4 Use electrical metallic tubing (EMT) where not subject to mechanical injury.

.5 Use flexible metal conduit for connection to motors in dry areas, connection to surface or recessed fluorescent fixtures.

.6 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.

.7 Minimum conduit size for lighting and power circuits: 19 mm.

.8 Bend conduit cold. Replace conduit if kinked or flattened more than $1/10^{th}$ of its original diameter.

.9 Mechanically bend steel conduit over 19mm dia.

.10 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.11 Install fish cord in empty conduits.

.12 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.

.13 Dry conduits out before installing wire.

.14 All penetrations through walls and floors to be properly sealed with approved fire rated materials.

3.2 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 on surface channels.

.5 Do not pass conduits through structural members except as indicated.

.6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

.7 Surface conduit shall only to be installed in Electrical and Mechanical utility rooms.

3.3 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 – Electrical General Requirements

1.2 PRODUCT DATA

.1 Submit product data in accordance with Section 26 05 00 – Electrical General Requirements.

Part 2 Products

2.1 BREAKERS GENERAL

.1 Bolt-On Molded Case Circuit Breaker: Quick-make, quick-break type, for manual and automatic operation.

.2 Plug-In Molded Case Circuit Breakers: Quick-make, quick-break type, for manual and automatic operation.

.3 Common-Trip Breakers: With single handle for multi-pole applications.

.4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting. Trip settings on breakers with adjustable trips to range from 5-10 times current rating.

.5 Circuit breakers with interchangeable trips as indicated.

.6 Circuit Breakers shall be supplied to provide a series rated system.

2.2 THERMAL MAGNETIC BREAKERS

.1 Molded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

2.3 SOLID STATE TRIP BREAKERS

.1 Molded case circuit breaker to operate by means of a solid-state trip unit with associated current monitors and self-powered shunt trip to provide inverse time current trip under overload condition, and long time, short time, instantaneous tripping for phase and ground fault short circuit protection.

Part 3 EXECUTION

3.1 INSTALLATION

.1 Install circuit breakers as indicated.

.2 Identification: Provide lamicoid plate on each breaker showing voltage, source of supply and load being fed.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 20 00: Concrete Reinforcing.

.2 Section 03 30 00: Cast in Place Concrete.

.3 Section 32 23 33: Excavating, Trenching and Backfilling.

1.2 REFERENCES

.1 All referenced standards to be the current edition or the edition referenced by the applicable Building Code in force at the time of building permit application, as noted on Structural Drawings.

.2 Canadian Standards Association (CSA International):

.1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CSA S16, Limit States Design of Steel Structures.

.3 CSA W47.1, Certification of Companies for Fusion Welding of Steel.

.4 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.

.5 CSA W59, Welded Steel Construction (Metal Arc Welding).

.3 ASTM International Inc.:

.1 ASTM A36/A36M, Standard Specification for Carbon Structural Steel.

.2 ASTM A123/A123M, Standard Specification for Zinc (Hot Dip Galvanized) coating on Iron and Steel Products

.3 ASTM F3125/F3125M, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPA) Minimum Tensile Strength, Inch and Metric dimensions

.4 ASTM A500, Specification for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

.4 Canadian Geotechnical Society:

.1 Canadian Foundation Engineering Manual.

1.3 QUALITY ASSURANCE

.1 Qualifications

.1 Companies supplying and installing helical piles to have minimum 5-year experience working with this type of foundations.

.2 Company installing helical piles to be certified by the supplier.

.3 Welding to be performed by a firm certified by the Canadian Welding Bureau under the requirements of CSA W47.1, Division 1 or 2.

.4 Welders to be CWB approved.

.5 Engage a Professional Engineer licensed in the place where the project is located to be responsible for design, detailing and installation of all helical piles,

1.4 QUALITY CONTROL

.1 Submit in accordance with Section 01 45 00 - Quality Control.

.2 Source Quality Control Submittals:

.1 Submit mill test reports showing chemical and physical properties of helical piles to be incorporated in the project.

.3 Tolerances:

.1 Maximum deviation at cut off elevation from position on plan: 65 mm (2½")
.2 Maximum deviation from cut off elevation: +12 mm, 50 mm (+½", -2")
.3 Maximum deviation from plumb: 2%
.4 Projection over legal boundary: zero

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit list of equipment to be used for installation, including calibration reports.

.3 Submit load testing procedure, including list of equipment to be used for testing and calibration records.

.4 Shop Drawings:

.1 Provide drawings stamped and signed by a Professional Engineer responsible for design of helical piles.
.2 When requested, submit sketches and design calculations stamped and signed by that Engineer.
.3 Show on drawings:
.1 Helical piles types, sizes and layouts.
.2 Design loads, ULS and SLS pile capacities.
.3 Expected total and differential settlements.
.4 Material specifications.
.5 Size of pile shaft and number and diameter of helical plates.
.6 Minimum effective installation torque.
.7 Inclination.
.8 Cut off elevation.
.9 Details of attachment to structure.
.10 Additional reinforcing steel and alternate pile cap details if required to accommodate the chosen helical piles.

.5 On completion of installation, provide a letter signed and sealed by the Professional Engineer responsible for helical piles stating that each pile will be capable of developing the required load capacity without excessive settlement

Part 2 Products

2.1 DESIGN AND DETAILING REQUIREMENTS

.1 Design helical piles and their anchorage using Limit State Design approach, in accordance with the governing Building Code, CSA A23.3, CSA S16 and Canadian Foundation Design Manual, to be capable of safely carrying the loads shown on drawings without excessive settlements. Use Geotechnical Resistance Factor in line with the method used to determine the ultimate geotechnical resistance.

.2 Establish pile length and refusal criteria necessary to achieve the specified capacity noted on the drawings.

.3 Specify performance and / or proof load testing procedure and acceptance criteria to confirm design assumptions. A testing program for helical piles subject to tension is mandatory.

.4 If requested, provide signed and sealed design calculation.

.5 If the pile supplier's design requires modifications of any other elements shown on design drawings (such as pile caps), the pile supplier will be responsible for all associated modification costs. The required modifications must be identified in the bid, and the cost to implement them must be included.

2.2 MATERIALS

.1 Helical pile shafts, blades and accessories: to CSA G40.21, hot dip galvanized per ASTM A123/A123M.

Part 3 Execution

3.1 SITE CONDITIONS

.1 Determine any potential interference with existing services and protect from disruption and damage

.2 Protect existing structure from damage.

.3 If the site is underlain by variable fill known to generate explosive gases, refer to Division 1 for safety requirements.

3.2 FOUNDATION CONDITIONS

.1 A Geotechnical Report has been prepared for the Project by WSP CANADA INC., Report No. 191-09179, dated October 11, 2019.

.2 The Geotechnical Report is not represented as a complete description of site conditions but only as to what was found in borings at indicated locations. The Departmental representative assumes no responsibility for any interpretation or deduction that the Contractor may make from the data. The Contractor to establish the nature of observable conditions to his own satisfaction and has the right to obtain additional information, if necessary in his judgment.

.3 A Geotechnical Engineer will be appointed by the contractor to provide full-time inspection during installation of helical piles.

.4 Notify Departmental Representative if subsurface conditions are found to differ materially from those indicated in the Contract Documents or geotechnical report.

3.3 OBSTRUCTIONS

.1 Obstructions may be encountered during installation of helical piles.

.2 All obstructions are to be confirmed by the Geotechnical Engineer, who will track and certify the time required for obstruction removal.

.3 The cost to extract and re-install foundation anchors due to obstructions will be paid by the Departmental representative based on the time required to do the work, plus the material cost to replace the damaged piles. The method used must be acceptable to the Geotechnical Engineer.

.4 Have all the equipment required to do this work readily available for the duration of the anchor installation.

.5 Delay time resulting from not having the required equipment readily available, or from breakdown of the equipment will be at the cost of the Contractor.

.6 Repair and replacement costs for damaged equipment shall not be considered extras.

.7 The time required to extract and reinstall the anchors cannot be claimed to extend the overall construction schedule.

3.4 INSTALLATION

.1 Do not install helical piles anchors unless the Geotechnical Engineer is present.

.2 Do not damage adjacent structures. Make good any damage caused by pile installation and operations.

.3 Hold piles securely and accurately in position while installing, and apply sufficient down pressure to advance them. Install in a smooth, continuous manner.

.4 Prevent load transfer between soil and the portion of the piles above the level of the competent soil to be used for bearing by providing bitumen coating or permanent smooth sleeves.

.5 Provide plain extension material as required to advance piles to the required depth. Extensions to be coupled to helical pier using high strength structural bolts.

.6 Monitor installation torque throughout the installation process.

.7 Terminate pile installation when the minimum installation torque and the minimum depth requirements are satisfied. Record termination torque.

.8 If the minimum torque requirement has not been satisfied at a pile’s minimum depth level, the contractor has the following options:

.1 To advance the pile deeper using additional plain extension material until the specified torque level is obtained.

.2 To remove the pile and to install another pile with larger and/or more helices. This revised pile to be installed at least 900 mm (3') beyond the termination depth of the original pile.

.3 To propose installation of additional piles and submit for Departmental Representative review.

.9 If the maximum torque rating of a pile and/or the installing unit is reached prior to satisfying the minimum depth requirement, remove the pile and install another pile with smaller and/or fewer helices. The revised pile to be installed at least 900 mm (3') beyond the termination depth of the original pile.

.10 Cut off piles neatly and square at elevations indicated.

.11 Connect piles to structure using steel brackets or end plates per capable of safely transferring the structural loads to the pile.

.12 Touch up all cuts, drills welds and other damage to galvanizing with Zinc Rich paint in accordance to SSPC Technology Guide No. 14.

.13 Keep accurate records and submit to Departmental Representative at the completion of installation. Records to include:

.1 Deviation from specified location and plumb.

.2 Type of installation equipment used.

.3 Installation torque measured at 300 mm (1') increments.

.4 Bottom elevation and cut off elevation.

.5 Ground surface elevation

.6 Load testing results.

.14 As an alternative to the submission of a full set of records, the Contractor may certify the records of the Inspection and Testing Agency and submit only the information not included in those records.

3.5 FIELD QUALITY CONTROL

.1 Refer to Section 01 45 00 - Quality Control.

.2 Perform load tests as required to confirm pile capacities.

.3 If a pile fails the load test, modify installation procedures as required to achieve the specified capacity and repeat the test. Submit proposal for the remedial work necessary to allow piles already installed to carry their specified load for Departmental Representative approval.

3.6 INSPECTION AND TESTING

.1 An Inspection and Testing Agency will be appointed to check pile refusal criteria, to review the proposed pile load testing procedures and acceptance criteria, and to observe and document installation and load testing of helical piles on a full-time basis.

.2 Assist the Inspection and Testing Agency in its work. Notify as to the Work Schedule and provide safe access to the work area as required.

.3 The Agency will submit reports covering the work inspected and the testing performed.

.4 The Agency will keep accurate records of the construction of each pile and submit to Departmental Representative at the completion of the piling operation.

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT

.1 Measure supply and erection of chain link fence in metres erected including gates.

.2 Measure supply and erection of chain link fence gates as units of each size erected.

1.2 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM A53/A53M-10 , Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

.2 ASTM A90/A90M-09 , Standard Test Method for Weight Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.

.3 ASTM A121-07 , Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.

.4 A653/A653M-10 , Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.5 ASTM C618-08a , Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

.6 ASTM F1664-08 , Standard Specification for Poly(Vinyl Chloride) (PVC)-Coated Steel Tension Wire Used with Chain-Link Fence.

.7 ASTM A123/A123M-09 , Standard Specification for Zinc (Hot Dip Galvanized) coatings on Iron and Steel Products.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-138.1-96 , Fabric for Chain Link Fence.

.2 CAN/CGSB-138.2-96 , Steel Framework for Chain Link Fence.

.3 CAN/CGSB-138.3-96 , Installation of Chain Link Fence.

.4 CAN/CGSB-138.4-96 , Gates for Chain Link Fence.

.5 CAN/CGSB-1.181-99 , Ready-Mixed Organic Zinc-Rich Coating.

.3 CSA Group (CSA)

.1 CSA A23.1/A23.2-09 , Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A3000-08 , Cementitious Materials Compendium.

.4 Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - current edition.

.5 CSC Technical Criteria for Correctional Institutions (latest edition).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

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

.3 Drawings to indicate all pertinent dimensions, connections, details, materials, finishes and all other information required to completely describe the chain link fence installation to this project.

.4 Mock-up: Provide Mock-up of a line post with tie wires.

.5 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for concrete mixes, fences, posts and gates] and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions and 01 61 00- Common Product Requirements.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations.

.2 Store and protect fence and gate materials from damage .

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 All materials must meet or exceed the latest edition of the CSC Technical Criteria for Correctional Institutions. Where there is a discrepancy between the Technical Criteria for Correctional Institutions and the materials identified in Section 2.1 Materials, the Technical Criteria for Correctional Institutions will be considered the Standard of Acceptance.

.2 Concrete mixes and materials: in accordance with CSA A23.1. Refer to structural drawings.

.1 Nominal coarse aggregate size: 20-5 .

.2 Compressive strength: 20 MPa minimum at 28 days.

.3 Additives: fly ash to ASTM C618 and CSA A3000 .

.3 Chain-link fence fabric: to CAN/CGSB-138.1 .

.1 Wire Size: 4.8 mm (min.) 6 Gauge

.2 Size of Mesh 50.8 mm

.3 Height of fabric: as indicated on drawings.

.4 Barbed edges top and bottom

.5 Average mass of zinc coating to be not less than 610 g/m2 of uncoated wire

.6 Breaking tensile strength to be 10,000 N.min.

.7 Galvanized wire to be black vinyl coated.

.4 Posts, braces and rails: to CAN/CGSB-138.2, galvanized steel pipe. Dimensions as indicated.

.1 Line Post minimum size shall be 73mm O.D. 8.6 kg/m.

.2 Corner and gate Post minimum size 150 mm O.D. 21 kg/m

.3 Bottom and Top Rail: 42.2 mm O.D. galvanized pipe, plain ends random lengths, standard continuous weld schedule 40 pipe. Minimum 3.4 kg/m.

.4 Intermediate rails shall not be used.

.5 Top rails to be in lengths of 5500 mm and shall be fitted with couplings or swedged for connecting the lengths into a continuous run. The couplings shall be not less than 152 mm long, with 2.0 mm minimum wall thickness, and shall allow for expansion and contraction of the rail.

.6 Posts, Braces and Rails to be painted black.

.5 Top and bottom tension wire: to CAN/CGSB-138.2, single strand, galvanized black vinyl coated wire.

.6 Tie wire fasteners: steel wire, 3.7mm diameter (9 gauge) galvanized steel wire at 300 mm spacing, to be painted black.

.7 Tension bar: to ASTM A653/A653M , 5 x 20 mm x height of fence minimum galvanized steel. Colour to be painted black

.8 Gate frames: to ASTM A53/A53M , galvanized steel pipe 73 mm outside diameter weighing 8.6 kg/m welded and drained.

.1 Fabricate gates as indicated with electrically welded joints, and hot-dip galvanized after welding.

.2 Fasten fence fabric to gate with twisted selvage at top.

.3 Furnish gates with galvanized truck and track to suit application.

.4 Gate frames to be painted black.

.9 Fittings and hardware: to CAN/CGSB-138.2 , galvanized steel.

.1 Tension bar bands: 3 x 20 mm minimum galvanized steel or 5 x 20 mm minimum aluminum.

.2 Post caps to provide waterproof fit, to fasten securely over posts and to carry top rail. Colour to be painted black.

.3 Overhang tops to provide waterproof fit, to hold top rails and an outward projection to hold barbed wire overhang.

.4 Provide 73 mm Outside Diameter Galvanized post arms to support Barbed Tape Concertina (BTC)

.5 Turnbuckles to be drop forged.

.10 Organic zinc rich coating: to CAN/CGSB-1.181 and MPI #18 .

.11 Barbed Tape Concertina:

.1 Barbed tape concertina (B.T.C.) shall be galvanized tape 20 x 0.5 mm clenched around a 2.5 mm diameter spring steel galvanized core wire to form a concertina

coil with a nominal exterior coil diameter of 710 mm. The coil, when installed, shall have a minimum diameter of 635 mm. The barbed concertina shall have 20 mm long blade type barbs measured from tip to tip of the blade, and barb clusters shall be spaced approximately 45 mm on centre. The concertina shall be formed by clipping adjacent loops of single helical coils together at a minimum of three (3) points on the circumference. Clips shall be galvanized. The resulting coil, when stretched, shall form a cylindrical pattern. The loop spacing shall not exceed 230 mm.

.12 Barbed Wire:

.1 For concertina coil support at fence top, two barbed wires stretched and fixed to post arms shall be provided. Barbed wire shall consist of two strands of 12 gauge wire with 4 point barbs at 130 mm spacing, all galvanized. To meet ASTM A121

.13 Galvanized steel arms with integral post top combination:

.1 Shall be provided on all line post tops to hold dense top rails where concertina is to be installed as detailed and in accordance with CSC standards. Post top arms to provide waterproof fit. Secure post arm cap to top of post with 2 – 4.5mm dia. Stainless steel Torx with Pin Tec screws.

.2 Include custom galvanized steel arm with recesses to hold 2 strands of barbed wire configured as follows:

.1 Location and spacing of recesses: as indicated

.2 Length of galvanized steel arm: as indicated

.3 Galvanized steel arm projection angle: as indicated

.4 The end of each arm must be able to support a 113.4 kg (250 lb) load.

.14 Grounding rod: 16 mm diameter copperwell rod, 3 m long, if required.

2.2 FINISHES

.1 Galvanizing:

.1 For chain link fabric: to CAN/CGSB-138.1 Grade 2 .

.2 For pipe: 550 g/m2 minimum to ASTM A90.

.3 For barbed wire: to CAN/CGSB-138.2, Class 2 .

.4 For other fittings: to ASTM A123/A123M .

.2 Aluminum coating:

.1 For barbed wire: to ASTM A121] , Class 2 .

.3 Vinyl coating: to ASTM F1664 .

.1 0.045 mm dry film thickness minimum.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for fence and gate installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 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 Departmental Representative.

3.2 PREPARATION

.1 Grading:

- .1 Remove debris and correct ground undulations along fence line to obtain smooth uniform gradient between posts.
  - .1 Provide clearance between bottom of fence and ground surface of 30 mm to 5 mm.

3.3 ERECTION OF FENCE

.1 Erect fence along lines as indicated and to CAN/CGSB-138.3.

.2 Excavate post holes as indicated on structural drawings.

.3 Space line posts maximum 2.5 m apart, measured parallel to ground surface.

.4 Install additional straining posts at sharp changes in grade and where directed by Departmental Representative.

.5 Install corner post where change in alignment exceeds 10 degrees.

.6 Install end posts at end of fence and at buildings.

- .1 Install gate posts on both sides of gate openings.

.7 Place concrete in post holes then embed posts into concrete to depths indicated on structural drawings.

- .1 Extend concrete 50 mm above ground level and slope to drain away from posts.
- .2 Brace to hold posts in plumb position and true to alignment and elevation until concrete has set. Ensure posts are centred in post holes.

.8 Install fence fabric after concrete has cured, minimum of 5 days.

.9 Install brace between end and gate posts and nearest line post, placed in centre of panel and parallel to ground surface.

- .1 Install braces on both sides of corner and straining posts in similar manner.

.10 Install overhang tops and caps.

.11 Install top rail between posts and fasten securely to posts and secure waterproof caps and overhang tops.

.12 Install bottom tension wire, stretch tightly and fasten securely to end, corner, gate and straining posts with turnbuckles and tension bar bands.

.13 Lay out fence fabric. Stretch tightly to tension recommended by manufacturer and fasten to end, corner, gate and straining posts with tension bar secured to post with tension bar bands spaced at 300 mm intervals. Ensure distance between tension bar and posts does not exceed 13 mm.

.1 Knuckled selvedge at bottom.

.2 Twisted selvedge at top.

.14 Secure fabric to top rails, line posts and bottom tension wire with tie wires at 300 mm intervals.

.1 Give tie wires minimum two twists.

.15 Fence fabric shall be pulled taut before fixing in place. Tautness, when fixed in place, is to be established by pull tests. The application of a 12 kg perpendicular pull at the midpoint of the mesh panel (midpoint of posts/rails) shall show a displacement of no more than 30 mm from the fence at rest plane.

.16 Wire mesh shall be continuous from top to bottom and shall be applied on the institutional compound side of the posts.

.17 Install barbed wire strands and clip securely to lugs of each projection.

3.4 INSTALLATION OF GATES

.1 Install gates in locations as indicated.

3.5 TOUCH UP

.1 Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply two coats of organic zinc-rich paint to damaged areas in accordance with Section 09 91 00.08 - Painting for Minor Works.

.1 Pre-treat damaged surfaces according to manufacturers' instructions for zinc-rich paint.

3.6 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.

.1 Leave Work area clean at end of each day.

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

.3 Waste Management: separate waste materials for reuse or recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Appendix A

CSC Bowden Gate Replacement Geotechnical Investigation – WSP
October 11, 2019

1X1 ARCHITECTURE INC.

CSC BOWDEN GATE REPLACEMENT

GEOTECHNICAL INVESTIGATION

BOWDEN, ALBERTA

OCTOBER 11, 2019

CONFIDENTIAL

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APPENDICES

1 INTRODUCTION

WSP Canada Inc. was retained by 1x1 Architecture Inc. to carry out a geotechnical investigation for a proposed gate replacement at the Correctional Service Canada (CSC) Bowden Institution near Bowden, Alberta. The geotechnical investigation was carried out in accordance with the scope of work outlined in our proposal dated August 29, 2019, and included the following:

- Two (2) geotechnical boreholes advanced to depths of 6.6 and 9.6 m depth
- Laboratory testing
- Geotechnical report

The objectives of this geotechnical investigation were to assess the subsoil conditions and to provide geotechnical recommendations to support the design and construction of the proposed gate replacement.

The use of this report is subject to the Terms of Reference (Appendix A).

2 SITE AND PROJECT DESCRIPTION

An existing gate is proposed to be replaced with a similar gate at the Bowden Institution (i.e., a prison complex). The existing gate is located at the existing F2 (west side) and F3 (north side) gates within the Bowden Institution. The project site is generally flat. WSP understands that the new gate will be supported on helical piles.

3 REVIEW OF SURFICICAL GEOLOGY

Based on a review of the surficial geology mapping, the subsurface soil generally consists of draped moraine[1]. These sediments generally consist of well-compacted material that is non-stratified and contains a heterogeneous mixture of particle sizes. It commonly comprises a mixture of sand, silt and clay.

4 GEOTECHNICAL INVESTIGATION

4.1 Field Investigation

A total of two (2) boreholes were advanced at the subject site on September 26, 2019. The boreholes drilling was carried out by All Service Drilling Inc. under full-time presence of WSP field representative who was responsible for soil logging and sample collections. The boreholes were drilled using a truck-mounted drill rig equipped with solid stem augers and a Standard Penetration Test (SPT) auto hammer. The borehole details are provided in Table 1. The borehole locations are shown on the site plan included in Appendix B.

[1] I, Shetsen; 1987 Quaternary Geology, Southern Alberta, Map 207; Alberta Research Council.

Table 1 Borehole Details

Borehole #	Depth (mbgs)	Latitude*	Longitude*
BH19-01	9.6	51.97574°	-114.00488°
BH19-02	6.6	51.97553°	-114.00504°

Note: mbgs – meters below ground surface
*As-built borehole coordinates were acquired using a handheld GPS (NAD 83). Coordinates are accurate to ±3 m

Disturbed soil samples were retrieved from auger flight at a continuous depth interval of 0.75 m in all boreholes. In addition, SPT was performed and split-spoon samples collected at depth interval of 1.5 m in all boreholes using auto hammer of weight 624 N and drop height 760 mm as per ASTM D1586. A pocket penetrometer reading was also taken on the cohesive auger samples. The collected samples were labelled with the project name and number, borehole number, date of sampling, the sample number and depth of the sample.

Groundwater and sloughing conditions were noted during and at the completion of drilling. No monitoring well was installed. The boreholes were backfilled with soil cuttings with cold-mixed asphalt patches on the surface.

Borehole logs presenting detail subsurface conditions in the individual borehole and summary of field and laboratory test results are enclosed in Appendix B.

4.2 Laboratory Testing

Soil samples retrieved from the field investigation were shipped to WSP's laboratory in Calgary for detailed visual examination and laboratory testing. The following laboratory tests were carried out on selected representative soil samples:

- 18 Moisture content tests on all retrieved samples
- 2 Atterberg limits
- 1 grain size analysis test (i.e., sieve and hydrometer)
- 2 soluble sulphate content tests

The laboratory test results are discussed in Section 5. The test results are shown in the borehole logs (Appendix B).

5 SUBSURFACE CONDITIONS

5.1 Subsurface Soil Layer

The soil profile encountered at the borehole locations generally consisted of asphalt over granular fill over clay till followed by silt until borehole termination depth with the exception of the following:

- An organic layer was encountered between the granular fill and clay till layers in BH19-02
- BH19-02 terminated in clay till (i.e., silt was not encountered)

Groundwater conditions are summarized in Section 5.1.6. Detailed descriptions of the subsurface soil strata are provided in the following sub-sections.

5.1.1 Asphalt

Asphalt was encountered in both boreholes at the surface. The asphalt was 125 and 175 mm thick in BH19-01 and BH19-02, respectively.

5.1.2 Granular Fill

Granular fill was encountered below the asphalt layer and extended to 0.6 mbgs in both boreholes. The granular fill was described as inferred road base gravel material. It was generally a well graded gravelly sand, and brown.

Moisture contents recorded on two granular fill samples resulted in 17 and 38%, which indicates wet condition.

5.1.3 Organic layer

An organic layer was encountered below the granular fill layer in BH19-02, which extended until 0.9 mbgs. It was described as inferred buried topsoil mixed with the granular fill layer from above.

One moisture content of 30% was recorded on the organic layer, which indicates wet condition.

5.1.4 Clay Till

Clay till was encountered either below the granular fill or below the organic layer and extended until 4.0 mbgs in BH19-01 and until borehole termination depth at 6.6 mbgs in BH19-02. The clay till was generally silty with some sand and was brown.

The SPT N values in the clay till layer ranged from 4 to 8 blows per 0.3 m of penetration, which corresponds to firm clay till.

Moisture contents recorded on 12 clay till samples ranged from 25 to 33%, indicating moist to wet condition.

The results of Atterberg limits and soluble sulphate tests on selected clay till samples are summarized in Table 2 below.

Table 2 Laboratory Test Results for Clay Till

Borehole #	Sample Depth (mbgs)	Plastic Limit %	Liquid Limit %	Plasticity Symbol	Soluble Sulphate (%)
BH19-01	0.6	20	38	CI	0.076
BH19-02	1.5	19	27	CL	0.082

Note: CI – medium plastic clay
CL – low plastic clay

Based on the Atterberg limits test results, the clay till ranges from low to medium plastic.

5.1.5 Silt

Silt was encountered in BH19-01 below the clay till and extended until borehole termination depth at 9.6 mbgs. The silt generally contained some clay and trace sand and was brown to grey.

The SPT N values in the silt layer ranged from 5 to 14 blows per 0.3 m of penetration, which corresponds to loose to compact silt.

Moisture contents recorded on seven silt samples ranged from 25 to 31%, indicating wet condition.

The grain size analysis test completed on the silt is summarized in Table 3

Table 3 Laboratory Test Results for Silt

Borehole #	Sample Depth (mbgs)	Sieve and Hydrometer		
		Sand (%)	Silt (%)	Clay (%)
19-01	4.6	4.3	81.3	14.4

5.1.6 Groundwater

Groundwater and sloughing conditions were observed during and at the completion of drilling.

The groundwater and sloughing observations are summarized in Table 4. It should be noted that the actual groundwater levels can vary and are subject to seasonal fluctuations in response to major weather events.

Table 4 Groundwater and Sloughing Observations

Borehole #	Drilled Depth (mbgs)	Depth of Slough at Drilling Completion (mbgs)	Water Seepage During Drilling (mbgs)	Water Level at Drilling Completion (mbgs)
BH19-01	9.6	None	3.0 & 4.6	2.1
BH19-02	6.6	3.4	3.4	3.7

6 GEOTECHNICAL COMMENTS AND RECOMMENDATIONS

This section provides geotechnical design parameters based on WSP's interpretation of the field and laboratory testing information. The geotechnical parameters provided are intended as preliminary guidance for planning and design by qualified engineers and architects. Where comments are made on construction, they are provided to highlight aspects of construction that could affect the implementation of the project. Parties requiring information beyond the scope or purpose of this report must contact WSP or make their own interpretation of the information provided.

6.1 Soil Design Parameters

The interpreted soil design parameters in Table 5 were developed using standard engineering techniques, as indicated in the Canadian Foundation Engineering Manual (CFEM)[2].

Table 5 Soil Design Parameters

Parameters	Clay Till	Silt
Total Unit Weight (KN/m^3)	19	19
Angle of Internal Friction (°)	24	27
Undrained Shear Strength, S_u (kPa)	35	N/A

6.2 Frost Penetration Depth

The near-surface soils on site are considered frost susceptible. The maximum seasonal frost penetration depth was calculated for the near-surface soils using the procedure described in CFEM. A mean freezing index of 1,350°C days based on a 30-year return period was used for the site. The maximum seasonal frost penetration depth is estimated to be 2.3 mbgs. The estimated frost penetration depth assumes a uniform soil type without snow cover.

6.3 Helical Piles

As discussed in Section 2, WSP understands that the new gates are to be supported on helical piles. As it is a proprietary system, design recommendations should come from an experienced helical pile contractor. The parameters provided in Table 5 can be considered for the design of the helical piles. Although cobbles were not encountered, it is common glacial till to contain cobbles and or gravels. Therefore, the piling contractor should review the report and use their judgement.

For pile installation, it is necessary to ensure the marked locations of helical pile installations are free from underground utilities, and the helix piles are properly aligned by controlled plumbing to minimize misalignment of the pile. In very stiff or dense soil, it may be necessary to pre-drill a pilot hole before the installation of the helical pile for easier installation. The pilot hole should not be greater than the shaft diameter of the helix pile so as not to reduce the load-bearing capacity of the pile.

The maximum achievable penetration depth of helical piles is usually governed by the available torque of the installation equipment and the structural capacity of the pile to sustain the torque. The installation torque is primarily a function of the frictional resistance along the shaft, the top and bottom surfaces of the helical plate(s), and the passive resistance along the leading edge(s) of the plate(s).

[2] Canadian Geotechnical Society; 2006; Canadian Foundation Engineering Manual; Fourth Edition

The installation torque for each pile should be monitored during pile installation for quality control. When load testing of a number of installed piles is undertaken, empirical correlations between installation torque and the pile capacity could also be used as a guide for estimating pile capacity during installation by the following equation from CFEM.

$$P_u = K_t T$$

Where, K_t is the empirical capacity to torque ratio, and T is the final or average installation torque.

It is important to match the installation equipment with the rated torque of the helical pile, monitor and record the installation torques. In compression loading, the torque often used for empirical correlations is the last torque reading at the termination depth of the pile. However, in tension loading, the average torque reading over a distance equal to three times the bearing plate diameter is recommended.

6.3.1.1 Pile Group

The minimum recommended pile spacing is 3D, where D is the pile diameter. Axially-loaded pile groups can act as a block, which may lead to the development of a shaft resistance around the perimeter of the pile group and end resistance at the bottom of the pile-soil block. Thus, a rational approach to estimating the pile group capacity involves the use of the minimum between:

- The sum of individual pile capacities
- The equivalent pile-soil block capacity

The factors that influence the pile group response include the method of installation, the geometry of the pile group, relative stiffness of pile and the soil, mode of load transfer in the pile, etc. It is desirable to space piles in a group to ensure that the load-bearing capacity of the pile group is not less than the sum of bearing capacity of each pile in the group. Thus, the group efficiency of the pile must be taken into consideration. The group efficiency (η) is defined as:

$$\eta = \frac{Nominal\ load\ bearing\ capacity\ of\ the\ pile\ group}{Sum\ of\ individual\ load\ bearing\ capacity\ of\ each\ pile}$$

6.4 Seismic Site Classification

The site classification for Seismic Site Response is provided in Sections 4.1.8.4 of National Building Code of Canada (NBCC) and Chapter 6 of CFEM and is determined using the expected shear wave velocity, Standard Penetration Resistance N-value and undrained shear strength within the top 30 m. Based on the available information, the average ground properties in the upper 30 m at the site are inferred as soft soil, corresponding to Class E as per Table 6.1A, CFEM.

6.5 Water Soluble Sulphate

The results from the soluble sulphate content laboratory tests are summarized in Table 2.

The test results indicate a negligible degree of exposure to sulphate attack on concrete in contact with the soil as per degree CSA A23.1-14[3]. Any imported soils should be tested for water-soluble sulphate concentration and associated sulphate exposure classification.

Concrete properties should be specified by the structural engineer to meet structural requirements and exposure to freezing and thawing and/or chlorides.

7 CLOSURE

This report has been prepared for the sole benefit of 1x1 Architecture Inc. and is not intended for use by others. This report may not be reproduced without the prior written consent of WSP. Contractors undertaking the work must draw their own interpretations of the factual information provided in this report as they affect the construction costs, procedures, and scheduling.

As boreholes are a localized representation of the total study area, subsurface conditions may vary between and/or beyond the borehole locations. If conditions encountered at the site vary significantly from that reported herein, WSP should be notified immediately so that our interpretation and recommendations can be reviewed and revised, if necessary.

[3] Canadian Standards Association; 2014; Concrete Materials and Methods of Concrete Construction, Canadian Standards Association International; CSA A23.1-14.

APPENDIX

A TERMS OF REFERENCE

TERMS OF REFERENCE FOR GEOTECHNICAL REPORTS ISSUED BY WSP CANADA INC.

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WSP Canada Inc. ("WSP") prepared and issued this geotechnical report (the "Report") for its client (the "Client") in accordance with generally-accepted engineering consulting practices for the geotechnical discipline. No other warranty, expressed or implied, is made. Unless specifically stated in the Report, the Report does not address environmental issues.

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WSP prepared the Report for the Client for the specific site, development, building, design or building assessment objectives and purpose that the Client described to WSP. The applicability and reliability of any of the information, observations, findings, suggestions, recommendations and opinions contained in the Report are only valid to the extent that there was no material alteration to or variation from any of the said descriptions provided by the Client to WSP unless the Client specifically requested WSP to review and revise the Report in light of such alteration or variation.

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The information, observations, findings, suggestions, recommendations and opinions contained in the Report, or any component forming the Report, are for the sole use and benefit of the Client and the team of consultants selected by the Client for the specific project that the Report was provided. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION OR COMPONENT WITHOUT THE WRITTEN CONSENT OF WSP. WSP will consent to any reasonable request by the Client to approve the use of this Report by other parties designated by the Client as the "Approved Users". As a condition for the consent of WSP to approve the use of the Report by an Approved User, the Client must provide a copy of these Terms of Reference to that Approved User and the Client must obtain written confirmation from that Approved User that the Approved User will comply with these Terms of Reference, such written confirmation to be provided separately by each Approved User prior to beginning use of the Report. The Client will provide WSP with a copy of the written confirmation from an Approved User when it becomes available to the Client, and in any case, within two weeks of the Client receiving such written confirmation.

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TERMS OF REFERENCE FOR GEOTECHNICAL REPORTS ISSUED BY WSP CANADA INC. (continued)

5. INTERPRETATION OF THE REPORT

a. **Nature and Exactness of Descriptions**: The classification and identification of soils, rocks and geological units, as well as engineering assessments and estimates have been based on investigations performed in accordance with the standards set out in Paragraph 1 above. The classification and identification of these items are judgmental in nature and even comprehensive sampling and testing programs, implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations or assessments utilizing the standards of Paragraph 1 involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and all persons making use of such documents or records should be aware of, and accept, this risk. Some conditions are subject to changes over time and the parties making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or when the Client has special considerations or requirements, the Client must disclose them to WSP so that additional or special investigations may be undertaken, which would not otherwise be within the scope of investigations made by WSP or the purposes of the Report.

b. **Reliance on information**: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site investigation and field review and on the basis of information provided to WSP. WSP has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, WSP cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the report as a result of misstatements, omissions, misrepresentations or fraudulent acts of persons providing information.

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When WSP submits both electronic and hard copy versions of the Instruments of Professional Services, the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding upon WSP. The hard copy versions submitted by WSP shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancy, the hard copy versions shall govern over the electronic versions; furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed and sealed versions of the Instruments of Professional Services maintained or retained, or both, by WSP shall be deemed to be the overall originals for the Project.

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APPENDIX

B SITE PLAN AND BOREHOLE LOGS

Site Plan
CSC Bowden Gate Replacement
Geotechnical Investigation

SOURCE	CLIENT NAME	PROJECT NUMBER
Google Earth	1x1 Architecture Inc.	191-09179-00

DRAWN	CHECK	APPR.	EPSG	DATE	SCALE	FIGURE NUMBER	REV.
KB	SB	-	-	08/10/2019	-	Figure 1	0

WSP Canada Inc.
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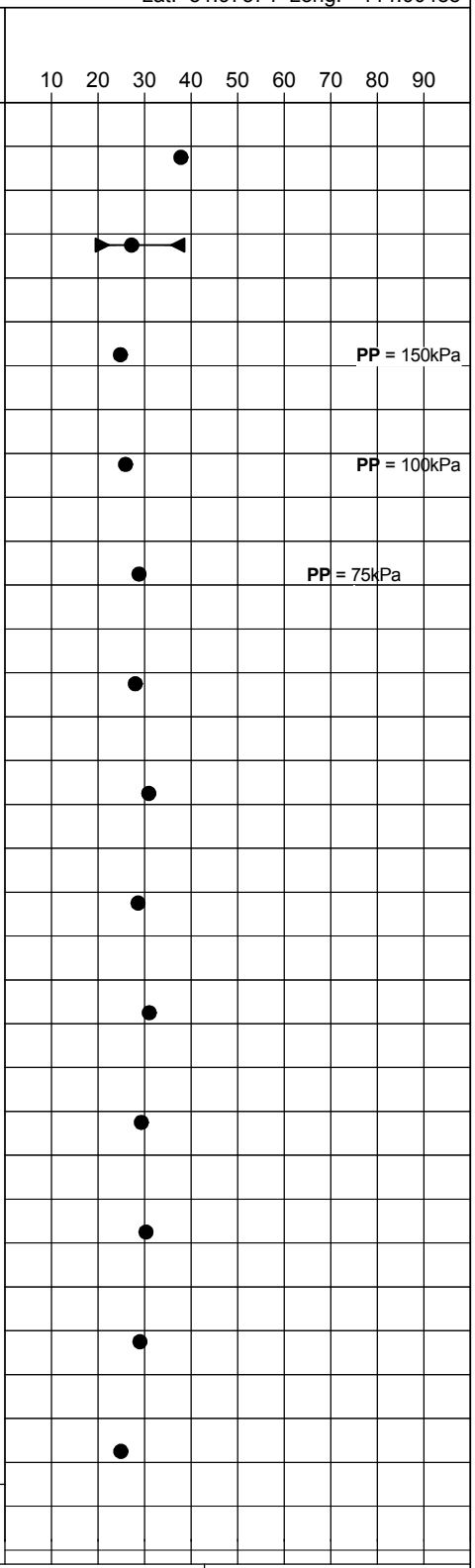
CSC Bowden Gate Replacement
1x1 Architecture Inc.
Bowden, AB

BH19-01

Pg 1 of 1
Project No: 191-09179-00
Lat: 51.97574 Long: -114.00488

Depth (m)	Depth (ft)	Description	C	N	Type/ Sample #	Water Level
		ASPHALT (125 mm thick)				
		brown, **GRANULAR FILL (sand, gravelly)**, inferred road base gravel, well graded, wet			G	
	2					
		firm, brown **CLAY TILL** , silty, some sand, medium plastic, moist to wet at 0.6 m - 0.076% soluble sulphate based on lab test		20	SPT	
	4					
	6			7	SPT	
2		at 1.8 m - wet				
	8			7	SPT	
	10					P1 Sep 26 2019
		from 3.0 m - grey, water seepage		7	SPT	
	12					
4		loose, brown to grey, **SILT** , some clay, trace sand, low plastic, wet		6	SPT	
	14					
		at 4.6 m - water seepage at 4.6 m - 4.3% sand, 81.3% silt and 14.4% clay based on sieve & hydrometer test		6	SPT	
	16					
	18			7	SPT	
6						
	20			7	SPT	
	22					
				5	SPT	
	24					
	26			6	SPT	
8		from 7.9 m - grey, trace clay, trace to some sand				
	28			8	SPT	
	30					
		from 9.0 m - compact		14	SPT	
	32					
		End of borehole at 9.6 m. Water level was at 2.1 m with no slough at drilling completion.				



C: Condition of Sample
Good
Disturbed
No Recovery

Type: Type of Sampler
SPT : 2 in. standard
ST : Shelby
G : Grab
CORE

N: Number of Blows
WH : Weight of Hammer
WR : Weight of Rod
Standard Penetration Test : ASTM D1586
Hammer Type:
DYNAMIC CONE PENETRATION TEST

Plastic Limit (%) Liquid Limit (%)
Moisture Content (%)
Ground Water Level
Shear strength in kPa (Torvane)
PP Pocket Penetrometer (compressive strength in kPa)
Shear strength in kPa (Unconfined)
Shear strength in kPa (Field vane)
Remolded strength in kPa
Percent Passing # 200 sieve

Drill Method: Solid Stem Auger
Date Drilled: 26/09/2019
Logged by: KB
Checked by: SB

SOIL CLASSIFICATION IN ACCORDANCE WITH THE CANADIAN FOUNDATION ENGINEERING MANUAL 4TH EDITION 2006.

1 LOG PER PAGE 10/10/19

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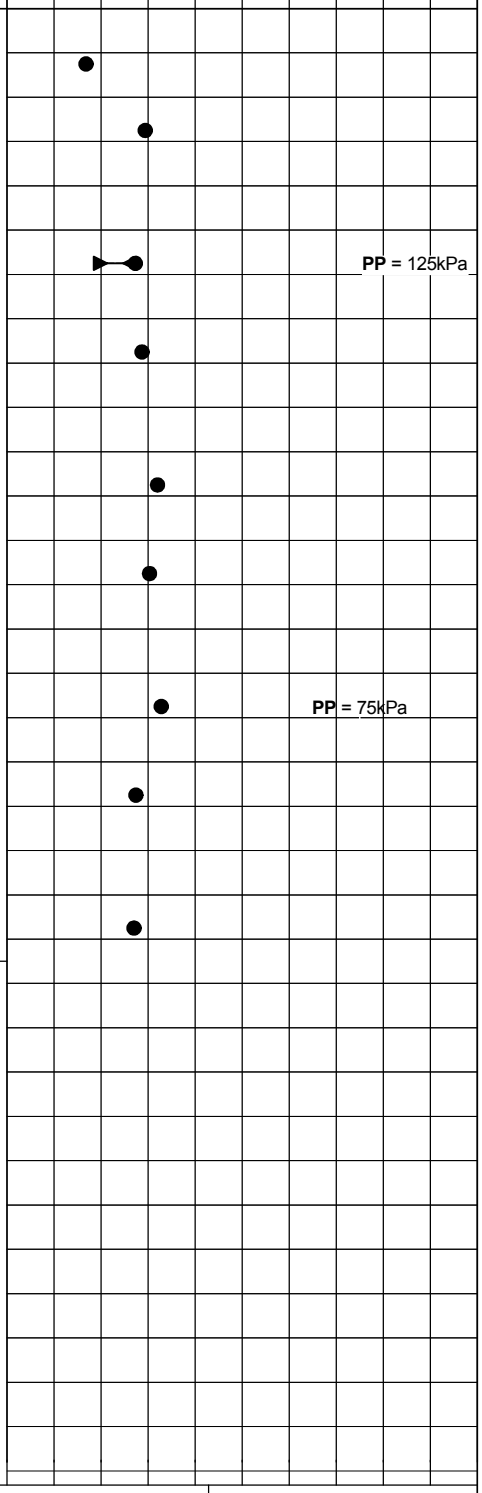
CSC Bowden Gate Replacement
1x1 Architecture Inc.
Bowden, AB

BH19-02

Project No: 191-09179-00
Lat: 51.97553 Long: -114.00504

Depth (m)	Depth (ft)	Description	C	N	Type/ Sample #	Water Level
		ASPHALT (175 mm thick)				
		brown, **GRANULAR FILL (sand, gravelly)**, inferred road base gravel, well graded, moist to wet			G	
	2	brown to black, **ORGANIC LAYER**, inferred buried topsoil mixed with road base gravel, wet		14	SPT	
	4	firm, brown **CLAY TILL** , silty, some sand, low to medium plastic, moist to wet				
	6	at 1.5 m - 0.082% soluble sulphate based on lab test		4	SPT	
2	8				G	
	10			4	SPT	P1 Sep 26 2019
	12	at 3.4 m - water seepage				
4	14				G	
	16			6	SPT	
	18				G	
6	20			8	SPT	
	22	End of borehole at 6.6 m. Water level was at 3.7 m with slough at 3.4 m at drilling completion.				
	24					
8	26					
	28					
	30					
	32					



C: Condition of Sample
Good
Disturbed
No Recovery

Type: Type of Sampler
SPT : 2 in. standard
ST : Shelby
G : Grab
CORE

N: Number of Blows
WH : Weight of Hammer
WR : Weight of Rod
Standard Penetration Test : ASTM D1586
Hammer Type:
DYNAMIC CONE PENETRATION TEST

Plastic Limit (%) Liquid Limit (%)
Moisture Content (%)
Ground Water Level
Shear strength in kPa (Torvane)
PP Pocket Penetrometer (compressive strength in kPa)
Shear strength in kPa (Unconfined)
Shear strength in kPa (Field vane)
Remolded strength in kPa
Percent Passing # 200 sieve

Drill Method: Solid Stem Auger
Date Drilled: 26/09/2019
Logged by: KB
Checked by: SB

SOIL CLASSIFICATION IN ACCORDANCE WITH THE CANADIAN FOUNDATION ENGINEERING MANUAL 4TH EDITION 2006.

1 LOG PER PAGE 10/10/19

Appendix B

Architectural Field Review and Compliance – Common Exterior - Sally Port Gate
F2/F3/P5

ARCHITECTURAL FIELD REVIEW AND COMPLIANCE - COMMON EXTERIOR - SALLY PORT GATE F2 F3

Static Verification
REVISION #: _____

NAME:	Jason Kun	CLIENT:	PSPC/CSC
COMPANY:	1x1 architecture inc.	PROJECT:	Bowden Sally Port Gates
ADDRESS:	120 Fort Street, Suite 103	FILE NUMBER:	R.100664
	Winnipeg, MB - Manitoba R3C 1C7	DATE:	DD / MM / YYYY

NAMEPLATE			
SUBJECT	**Exterior**	LOCATION	
ASSEMBLY	**Sally Port Gate**	DRAWING REFERENCE	

COMPONENTS	SPECIFIED	SHOP DRAWINGS	INSTALLED
Hardware - sliding gate F2/F3			
Hardware - fence posts (line)			
Hardware - fence posts (corner and gate)			
Hardware - top and bottom rails			
Hardware - fence mesh			
Hardware - barbed tape concertina (BTC)			
Hardware - Gate P5			

Hardware - sliding gate

Architectural Field Review & Compliance Activity	Performance Criteria	STATUS			COMMENTS
		YES	NO	N/A	
Construction checklists prepared					
Construction checklists completed					
Field review reports completed					
Compliance test reports completed					
Deficiency (Issues) log created					
Deficiency Log items addressed					
Verify training completed					
Review required maintenance and data, and systems operations manuals					
INTERIM ACCEPTANCE					
Outstanding Cx issues addressed or explained					
FINAL ACCEPTANCE					

Hardware - fence posts (line)

Architectural Field Review & Compliance Activity	Performance Criteria	STATUS			COMMENTS
		YES	NO	N/A	
Construction checklists prepared					
Construction checklists completed					
Field review reports completed					
Compliance test reports completed					
Deficiency (Issues) log created					
Deficiency Log items addressed					
Verify training completed					
Review required maintenance and data, and systems operations manuals					
INTERIM ACCEPTANCE					

ARCHITECTURAL FIELD REVIEW AND COMPLIANCE - COMMON EXTERIOR - SALLY PORT GATE F2 F3

Static Verification
REVISION #: _____

NAME:	Jason Kun	CLIENT:	PSPC/CSC
COMPANY:	1x1 architecture inc.	PROJECT:	Bowden Sally Port Gates
ADDRESS:	120 Fort Street, Suite 103	FILE NUMBER:	R.100664
	Winnipeg, MB - Manitoba R3C 1C7	DATE:	DD / MM / YYYY

Outstanding Cx issues addressed or explained					
FINAL ACCEPTANCE					

Hardware - fence posts (corner & gate)					
Architectural Field Review & Compliance Activity	Performance Criteria	STATUS			COMMENTS
		YES	NO	N/A	
Construction checklists prepared					
Construction checklists completed					
Field review reports completed					
Compliance test reports completed					
Deficiency (Issues) log created					
Deficiency Log items addressed					
Verify training completed					
Review required maintenance and data, and systems operations manuals					
INTERIM ACCEPTANCE					
Outstanding Cx issues addressed or explained					
FINAL ACCEPTANCE					

Hardware - top & bottom rails					
Architectural Field Review & Compliance Activity	Performance Criteria	STATUS			COMMENTS
		YES	NO	N/A	
Construction checklists prepared					
Construction checklists completed					
Field review reports completed					
Compliance test reports completed					
Deficiency (Issues) log created					
Deficiency Log items addressed					
Verify training completed					
Review required maintenance and data, and systems operations manuals					
INTERIM ACCEPTANCE					
Outstanding Cx issues addressed or explained					
FINAL ACCEPTANCE					

Hardware - fence mesh					
Architectural Field Review & Compliance Activity	Performance Criteria	STATUS			COMMENTS
		YES	NO	N/A	
Construction checklists prepared					
Construction checklists completed					
Field review reports completed					
Compliance test reports completed					
Deficiency (Issues) log created					

ARCHITECTURAL FIELD REVIEW AND COMPLIANCE - COMMON EXTERIOR - SALLY PORT GATE F2 F3

Static Verification
REVISION #: _____

NAME:	Jason Kun	CLIENT:	PSPC/CSC
COMPANY:	1x1 architecture inc.	PROJECT:	Bowden Sally Port Gates
ADDRESS:	120 Fort Street, Suite 103	FILE NUMBER:	R.100664
	Winnipeg, MB - Manitoba R3C 1C7	DATE:	DD / MM / YYYY

Deficiency Log items addressed					
Verify training completed					
Review required maintenance and data, and systems operations manuals					
INTERIM ACCEPTANCE					
Outstanding Cx issues addressed or explained					
FINAL ACCEPTANCE					
Outstanding Cx issues addressed or explained					
FINAL ACCEPTANCE					

Hardware - barbed tape concertina (BTC)

Architectural Field Review & Compliance Activity	Performance Criteria	STATUS			COMMENTS
		YES	NO	N/A	
Construction checklists prepared					
Construction checklists completed					
Field review reports completed					
Compliance test reports completed					
Deficiency (Issues) log created					
Deficiency Log items addressed					
Verify training completed					
Review required maintenance and data, and systems operations manuals					
INTERIM ACCEPTANCE					
Outstanding Cx issues addressed or explained					
FINAL ACCEPTANCE					

Hardware - Gate P5

Architectural Field Review & Compliance Activity	Performance Criteria	STATUS			COMMENTS
		YES	NO	N/A	
Construction checklists prepared					
Construction checklists completed					
Field review reports completed					
Compliance test reports completed					
Deficiency (Issues) log created					
Deficiency Log items addressed					
Verify training completed					
Review required maintenance and data, and systems operations manuals					
INTERIM ACCEPTANCE					
Outstanding Cx issues addressed or explained					
FINAL ACCEPTANCE					

ARCHITECTURAL FIELD REVIEW AND COMPLIANCE - COMMON EXTERIOR - SALLY PORT GATE F2 F3

Static Verification

REVISION #: _____

NAME:	Jason Kun	CLIENT:	PSPC/CSC
COMPANY:	1x1 architecture inc.	PROJECT:	Bowden Sally Port Gates
ADDRESS:	120 Fort Street, Suite 103	FILE NUMBER:	R.100664
	Winnipeg, MB - Manitoba R3C 1C7	DATE:	DD / MM / YYYY

GENERAL COMMENTS:

POSITION/TITLE	SIGNATURE	DATE

Appendix C

Existing As-Built Conditions – Site Photos

Gate F2

View from North (Inside Sally Port)

View from South

Gate F2 (continued)

View of southwest corner

View from East

Gate F3

View from East (inside Sally Port)

Gate P5 (Detail)

Lock Detail

Appendix D

Electrical Commissioning Forms - Sally Port Gate F2/F3/P5

Project Name: CSC Bowden Institution Sally Port Gate Replacement
Project Number: 191-09179

Electrical Field Review and Compliance Checklist

Name: Davin Urness

Address: 237 - 4th Avenue S.W Calgary,AB Suite 3300

Date: 2020.03.13

Installation Check-List

COMPONENTS	SPECIFIED	SHOP DRAWINGS	INSTALLED
Hardware - Gates and Controllers ('F2' and 'F3') (To be commissioned by Gate Supplier/Contractor)			
Exterior Fence Mounted Junction Box			
Exterior Weatherproof Pushbutton			
Exterior Teck Cable and Tray (See attached Checklist)			
Circuit Breakers (See attached Checklist)			

HARDWARE - GATE 'F2' CONTROLLER (TO BE COMMISSIONED BY GATE SUPPLIER/CONTRACTOR AND WITNESSED BY WSP

Electrical Field Review & Compliance Activity	Status			COMMENTS
	Yes	No	N/A	
Construction Checklists Prepared (See Attached)				
Construction Checklists Completed (See Attached)				
Field Review Completed				
Functionality Verified On-Site				
Reviewed Operations and Maintenance Manual				
Final Acceptance				

HARDWARE - GATE 'F3' CONTROLLER (TO BE COMMISSIONED BY GATE SUPPLIER/CONTRACTOR AND WITNESSED BY WSP

Electrical Field Review & Compliance Activity	Status			COMMENTS
	Yes	No	N/A	
Construction Checklists Prepared (See Attached)				
Construction Checklists Completed (See Attached)				
Field Review Completed				
Functionality Verified On-Site				

Reviewed Operations and Maintenance Manual				
Final Acceptance				

EXTERIOR FENCE MOUNTED JUNCTION BOX				
Electrical Field Review & Compliance Activity	**Status**			**COMMENTS**
	Yes	**No**	**N/A**	
Construction Checklists Prepared				
Construction Checklists Completed				
Field Review Completed				
Functionality Verified On-Site				
Reviewed Operations and Maintenance Manual				
Final Acceptance				

EXTERIOR WEATHERPROOF PUSHBUTTON				
Electrical Field Review & Compliance Activity	**Status**			**COMMENTS**
	Yes	**No**	**N/A**	
Construction Checklists Prepared (See Attached)				
Construction Checklists Completed (See Attached)				
Field Review Completed				
Functionality Verified On-Site				
Reviewed Operations and Maintenance Manual				
Final Acceptance				

EXTERIOR TECK CABLE AND TRAY (SEE ATTACHED CHECKLIST)				
Electrical Field Review & Compliance Activity	**Status**			**COMMENTS**
	Yes	**No**	**N/A**	
Construction Checklists Prepared (See Attached)				
Construction Checklists Completed (See Attached)				
Field Review Completed				
Functionality Verified On-Site				
Reviewed Operations and Maintenance Manual				
Final Acceptance				

CIRCUIT BREAKERS (SEE ATTACHED CHECKLIST)				
Electrical Field Review & Compliance Activity	**Status**			**COMMENTS**
	Yes	**No**	**N/A**	
Construction Checklists Prepared (See Attached)				

Project Name: **CSC Bowden Institution Sally Port Gate Replacement**
Project Number: **191-09179**

Construction Checklists Completed (See Attached)				
Field Review Completed				
Functionality Verified On-Site				
Reviewed Operations and Maintenance Manual				
Final Acceptance				

Comments

Commissionioned By:	Davin Urness
Company:	WSP Canada Inc.
Date:	2020.03.13
Signature :	

Project Name: CSC Bowden Institution Sally Port Gate Replacement
Project Number: 191-09179

Cable and Raceway Installation Checklist

Cable ID:	Gate 'F2'	Cable Type:	TECK
Fed From:	Panel EB 25,27,29	Cable Size:	
Fed To:	Gate 'F2'	Rated Voltage:	

Measurements (To be taken by Electrical Contractor, and witnessed by WSP)

			Comments
Measured current Phase A		Amps	
Measured current Phase B		Amps	
Measured current Phase C		Amps	
Measured Voltage AB		Volts	
Measured Voltage AC		Volts	
Measured Voltage AN		Volts	
Measured Voltage BN		Volts	
Measured Voltage BC		Volts	
Measured Voltage CN		Volts	
Megger test Voltage:		Volts	
Megger Test Results A-B		Ohms	
Megger Test Results A-N		Ohms	
Megger Test Results A-G		Ohms	
Megger Test Results B-C		Ohms	
Megger Test Results B-N		Ohms	
Megger Test Results B-G		Ohms	
Megger Test Results C-A		Ohms	
Megger Test Results C-N		Ohms	
Megger Test Results C-G		Ohms	
Megger Test Results N-G		Ohms	

Project Name: CSC Bowden Institution Sally Port Gate Replacement
Project Number: 191-09179

Installation Check-List

Item	Status			Comments
	Yes	No	N/A	
Cable has been installed neatly throughout renovation area?				
Cable is adequately supported as per C.E.C requirements?				
Cable is adequately protected from Mechanical Damage?				
Cable is adequately sized as per load requirements?				
Cable has been provided with the correct type of fittings for installation as per C.E.C requirements?				
Conductors have been tagged with correct circuit number(s) as required?				
Cable has been visually inspected for any damage by Electrical Contractor?				
Cable has been Meggered by Electrical Contractor?				
Cable has been witnessed to be in fuctional condition?				
Raceway has been installed neatly throughout renovation area?				
Raceway has been bonded as per C.E.C requirements?				
Raceway has been adequately supported as per C.E.C requirements?				

Comments

Commissionioned By:	Davin Urness
Company:	WSP Canada Inc.
Date:	202.03.13
Signature :	

Project Name: CSC Bowden Institution Sally Port Gate Replacement
Project Number: 191-09179

Cable and Raceway Installation Checklist

Cable ID:	Gate 'F3'	Cable Type:	TECK
Fed From:	Panel EB 32,34,36	Cable Size:	
Fed To:	Gate 'F3'	Rated Voltage:	

Measurements (To be taken by Electrical Contractor, and witnessed by WSP)

			Comments
Measured current Phase A		Amps	
Measured current Phase B		Amps	
Measured current Phase C		Amps	
Measured Voltage AB		Volts	
Measured Voltage AC		Volts	
Measured Voltage AN		Volts	
Measured Voltage BN		Volts	
Measured Voltage BC		Volts	
Measured Voltage CN		Volts	
Megger test Voltage:		Volts	
Megger Test Results A-B		Ohms	
Megger Test Results A-N		Ohms	
Megger Test Results A-G		Ohms	
Megger Test Results B-C		Ohms	
Megger Test Results B-N		Ohms	
Megger Test Results B-G		Ohms	
Megger Test Results C-A		Ohms	
Megger Test Results C-N		Ohms	
Megger Test Results C-G		Ohms	
Megger Test Results N-G		Ohms	

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Installation Check-List

Item	Status			Comments
	Yes	No	N/A	
Cable has been installed neatly throughout renovation area?				
Cable is adequately supported as per C.E.C requirements?				
Cable is adequately protected from Mechanical Damage?				
Cable is adequately sized as per load requirements?				
Cable has been provided with the correct type of fittings for installation as per C.E.C requirements?				
Conductors have been tagged with correct circuit number(s) as required?				
Cable has been visually inspected for any damage by Electrical Contractor?				
Cable has been Meggered by Electrical Contractor?				
Cable has been witnessed to be in fuctional condition?				
Raceway has been installed neatly throughout renovation area?				
Raceway has been bonded as per C.E.C requirements?				
Raceway has been adequately supported as per C.E.C requirements?				

Comments

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Company:	WSP Canada Inc.
Date:	202.03.13
Signature :	

Project Name: CSC Bowden Institution Sally Port Gate Replacement
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Cable and Raceway Installation Checklist

Cable ID:	Weatherproof Pole Mounted Junction Box	Cable Type:	TECK
Fed From:		Cable Size:	
Fed To:	Pole Mounted Junction Box	Rated Voltage:	

Measurements (To be taken by Electrical Contractor, and witnessed by WSP)

			Comments
Measured current Phase A		Amps	
Measured current Phase B		Amps	
Measured current Phase C		Amps	
Measured Voltage AB		Volts	
Measured Voltage AC		Volts	
Measured Voltage AN		Volts	
Measured Voltage BN		Volts	
Measured Voltage BC		Volts	
Measured Voltage CN		Volts	
Megger test Voltage:		Volts	
Megger Test Results A-B		Ohms	
Megger Test Results A-N		Ohms	
Megger Test Results A-G		Ohms	
Megger Test Results B-C		Ohms	
Megger Test Results B-N		Ohms	
Megger Test Results B-G		Ohms	
Megger Test Results C-A		Ohms	
Megger Test Results C-N		Ohms	
Megger Test Results C-G		Ohms	
Megger Test Results N-G		Ohms	

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Installation Check-List

Item	Status			Comments
	Yes	No	N/A	
Cable has been installed neatly throughout renovation area?				
Cable is adequately supported as per C.E.C requirements?				
Cable is adequately protected from Mechanical Damage?				
Cable is adequately sized as per load requirements?				
Cable has been provided with the correct type of fittings for installation as per C.E.C requirements?				
Conductors have been tagged with correct circuit number(s) as required?				
Cable has been visually inspected for any damage by Electrical Contractor?				
Cable has been Meggered by Electrical Contractor?				
Cable has been witnessed to be in fuctional condition?				
Raceway has been installed neatly throughout renovation area?				
Raceway has been bonded as per C.E.C requirements?				
Raceway has been adequately supported as per C.E.C requirements?				

Comments

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Project Name: CSC Bowden Institution Sally Port Gate Replacement
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Panelboard Specs

Equiment ID	Panel 'EB'	Location:	Guard House
Manufacturer:	Square D	Rated Voltage:	120/208V
Model No.:	QBL-442CU	Fed from:	MDP
Serial No.:	QBL-442CU	Rated Current:	225A
Main Breaker:	100A	Enclosure Type:	Surface Interior
# of Circuits:	42		
Feeder Cable Size:			

Installation Check-List

Item	Status			Comments
	Yes	No	N/A	
Panelboard has been installed and is in functional condition?				
Panelboard has been provided with a typed up schedule?				
Equipment is clean and undamaged?				
All access doors are in place and can open fully without obstruction?				
Power and Control Wiring has been installed and verified?				
Operation of Breakers Verified?				
Correct Phase Rotation?				
Correct Labelling?				
Lamacoid label provided?				
Grounding Provided?				
Electrical contractor has completed point to point verification of branch circuit device(s) ?				

Comments

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Company:	WSP Canada Inc.
Date:	2020.03.13
Signature :	

HySecurity
Simple. Reliable. Secure.®

Date: 12/15/2010

Operators: SlideDriver™

SlideDriver Checklist

This check list is provided by HySecurity and is to be used after installing a SlideDriver operator.

1. Before checking the items in this list, make sure power is turned OFF at the main power disconnect and the operator's control box power switch is also in the OFF position.

DANGER

Electrical power to the operator must be turned off as the first step BEFORE proceeding. Failure to comply can result in serious injury or death.

2. Lower the toggle handle to unclamp the drive wheels from the drive rail and check the following:

❑ Gate moves smoothly and freely by hand ❑ Electric Motor and transformer wired properly

❑ Incoming power supply voltage matches the label on the motor ❑ Gate operator is level

❑ Operator is labeled as appropriate for both the type and UL usage class of the gate

Make sure the phase, hertz, and power match the operator and its labeling:

❑ 1 Ø ❑ 3 Ø ❑ 50 Hz ❑ 60 Hz

❑ DC-24V ❑ 115 VAC ❑ 208 VAC ❑ 230 VAC ❑ 480 VAC ❑ ____V

❑ Power cable run to the operator is of sufficient wire size to handle starting current

❑ NEC/NFPA ground rod is installed

❑ All wires and cables are clear of moving parts (limits, valves, power, etc.)

❑ Vent cap has been installed in the pump ❑ Oil level checked.

❑ All chassis and base riser bolts are tight ❑ Gate wheels & rollers have covers

❑ Pinch points protected ❑ 6 foot (1.8 m) minimum distance to access controls

❑ Pedestrian gate exists ❑ Physical gate stops are present

❑ On gate, protective mesh complies with ASTM F2200 and UL 325 standards

❑ Gate is not on a slope

NOTE: Be sure to read the installation and maintenance manual that accompanies the operator because it explains, in detail, many aspects about installation, maintenance and safety procedures. If you have further questions, please contact Technical Support at 800-321-9947.

SlideDriver Checklist, continued

3. For the remaining checks, you want to cycle test the gate operator. To do so,
   - Re-engage the wheels by lifting the toggle handle and clamping the drive wheels onto the drive rail.
   - Turn the main power ON, and then turn ON the power switch located on the operator's control box.
4. Prior to moving the gate, make sure the wheel clamp spring is compressed to 2 inches (5 cm) or less.
5. Cycle test the gate by pressing the CLOSE and OPEN buttons. Allow the gate to continue traveling throughout its entire range while you or your assistant check the following:
   - ❑ Gate hand is set correctly.
   - ❑ Horizontal rail surface is 9¼ in. ± ½ in. (23 cm ± 1 cm) above the pad over full gate travel.
   - ❑ Rail flange, attached to the gate supports, remains at a distance of 1¾ in. ± 1/8 in. (4 cm ± 3 mm) from the outside edge of the operator (edge closest to the gate panel) over the full range of gate travel.
   - ❑ Drive wheel face(s) are parallel to the rail ± 1/8 in. (3 mm) with a 2 ft (61 cm) straight edge.
   - ❑ Limit switches are adjusted to clear the drive rail, but solidly contact the limit ramps.
   - ❑ Limit ramps are adjusted to stop the gate 1 to 2 inches (2 - 5 cm) from the end of the drive rail.
   - ❑ Pressure relief valve is properly set. Refer to the yellow tag inside the operator or see the table in the *SlideDriver Technical Reference Manual*, Pressure Relief Valve—Pressure Settings.

Peripherals, accessories, safety devices, and options have been installed and tested.

Check all those that apply.

❑ Free exit ❑ Inside Obstruction Loop ❑ Outside Obstruction Loop

❑ Open edge ❑ Close edge ❑ Open photo eye ❑ Close photo eye

❑ Stop input (1) ❑ Local Open (2) ❑ Close timer set (3) ❑ Radio open (4)

❑ IES sensor ❑ Fire Dept. Open ❑ Emergency Close ❑ Solenoid lock

❑ WARNING placards mounted on gate per UL 325 standards

Date: _____ Operator Serial Number: _____

Installer Name (please print): _____

End user's name (please print): _____

Site address: _____

_____

Notes: _____