Bowden Institution
Masonry Re-point Exterior Administration, Multicultural & Chapel Buildings and Window Replacement at Multicultural & Chapel Buildings

Issued for Construction
January 26, 2017

Bowden Institution
Bowden, Alberta
Project No. R. 032532.001

Client:

Public Works and Government Services Canada

SPECIFICATIONS

DRAWINGS

End of Section

Part 1 General

1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises general construction of the Re-Pointing of the Administration, Multicultural & Chapel and Window Replacement of the Multicultural and Chapel Buildings, located at Bowden Institution; and further identified as Project No: R.032532.001.

1.2 WORK SEQUENCE

.1 Construct Work in stages to accommodate Departmental Representative's continued use of premises during construction.

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

.3 Maintain fire access/control.

1.3 CONTRACTOR USE OF PREMISES

.1 Departmental Representative to have unlimited access to site.

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

.3 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

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

.5 At completion of operations the condition is to be equal to or better than that which existed before new work started.

1.4 DEPARTMENTAL REPRESENTATIVE OCCUPANCY

.1 Departmental Representative will be available for meetings, inspections, and the execution of the normal operations during the construction period.

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

1.5 EXISTING SERVICES

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

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

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

.4 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.

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

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

1.6 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.
.9 Copy of Approved Work Schedule.
.10 Corporate and Site Specific Health and Safety Plan and Site Specific Other Safety Related Documents.
.11 WHMIS data sheets.
.12 Other documents as specified.

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 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,

.3 an explosive or a bomb or a component thereof,

.4 currency over any applicable prescribed limit $50.00, and

.5 any item not described in paragraphs (1) to (4) 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 "Director" means Departmental Representative, Warden or Superintendent of the Institution as applicable.

.6 "Construction employees" means persons working for the general contractor, the sub-contractors, equipment operators, material suppliers, testing and inspection companies and regulatory agencies.

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

.8 "Perimeter" means the fenced or walled area of the institution that restrains the movement of the inmates.

.9 "Construction limits" means the area as shown on the contract drawings that the contractor will be allowed to work. This area may or may not be isolated from the security area of the institution. These are the immediate areas in and around the concrete pads under construction.

1.3 PRELIMINARY PROCEEDINGS

.1 Prior to the commencement of work, the Contractor will meet with the Departmental Representative or his 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 The Contractor will:

.1 Ensure that all construction employees are aware of the security requirements.

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

.3 Co-operate with institutional personnel in ensuring that security requirements are observed by all construction employees.

1.4 CONSTRUCTION EMPLOYEES

.1 Submit to the Correctional Services Canada (CSC): Jason Kremp: Email: Jason.Kremp@CSC-SCC.GC.CA . Phone: 403-227-8150. Fax: 403-227-8151. List the names with date of birth of all construction employees to be employed on the construction site and a security clearance and request form for each employee. Contact information could change without prior notice. Please contact the Departmental Representative prior to sending for confirmation.

.2 Allow two (2) weeks for processing of security clearances. Employees will not be admitted to the Institution without a valid security clearance in place and a recent picture identification such as a provincial driver's license. Security clearances obtained from other CSC institutions are not valid at this institution.

.3 The Departmental Representative may require that facial photographs may be taken of construction employees and these photographs may be displayed at appropriate locations in the institution or in an electronic database for identification purposes. The Departmental Representative may require that Photo ID cards be provided for all construction workers. ID cards will then be left at the designated entrance to be picked up on arrival at the institution and shall be displayed prominently on the construction employees clothing at all time while employees are in the institution.

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

.5 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 Departmental Representative or an employee of the company that owns the vehicle. The Institution requires lockable gas caps on all vehicles and motorized equipment used in the construction area.

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

.3 Drivers of delivery vehicles for material required by the project will not require security clearances but must remain with their vehicle the entire time that the vehicle is in the Institution. The Departmental Representative may require that these vehicles be escorted by Institutional staff or Commissionaires while in the Institution.

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 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.

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 Wireless cellular and digital telephones, including but not limited to devices for telephone messaging, pagers, BlackBerries, telephone used as 2-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, will not take pictures of any person, will submit to a search of all photos, and must obtain a camera/phone pass daily.

.3 The Departmental Representative may approve but limit the use of two way radios.

1.9 WORK HOURS

.1 Work hours within the Institution are: Monday to Friday 8:00 a.m. (0800hrs.) to 4:00 p.m. (1600 hrs).

.2 Work will not be permitted during weekends and statutory holidays without the permission of the Departmental Representative. A minimum of seven days advance notice will be required to obtain the required permission. In case of emergencies or other special circumstances, this advance notice may be waved or period shortened by the Departmental Representative.

1.10 OVERTIME WORK

.1 No overtime work will be allowed without permission of the Departmental Representative. Give a minimum forty-eight (48) hours advance notice when overtime work on the construction project is necessary and approved. If overtime work is required because of an emergency such the completion of a concrete pour or work to make the construction safe and secure, the contractor will advise the Departmental Representative as soon as this condition is known and follow the directions given by the Departmental Representative. Costs to the Crown for such events may be attributed to the contractor.

.2 When overtime work, weekend statutory holiday work is required and approved by the Departmental Representative, extra staff members may be posted by the Departmental Representative or his designate, to maintain the security surveillance. The Departmental Representative may post extra staff for inspection of construction activities. The actual cost of this extra staff may be subject to reclamation by the Crown.

1.11 SECURITY HARDWARE

.1 Turn over all removed security hardware to the Departmental Representative of the Institution for disposal or for safekeeping until required for re-installation.

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.

.4 Smoking arrangements are to be made with the Departmental Representative.

1.14 CONTRABAND

.1 Weapons, ammunition, explosives, alcoholic beverages, drugs and narcotics are prohibited on institutional property.

.2 The 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 should be vigilant with both their staff and the staff of their sub-contractors and suppliers. The discovery of contraband may result in cancellation of the security clearance of the affected employee. Serious infractions may result in the removal of the company from the Institution for the duration of the construction.

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 may order that person to be searched.

.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 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 08:00 a.m. to 0:400 p.m.(or within approved hours of work).

.2 The contractor shall advise the Departmental Representative twenty four (24) hours in advance to the arrival on the 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 wall or fence of medium or maximum security institutions without the permission of the Departmental Representative.

.7. With prior approval of the Departmental Representative, a vehicle may be used in the morning and evening to transport a group of employees to the work site. This vehicle will not remain within the Institution the remainder of the day.

.8. 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 solid 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 employees as much freedom of action and movement as is possible.

.2 However, notwithstanding paragraph above, the Departmental Representative may:

.1 Prohibit or restrict access to any part of the institution.

.2 Require that in certain areas of the institution, either during the entire construction project or at certain intervals, construction employees only be allowed access when accompanied by a member of the CSC security staff.

.3 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 INSPECTION

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

.2 CSC staff members will 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 request at any time that the contractor, his employees, sub-contractors and their employees not enter or 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 staff member making the request and the time of the request and obey the order as quickly as possible.

.2 The contractor shall advise the Departmental Representative within 24 hours of this delay to the progress of the work.

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 employee doing any of the above will be removed from the site and his security clearance revoked.

.2 It is 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 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 APPLICATIONS FOR PROGRESS PAYMENT

.1 Submit to Departmental Representative, at least 14 days before first application for payment, Cost Breakdown, in detail as directed by Departmental Representative, for parts of Work, aggregating total amount of Contract Price, so as to facilitate evaluation of applications for payment and predicted cash flow. After approval by Departmental Representative, Cost Breakdown will be used as basis for progress payments.

.2 Support claims for products delivered to Place of Work but not yet incorporated into Work by such evidence as Departmental Representative may reasonably require to establish value and delivery of products.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.

.2 Prepare agenda for meetings.

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

.4 Preside at meetings.

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

.6 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants.

.7 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 Site meetings are to be held at the PWGSC office at the Bowden Institution.

.2 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.3 Senior representatives of, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

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

.5 Agenda to include:

- .1 Appointment of official representative of participants in the Work.
- .2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedule - Gantt Bar 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 storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
- .5 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .6 Departmental Representative provided products.
- .7 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

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

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

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

.11 Appointment of inspection and testing agencies or firms.

.12 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

.1 Site meetings are to be held at the PWGSC office at the Bowden Institution.

.2 During course of Work and 2 weeks prior to project completion, schedule progress meetings bi-weekly.

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

.4 Notify parties minimum 5 days prior to meetings.

.5 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.

.6 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

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

.12 Other business.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

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

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

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

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

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

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

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

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

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

1.2 REQUIREMENTS

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

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

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

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

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit to Departmental Representative within 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 5 working days of receipt of acceptance of Master Plan.

1.4 MASTER PLAN

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

.2 Departmental Representative will review and return revised schedules within 5 working days.

.3 Revise impractical schedule and resubmit within 5 working days.

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

1.5 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

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

.1 Award.

.2 Shop Drawings, Samples.

.3 Permits.

.4 Mobilization.

.5 Repointing and Brick Repair.

.6 Lighting.

.7 Heating, Ventilating, and Air Conditioning.

.8 Testing and Commissioning.

.9 Supplied equipment long delivery items.

.10 Engineer supplied equipment required dates.

1.6 PROJECT SCHEDULE REPORTING

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

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

1.7 PROJECT MEETINGS

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

.2 Weather related delays with their remedial measures will be discussed and negotiated.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

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

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

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

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

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

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

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

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

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

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

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit shop drawings bearing stamp and signature of qualified professional Department Representative registered or licensed in Province of Alberta, Canada.

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

.4 Allow 7 days for Departmental Representative's review of each submission.

.5 Adjustments made on shop drawings as Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing on a separate document clearly identified as a proposal to change. Submit this document to the Departmental Representative with the submitted shop drawing for review.

.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 Provide shop drawings that are within the scope of the contract.

.8 Provide alternate shop drawings only after shop drawings within scope, are submitted.

.9 Accompany submissions with transmittal letter, in duplicate, 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.

.10 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.

.11 After Departmental Representative's review, distribute copies.

.12 Submit one digital and 1 hard copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.13 Submit digital copies and 2 copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.14 Submit digital copies and 2 copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

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

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

.15 Submit digital copies and 2 copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.

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

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

.16 Submit digital copies and 2 copies of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.

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

.17 Submit digital copies and 2 copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

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

.18 Submit digital copies and 2 copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.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, digital or hard copy will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.21 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.

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

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

1.3 SAMPLES

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

.2 Deliver samples prepaid to Departmental Representative's office.

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

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

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

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

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

1.4 CERTIFICATES AND TRANSCRIPTS

.1 Submit transcription of insurance to the Contracting Officer and the Departmental Representative immediately after the award of Contract.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Safety requirements and adherence.

1.2 REFERENCES

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

.2 Province of Alberta:

.1 Occupational Health and Safety Act, R.S.A. updated January 1, 2016

1.3 SAFETY PLAN

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to commencing any 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.

1.4 RESPONSIBILITY

.1 The "Prime Contractor" according applicable local jurisdiction, is 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, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

.3 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, and follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Alberta having jurisdiction. Advise Departmental Representative verbally and in writing.

1.5 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00.

.2 Submit site-specific Health and Safety Plan: Within 7 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.

.3 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative.

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

.5 Submit copies of incident and accident reports.

.6 Submit Material Safety Data Sheets (MSDS) to Departmental Representative.

.7 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.

.8 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.

.9 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.

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

1.6 SAFETY ACTIVITIES

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

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

.3 Perform Work in accordance with Section 01 41 00 - Regulatory Requirements and this section.

1.7 HEALTH AND SAFETY COORDINATOR

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

.1 Have minimum two (2) years' site-related working experience specific to activities associated with re-roofing.

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

.3 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.

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

.5 Be on site during execution of Work .

1.8 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 Alberta having jurisdiction, and in consultation with Departmental Representative.

1.9 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.

1.10 HAZARDOUS WORK

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

.2 If hazardous material is encountered, stop work and notify Departmental Representative.

1.11 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta Reg, 2016.

1.12 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.

1.13 FIRE PROTECTION

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

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

.3 Maintain placed or installed barriers to protect the portions of the Work during construction.

1.14 FALL PROTECTION

.1 Contractor is responsible to supply and install temporary fall protection for workers, Departmental Representative, Consultant, and Inspectors on the roof.

.2 Fall protection to meet governing codes, regulations, and bylaws.

END OF SECTION

Part 1 General

1.1 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.

1.2 FIRES

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

1.3 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site unless approved by Departmental Representative.

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

1.4 DRAINAGE

.1 Monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.2 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

.3 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

.4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.5 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties where indicated.

.2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

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

1.6 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, by providing temporary enclosures.

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

1.7 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, and permits.

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

END OF SECTION

Part 1 General

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada 2010 (NBC) 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 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.

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

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

1.3 BUILDING SMOKING ENVIRONMENT

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

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, notify the Departmental Representative and 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.

1.2 ACCESS TO WORK

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

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

1.3 PROCEDURES

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

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

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

1.4 REJECTED WORK

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

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

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

1.5 REPORTS

.1 Submit digital copies and 2 hardcopies of inspection and test reports to Departmental Representative.

.2 Provide copies to subcontractor of work being inspected or tested.

1.6 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-0121-M1978(R2003), Douglas Fir Plywood.

.3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.

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

1.2 SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

.1 Indicate use of supplemental or other staging area.

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

.3 Remove from site all such work after use.

.4 The stage and storage areas will be located in minimum security area.

1.4 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2.

.2 Provide and maintain scaffolding.

.1 Scaffolding to be erected in a manner that will not comprise the facility security.

1.5 HOISTING

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

.2 Hoists cranes to be operated by qualified operator.

1.6 SITE STORAGE/LOADING

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

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

1.7 CONSTRUCTION PARKING

.1 Parking Area to be assigned by Departmental Representative.

1.8 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

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

.3 Locate storage facilities as directed by Departmental Representative.

.4 Staging and lay-down areas will be designated by the Departmental Representative in areas non-adjacent to the Administration Building.

.5 All storage will be located in the minimum security area.

1.9 SANITARY FACILITIES

.1 Existing facilities may be used on approval of Departmental Representative.

1.10 CLEAN-UP

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

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

.3 Store materials resulting from demolition activities that are salvageable all others are the responsiblity of the Contractor for removal from site and disposal.

.4 Construction debris, waste materials and packing material to be removed by means of waste disposal vehicles or waste bins must conform to Security Restrictions Section 01 14 10 of this specification.

.5 Waste bins must be locked and secured to meet Institutional security requirements.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.

.2 Canadian Standards Association (CSA International)

.1 CSA-O121-M1978(R2003), Douglas Fir Plywood.

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.3 DUST TIGHT SCREENS

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

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

1.4 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.

1.5 PROTECTION OF BUILDING FINISHES

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

.2 Provide necessary screens, covers, and hoardings.

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

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

1.6 WASTE MANAGEMENT AND DISPOSAL

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

.2 Waste bins must be locked and secured to meet Institutional security requirements.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 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 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, unless determined in Contract Documents, 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 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.

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

1.4 STORAGE, HANDLING AND PROTECTION

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

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

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

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

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

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

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

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

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

1.5 TRANSPORTATION

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

.2 Transportation cost of products supplied by Contractor will be paid for by Contractor. Unload, handle and store such products.

1.6 MANUFACTURER'S INSTRUCTIONS

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

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

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

1.7 QUALITY OF WORK

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

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

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

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

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

1.11 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Departmental Representative of conflicting installation. Install as directed.

1.12 FASTENINGS

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

.2 Prevent electrolytic action between dissimilar metals and materials.

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

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

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

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

1.13 FASTENINGS - EQUIPMENT

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

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 PROTECTION OF WORK IN PROGRESS

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

1.15 EXISTING UTILITIES

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

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

END OF SECTION

Part 1 General

1.1 EXISTING SERVICES

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

1.2 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.

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 Departmental Representative or separate contractor.

.3 Include in request:

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

1.2 MATERIALS

.1 Required for original installation.

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

1.3 PREPARATION

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

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

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

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

.5 Provide protection from elements for areas which are to be exposed by uncovering work; all work to ensure occupants of building will not be affected or work routines altered due to contract work. Contract states winter construction plan as such.

.6 Maintain excavations free of water.

1.4 EXECUTION

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

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

.3 Uncover Work to install ill-timed Work.

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

.5 Remove samples of installed Work for testing.

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

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

.8 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.10 Restore work with new products in accordance with requirements of Contract Documents.

.11 Fit Work airtight/watertight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.12 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 reuse 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, including that caused by Departmental Representative 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 Clear snow and ice from access to building, bank/pile snow in designated areas only.

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

.5 Provide location to co-ordinated and approved by Departmental Representative containers for collection of waste materials and debris.

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

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

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

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

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

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

1.2 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 other than that caused by Departmental Representative or other Contractors.

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

.8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.9 Remove dirt and other disfiguration from exterior surfaces.

.10 Sweep and wash clean paved areas.

1.3 WASTE MANAGEMENT AND DISPOSAL

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

.2 Waste bins must be locked and secured to meet Institutional security requirements.

END OF SECTION

Part 1 General

1.1 WASTE MANAGEMENT GOALS

.1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss PWGSC's Waste Management Plan and Goals.

.2 PWGSC's Waste Management Goal 75 percent of total Project Waste to be diverted from landfill sites. Provide Departmental Representative documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.

.3 Accomplish maximum control of solid construction waste.

.4 Preserve environment and prevent pollution and environment damage.

1.2 DEFINITIONS

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

.2 Cost/Revenue Analysis Workplan (CRAW): based on information from WRW, and intended as financial tracking tool for determining economic status of waste management practices.

.3 Demolition Waste Audit (DWA): relates to actual waste generated from project.

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

.5 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

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

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

.8 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.

.9 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.

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

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

.12 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

.13 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill. Refer to Schedule A.

.14 Waste Management Co-ordinator (WMC) : contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

.15 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).

1.3 DOCUMENTS

.1 Maintain at job site, one copy of following documents:

- .1 Waste Audit.
- .2 Waste Reduction Workplan.
- .3 Material Source Separation Plan.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Prepare and submit following prior to [project start-up]:

- .1 Submit 2 copies of completed Waste Audit (WA): Schedule A.
- .2 Submit 2 copies of completed Waste Reduction Workplan (WRW): Schedule B.
- .3 Submit 2 copies of completed Demolition Waste Audit (DWA): Schedule C.
- .4 Submit 2 copies of Cost/Revenue Analysis Workplan (CRAW): Schedule D.
- .5 Submit 2 copies of Materials Source Separation Program (MSSP) description.

.3 Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using deconstruction/disassembly material audit form.

- .1 Failure to submit could result in hold back of final payment.
- .2 Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled, or disposed of.
- .3 For each material reused, sold or recycled from project, include amount quantities by number, type and size of items and the destination.
- .4 For each material land filled or incinerated from project, include amount in tonnes of material and identity of landfill, incinerator or transfer station.

1.5 WASTE AUDIT (WA)

.1 Conduct WA prior to project start-up.

.2 Prepare WA: Schedule A.

.3 Record, on WA - Schedule A, extent to which materials or products used consist of recycled or reused materials or products.

1.6 WASTE REDUCTION WORKPLAN (WRW)

.1 Prepare WRW prior to project start-up.

.2 WRW should include but not limited to:

.1 Destination of materials listed.

.2 Deconstruction/disassembly techniques and sequencing.

.3 Schedule for deconstruction/disassembly.

.4 Location.

.5 Security.

.6 Protection.

.7 Clear labelling of storage areas.

.8 Details on materials handling and removal procedures.

.9 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.

.3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

.4 Describe management of waste.

.5 Identify opportunities for reduction, reuse, and recycling of materials. Based on information acquired from WA.

.6 Post WRW or summary where workers at site are able to review content.

.7 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.

.8 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

1.7 DEMOLITION WASTE AUDIT (DWA)

.1 Prepare DWA prior to project start-up.

.2 Complete DWA: Schedule C.

.3 Provide inventory of quantities of materials to be salvaged for reuse, recycling, or disposal.

1.8 COST/REVENUE ANALYSIS WORKPLAN (CRAW)

.1 Prepare CRAW: Schedule D.

1.9 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

.1 Prepare MSSP and have ready for use prior to project start-up.

.2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.

.3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide containers to deposit reusable and recyclable materials.

.5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.

.6 Locate separated materials in areas which minimize material damage.

.7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.

.1 Transport to approved and authorized recycling facility.

.8 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.

.1 Ship materials to site operating under Certificate of Approval.

.2 Materials must be immediately separated into required categories for reuse or recycling.

1.10 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 do not become Contractor's property.

.3 Protect, stockpile, store and catalogue salvaged items.

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

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

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

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

.8 Separate and 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 Provide waybills for separated materials.

1.11 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste 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 from deconstruction as deconstruction/disassembly Work progresses.

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

1.12 USE OF SITE AND FACILITIES

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

.2 Maintain security measures established by existing facility.

1.13 SCHEDULING

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 SELECTIVE DEMOLITION

.1 Reuse of Building Elements: this project has been designed to result in end of project rates for reuse of building elements as follows: do not demolish building elements beyond what is indicated on Drawings without approval by Departmental Representative.

3.2 APPLICATION

.1 Do Work in compliance with WRW.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.3 CLEANING

.1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

3.4 DIVERSION OF MATERIALS

.1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.

.1 Mark containers or stockpile areas.

.2 Provide instruction on disposal practices.

.2 On-site sale of is not permitted.

.3 Demolition Waste:

Material Type	Recommended Diversion %	Actual Diversion %
Other		

.4 Construction Waste:

Material Type	Recommended Diversion %	Actual Diversion %
Cardboard	100	
Plastic Packaging	100	
Rubble	100	
Steel	100	
Wood (uncontaminated)	100	
Other		

3.5 WASTE AUDIT (WA)

.1 Schedule A - Waste Audit (WA):

(1) Material Category	(2) Material Quantity Unit	(3) Estimated Waste %	(4) Total Quantity of Waste (unit)	(5) Generation Point	(6) % Recycled	(7) % Reused
Wood and Plastics Material Description						
Off-cuts						
Warped Pallet Forms						
Plastic Packaging						
Cardboard Packaging						
Other						
Doors and Windows Material Description						
~~Painted Frames~~						
~~Glass~~						
~~Wood~~						
~~Metal~~						
~~Other~~						

3.6 WASTE REDUCTION WORKPLAN (WRW)

.1 Schedule B:

(1) Material Category	(2) Person(s) Respon-	(3) Total Quantity of Waste	(4) Reused Amount	Actual	(5) Recycled Amount	Actual	(6) Material(s) Destina-

	sible	(unit)	(units) Projected		(unit) Projected		tion
Wood and Plastics Material Description							
Chutes							
Warped Pallet Forms							
Plastic Packaging							
Card-board Packaging							
Other							
Doors and Windows Material Description							
Painted Frames							
Glass							
Wood							
Metal							
Other							

3.7 DEMOLITION WASTE AUDIT (DWA)

.1 Schedule C - Demolition Waste Audit (DWA):

(1) Material Description	(2) Quantity	(3) Unit	(4) Total	(5) Volume (cum)	(6) Weight (cum)	(7) Remarks and Assumptions
Wood						
Wood Stud						
Plywood						
Baseboard-Wood						
Door Trim - Wood						
Cabinet						
Doors and Windows						
Panel Regular						
Slab Regular						
Wood						

Laminate						
Byfold - Closet						
Glazing						

3.8 COST/REVENUE ANALYSIS WORKPLAN (CRAW)

.1 Schedule D - Cost/Revenue Analysis Workplan (CRAW):

(1) Material Description	(2) Total Quantity (unit)	(3) Volume (cum)	(4) Weight (cum)	(5) Disposal Cost/Credit $(+/-)	(6) Category Sub-Total $(+/-)
Wood					
Wood Stud					
Plywood					
Baseboard - Wood					
Door Trim - Wood					
Cabinet					$
Doors and Windows					
Panel Regular					
Slab Regular					
Wood Laminate					
Byfold - Closet					
Glazing					$
		(7) Cost (-) / Revenue (+)			$

3.9 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Schedule E - Government Chief Responsibility for the Environment:

Province	Address	General Inquires	Website
Alberta	Alberta Environmental Protection Petroleum Plaza, South Tower 9915 - 108 th Street Edmonton AB T5K 2G8	403-427-2739	http://aep.alberta.ca/
	Alberta Special Waste Management Corporation Pacific Plaza, Suite 610 10909 Jasper Avenue NW	403-422-5029	http://aep.alberta.ca/waste/hazardous-waste-management/

	Edmonton AB T5J 3L9		

END OF SECTION

Part 1 General

1.1 INSPECTION AND DECLARATION

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

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

.2 Request Departmental Representative Inspection.

.2 Departmental Representative Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

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

.4 Operation of systems have been demonstrated to Departmental Representative's personnel.

.5 Work is complete and ready for final inspection.

.4 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative, Departmental Representative, and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request reinspection.

.5 Declaration of Substantial Performance: when Departmental Representative consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance.

1.2 CLEANING

.1 In accordance with Section 01 74 11 - Cleaning.

.2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

.1 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 after final inspection, with Departmental Representative's comments.

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

.5 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English.

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

.7 Furnish evidence, if requested, for type, source and quality of products provided.

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

.9 Pay costs of transportation.

.10 Provide 3 hard copies and 1 electronic version of the O&M Manuals.

1.2 FORMAT

.1 Organize data as instructional manual.

.2 Submit PDF copies of Closeout Submittal and hard copies.

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

.4 When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.

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

.6 Arrange content by systems, under Section numbers and sequence of Table of Contents.

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

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

.9 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.10 Provide 1:1 scaled CAD files in dxf format on CD.

.11 Electronic copy of all final documents to be delivered as completed.

.12 Operations and Maintenance Manual format:

Cover and Binder Edge
Identify each binder with:

Operation & Maintenance Manual
Project: PWxxxxxx and Title
City, Prov/Terr
Date

Table of Contents

TAB A - Warranty information

Letter on letterhead providing one year warranty on installation from date of substantial completion
• Dated and signed.
• Project project name, number and building / location.
• Starting point of warranty period.
• Duration of overall warranty period.
• List of equipment that is covered by extended warranty as well as duration.
• Organization, names and phone numbers of persons to call for warranty service

TAB B - List of Project Participants

• Company names, addresses, telephone numbers and email addresses of Department Representative and Contractor with name of responsible parties.

TAB C - Reports

• Your site photographs showing before and after views of the project

TAB D - Permits

• Construction / Installation Permits and Inspection Certificates.

TAB E - Equipment and Systems information

• Approved "as-built" drawings

• Copy of approved project shop-drawings
• Include Manufacturer's data / brochures and recommendations relating: product information, installation, commissioning, start-up, O&M, shutdown and training materials for equipment installed on this project.

TAB F - Include supporting documentation and miscellaneous items

• Health and safety submittals including site specific hazard assessment, Safety Manual TOC and company safety policy, MSDS sheets if applicable, signed site orientations for workers, copy of first aid certificate, copy of emergency plan and muster location.

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, and equipment.

.2 Acronyms:

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

.2 BMM - Building Management Manual.

.3 Cx - Commissioning.

.4 EMCS - Energy Monitoring and Control Systems.

.5 O M - Operation and Maintenance.

.6 PI - Product Information.

.7 PV - Performance Verification.

.8 TAB - Testing, Adjusting and Balancing.

1.2 GENERAL

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

.1 Verify installed products, operate in accordance with contract documents and design criteria and intent.

.2 Effectively train O M staff.

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

.1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactive with each other as intended in accordance with Contract Documents and design criteria.

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

.3 Design Criteria: as per client's requirements or determined by designer. To meet Project functional and operational requirements.

1.3 COMMISSIONING OVERVIEW

.1 Section 01 91 31 - Commissioning (Cx) Plan.

.2 For Cx responsibilities refer to Section 01 91 31 - 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 built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities includes transfer of critical knowledge to facility operational personnel.

.6 Departmental Representative will issue Interim Acceptance Certificate when:

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

.2 Final O&M and Training Manual receive, review, and approve by Departmental Representative for suitability.

.7 Completion of training session to all Operational and Maintenance Staffs.

1.4 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

.1 Should equipment 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 paid directly from Contractor.

1.5 PRE-CX REVIEW

.1 Before Construction:

.1 Review contract documents, confirm by writing to Departmental Representative.

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

.2 During Construction:

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

.3 Before start of Cx:

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

.2 Ensure installation of related components, equipment, sub-systems, systems is complete.

.3 Fully understand Cx requirements and procedures as per PWGSC-AECoE Requirements.

.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 2 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 4 weeks prior to start of Cx.

.3 Submit proposed Cx procedures to Departmental Representative not specified and obtain written approval at least 4 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 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms for requirements and instructions for use].

.2 Departmental Representative and Consultant to review and approve Cx documentation.

.3 Provide completed and approved Cx documentation to Departmental Representative and Consultant.

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. Contractor 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. Consultant will record and distribute minutes.

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

1.11 WITNESSING OF STARTING AND TESTING

.1 Provide 14 days' notice prior to commencement.

.2 Departmental Representative to witness start-up and testing.

.3 Contractor's Cx Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

1.12 PROCEDURES

.1 Correct deficiencies and obtain approval from Departmental Representative after distinct phases have been completed and before commencing next phase.

.2 Document required tests on approved PV forms.

1.13 TEST RESULTS

.1 If 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.

1.14 START OF COMMISSIONING

.1 Notify Departmental Representative at least 21 days prior to start of Cx.

1.15 INSTRUMENTS / EQUIPMENT

.1 Submit to Departmental Representative for review and approval:

.1 Complete list of instruments proposed to be used.

.2 Provide all required equipment to complete testing.

1.16 COMMISSIONING PERFORMANCE VERIFICATION

.1 Carry out Cx:

.1 Under actual operating conditions, over entire operating range, in all modes.

.2 On independent systems and interacting systems.

.2 Cx procedures to be repeatable and reported results are to be verifiable.

.3 Follow equipment manufacturer's operating instructions.

1.17 WITNESSING COMMISSIONING

.1 Departmental Representative, CSC Representative, and Consultant to witness activities and verify results.

1.18 AUTHORITIES HAVING JURISDICTION

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

.2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.

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

1.19 EXTRAPOLATION OF RESULTS

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

1.20 EXTENT OF VERIFICATION

.1 Number and location to be at discretion of Departmental Representative.

.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 in more than 20% of reported results.

.4 Perform additional commissioning until results are acceptable to Departmental Representative.

1.21 REPEAT VERIFICATIONS

.1 Assume costs for all subsequent verifications where:

.1 Verification of reported results fail to receive Departmental Representative's approval.

.2 Repetition of second verification again fails to receive approval.

.3 Departmental Representative deems Contractor's request for second verification was premature.

1.22 DEFICIENCIES, FAULTS, DEFECTS

.1 Correct deficiencies found during 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 confirmed accepted by Departmental Representative.

1.24 TRAINING

.1 In accordance with Section 01 91 41 - Commissioning (Cx) - Training.

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 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 Cx Plan and roles and responsibilities of Cx team.

1.2 REFERENCES

.1 Public Works and Government Services Canada (PWGSC)

.2 Underwriters' Laboratories of Canada (ULC).

.3 Alberta Roofing Contractors Association (ARCA).

1.3 GENERAL

.1 Provide a fully functional facility:

.1 Equipment meet user's functional requirements before date of acceptance, and operate consistently at peak efficiencies and within specified energy budgets under normal loads.

.2 Facility user and O M personnel have been fully trained in aspects of installed systems.

.3 Optimized life cycle costs.

.4 Complete documentation relating to training, installed equipment and systems.

.2 Term "Cx" in this section means "Commissioning".

.3 Use this Cx Plan as master planning document for Cx:

.1 Outlines organization, scheduling, allocation of resources, documentation, pertaining to implementation of Cx.

.2 Communicates responsibilities of team members involved in Cx Scheduling, documentation requirements, and verification procedures.

.3 Sets out deliverables relating to O M, process and administration of Cx.

.4 Describes process of verification of how built works meet design requirements.

.5 Produces a complete functional system prior to issuance of Certificate of Occupancy.

.6 Management tool that sets out scope, standards, roles and responsibilities, expectations, deliverables, and provides:

.1 Overview of Cx.

.2 General description of elements that make up Cx Plan.

.3 Process and methodology for successful Cx.

.4 Acronyms:

.1 Cx - Commissioning.

.2 BMM - Building Management Manual.

.3 EMCS - Energy Monitoring and Control Systems.

.4 MSDS - Material Safety Data Sheets.

.5 PI - Product Information.

.6 PV - Performance Verification.

.7 TAB - Testing, Adjusting and Balancing.

.8 WHMIS - Workplace Hazardous Materials Information System.

.5 Commissioning terms used in this Section:

.1 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 95% completed by Departmental Representative and transmit to the Contractor.

.2 Cx Plan to be 100% completed within 4 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 100% completed Cx Plan completed by Departmental Representative and transmit to the Contractor.

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 Submit each revised Cx Plan to Departmental Representative for review and obtain written approval.

.3 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 PWGSC Design Quality Review Team: during construction, will conduct periodic site reviews to observe general progress.

.2 PWGSC Quality Assurance Commissioning Manager: confirm Cx processes, forms, sequence of operation and control logic are developed in the Cx Plan to deliver a fully operational project.

.1 Protection of health, safety and comfort of occupants and O M personnel.

.3 Contractor is responsible for:

.1 Organizing Cx.

.2 Monitoring operations Cx activities.

.3 Witnessing, certifying accuracy of reported results.

.4 Ensuring implementation of final Cx Plan.

.5 Performing verification of performance of installed systems and equipment.

.6 Implementation of Training Plan.

.7 Review for performance, reliability, durability of operation, accessibility, maintainability, operational efficiency under conditions of operation.

.8 Monitoring of Cx activities, training, and development of Cx documentation.

.9 Work closely with members of Cx Team.

.4 Construction Team: contractor, sub-contractors, 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:

.1 Equipment and systems except as noted.

.2 Specialist subcontractor: equipment supplied and installed by specialist subcontractor.

.3 Specialist Cx agency:

.1 Possessing specialist qualifications and installations providing environments essential to client's program but are outside scope or expertise of Cx specialists on this project.

.4 Contractor to 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.

.5 Provide names of participants to Departmental Representative and details of instruments and procedures to be followed for Cx 1 month prior to starting date of Cx for review and approval.

1.8 EXTENT OF CX

.1 Cx Structural and Architectural Systems:

.1 Architectural and structural:

.1 Windows.

1.9 DELIVERABLES RELATING TO O M PERSPECTIVES

.1 General requirements:

.1 Compile documentation in English.

.2 Documentation to be computer-compatible format ready for inputting for data management.

.2 Provide deliverables:

.1 Warranties.

.2 Project record documentation.

.3 Maintenance Management System (MMS) identification system used.

.4 WHMIS information.

.5 MSDS data sheets.

.6 Preventive maintenance program.

.7 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 Tests of following witnessed by Departmental Representative, and Consultant.

.9 Tests performed by Contractor.

.10 Training Plans.

.11 Cx Reports.

.12 Prescribed activities during warranty period.

.4 Departmental Representative to witness tests.

1.11 PRE-CX ACTIVITIES AND RELATED DOCUMENTATION

.1 Items listed in this Cx Plan include the following:

.1 Pre-Start-Up inspections: by Consultant prior to permission to start up and rectification of deficiencies to Departmental Representative's satisfaction.

.2 Consultant to use approved check lists.

.3 Consultant will monitor all of these pre-start-up inspections.

.4 Include completed documentation with Cx report.

.5 Departmental Representative will attend these inspections and tests.

.6 Include completed documentation in Cx report.

1.12 CX ACTIVITIES AND RELATED DOCUMENTATION

.1 Perform Cx by specified Cx agency using procedures developed by Consultant and approved by Departmental Representative.

.2 Consultant to monitor Cx activities.

.3 Upon satisfactory completion, Cx agency performing tests to prepare Cx Report using approved PV forms.

.4 Consultant to witness, certify reported results of, Cx activities and forward to Departmental Representative.

1.13 CX OF INTEGRATED SYSTEMS AND RELATED DOCUMENTATION

.1 Cx to be performed by specified Cx specialist, using procedures developed by Departmental Representative and approved by Departmental Representative.

.2 Tests to be witnessed by Consultant and documented on approved report forms.

.3 Upon satisfactory completion, Cx specialist to prepare Cx Report, to be certified by Consultant and submitted to Departmental Representative for review.

.4 Departmental Representative reserves right to verify percentage of reported results.

.5 Identification:

.1 In later stages of Cx, before hand-over and acceptance Consultant and Cx Manager to co-operate to complete inventory data sheets and provide assistance to PWGSC in full implementation of MMS identification system of components.

1.14 INSTALLATION CHECK LISTS (ICL)

.1 Refer to Section 01 91 33 - Commissioning (Cx) 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 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

1.16 PERFORMANCE VERIFICATION (PV) REPORT

.1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

1.17 DELIVERABLES RELATING TO ADMINISTRATION OF CX

.1 General:

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

1.18 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: 15 days before start of Cx.

.3 Cx procedures: 20 days after award of contract.

.4 Cx Report format: 20 days after contract award.

.5 Notification of intention to start Cx: 14 days before start of Cx.

.6 Notification of intention to start Cx of integrated systems: after Cx of related systems is completed 14 days before start of integrated system Cx.

.7 Identification of deferred Cx.

.8 Implementation of training plans.

.2 Detailed training schedule to demonstrate no conflicts with testing, completion of project and hand-over to Departmental Representative.

.3 3 months in Cx schedule for verification of performance in all seasons and wear conditions.

.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.

1.19 CX REPORTS

.1 Submit reports of tests, witnessed and certified by Consultant 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 and Consultant.

1.20 ACTIVITIES DURING WARRANTY PERIOD

.1 Cx activities must be completed before issuance of Interim Certificate, it is anticipated that certain Cx activities may be necessary during Warranty Period.

1.21 TESTS TO BE PERFORMED BY OWNER/USER

.1 None is anticipated on this project.

1.22 TRAINING PLANS

.1 Refer to Section 01 91 41 - Commissioning (Cx) - Training.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Commissioning forms to be completed for equipment, system and integrated system.

1.2 INSTALLATION/START-UP CHECK LISTS

.1 Include the following data:

.1 Product manufacturer's installation instructions and recommended checks.

.2 Special procedures as specified in relevant technical sections.

.3 Items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.

.2 Equipment manufacturer's installation/start-up check lists are acceptable for use. As deemed necessary by Departmental Representative supplemental additional data lists will be required for specific project conditions.

.3 Use check lists for equipment installation. Document check list verifying checks have been made; indicate deficiencies and corrective action taken.

.4 Installer to sign check lists upon completion, certifying stated checks and inspections have been performed. Return completed check lists to Departmental Representative. Check lists will be required during Commissioning.

1.3 PRODUCT INFORMATION (PI) REPORT FORMS

.1 Product Information (PI) forms compiles gathered data on items of equipment produced by equipment manufacturer, includes 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.

.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 report forms include those developed by Contractor records measured data and readings taken during functional testing and Performance Verification procedures.

1.5 SAMPLES OF COMMISSIONING FORMS

.1 Consultant will develop and provide to Contractor required project-specific Commissioning forms in electronic format complete with specification data.

.2 Revise items on Commissioning forms to suit project requirements.

.3 Samples of Commissioning forms and a complete index of produced to date will be attached to this section.

1.6 CHANGES AND DEVELOPMENT OF NEW REPORT FORMS

.1 When additional forms are required, but are not available from Consultant develop appropriate verification forms and submit to Departmental Representative for approval prior to use.

.1 Additional commissioning forms to be in same format as provided by Consultant.

1.7 COMMISSIONING FORMS

.1 Use Commissioning forms to verify installation and record performance when starting equipment and systems.

.2 Strategy for Use:

.1 Contractor project-specific Commissioning forms with Specification data included to be produced by Consultant and approved by Departmental Representative.

.2 Contractor will provide required shop drawings information and verify correct installation and operation of items indicated on these forms.

.3 Confirm operation as per design criteria and project intent.

.4 Identify variances between design and operation and reasons for variances.

.5 Record analytical and substantiating data.

.6 Verify reported results.

.7 Form to have signatures of recording technician and reviewed and signed off by Departmental Representative and Consultant.

.8 Submit to Departmental Representative and Consultant immediately after tests are performed.

.9 Reported results in true measured SI unit values.

.10 Provide Departmental Representative with originals and electronic copies of completed forms.

.11 Maintain copy on site during start-up, testing and commissioning period.

1.8 LANGUAGE

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

Project: R032532.001 Bowden Institution Repoint and Window Replacement- Admin Building				
Sequence of Operation	**Verified**	**Acceptable/Non Acceptable/ Not Applicable**	**Provided Documentation for Maintenance**	**Comments**
Removal of Existing Windows as Noted				
Installation of New Windows				
Verify – Air Leakage				
Verify – Water Leakage				
Verify – Window Thermography				
Verify – Windows open and close and hardware functions				

Additional Comments:

Project: R032532.001 Bowden Institution Repoint and Window Replacement- Multi-Cultural Building				
Sequence of Operation	**Verified**	**Acceptable/Non Acceptable/ Not Applicable**	**Provided Documentation for Maintenance**	**Comments**
Removal of Existing Windows as Noted				
Installation of New Windows				

Additional Comments:

Project: R032532.001 Bowden Institution Repoint and Window Replacement- Chapel Building				
Sequence of Operation	**Verified**	**Acceptable/Non Acceptable/ Not Applicable**	**Provided Documentation for Maintenance**	**Comments**
Removal of Existing Windows as Noted				
Installation of New Windows				

Additional Comments:

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 This Section specifies roles and responsibilities of Commissioning Training.

1.2 TRAINEES

.1 Trainees: personnel selected for operating and maintaining this facility. Includes Facility Manager, building operators, maintenance staff, security staff, and technical specialists as required.

.2 Trainees will be available for training during later stages of construction for purposes of familiarization with systems.

1.3 INSTRUCTORS

.1 Departmental Representative will provide:

.1 Descriptions of systems.

.2 Instruction on design philosophy, design criteria, and design intent.

.2 Contractor and certified factory-trained manufacturers' personnel: to provide instruction on the following:

.1 Start-Up, operation, shut-down of equipment, components and systems.

.2 Control features, reasons for, results of, implications on associated systems of, adjustment of set points of control and safety devices.

.3 Instructions on servicing, maintenance and adjustment of systems, equipment and components.

.3 Contractor and equipment manufacturer to provide instruction on:

.1 Start-up, operation, maintenance and shut-down of equipment they have certified installation, started up and carried out PV tests.

1.4 TRAINING OBJECTIVES

.1 Training to be detailed and duration to ensure:

.1 Effective on-going inspection, measurements of system performance.

.2 Proper preventive maintenance, diagnosis and trouble-shooting.

.3 Ability to update documentation.

.4 Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

1.5 TRAINING MATERIALS

.1 Instructors to be responsible for content and quality.

.2 Training materials to include:

.1 "As-Built" Contract Documents.

.2 Operating Manual.

.3 Maintenance Manual.

.4 Management Manual.

.5 TAB and PV Reports.

.3 Project Manager, Commissioning Manager and Facility Manager will review training manuals.

.4 Training materials to be in a format that permits future training procedures to same degree of detail.

1.6 SCHEDULING

.1 Include in Commissioning Schedule time for training.

.2 Deliver training during regular working hours, training sessions to be maximum 3 hours in length.

.3 Training to be completed prior to acceptance of facility.

1.7 RESPONSIBILITIES

.1 Be responsible for:

.1 Implementation of training activities,

.2 Coordination among instructors,

.3 Quality of training, training materials,

.2 Departmental Representative will evaluate training and materials.

.3 Upon completion of training, provide written report, signed by Instructors, witnessed by Departmental Representative.

1.8 TRAINING CONTENT

.1 Training to include demonstrations by Instructors using the installed equipment and systems.

.2 Content includes:

.1 Review of facility and occupancy profile.

.2 Functional requirements.

.3 System philosophy, limitations of systems and emergency procedures.

.4 Review of system layout, equipment, components and controls.

.5 Equipment and system start-up, operation, monitoring, servicing, maintenance and shut-down procedures.

.6 System operating sequences, including step-by-step directions for starting up, shut-down, operation of valves, dampers, switches, adjustment of control settings and emergency procedures.

.7 Maintenance and servicing.

.8 Trouble-shooting diagnosis.

.9 Inter-Action among systems during integrated operation.

.10 Review of O M documentation.

.3 Provide specialized training as specified in relevant Technical Sections of the construction specifications.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 CSA International

.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 74 21 - Construction/Demolition Waste Management Disposal.

.2 Submit demolition drawings:

.1 Submit for review and approval by Departmental Representative shoring and underpinning drawings stamped and signed by professional engineer registered or licensed in the Province of Alberta Canada, showing proposed method.

1.3 SITE CONDITIONS

.1 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.

.1 Proceed only after receipt of written instructions have been received from Departmental Representative.

.2 Notify Departmental Representative before disrupting building access or services.

.3 Contractor to provide pictures of existing wall opening and concrete sill once existing windows are removed.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 EXAMINATION

.1 Inspect site with Departmental Representative and verify extent and location of items designated 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 Notify and obtain approval of utility companies before starting demolition.

.4 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.

.1 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.

.2 Immediately notify the Department Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

3.2 PREPARATION

.1 Protection of In-Place Conditions:

.1 Prevent movement, settlement, or damage to adjacent 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.

.2 Demolition/Removal:

.1 Remove items as indicated.

.2 Remove parts of existing building to permit new construction.

.3 Trim edges of partially demolished building elements to tolerances as defined by Departmental Representative to suit future use.

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 Refer to demolition drawings and specifications for items to be salvaged for reuse.

.4 Waste Management: separate waste materials for recycling 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 REFERENCE STANDARDS

.1 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act, 1999 (CEPA).

.2 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.2 DEFINITIONS

.1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.

.2 Amended Water: water with nonionic surfactant wetting agent added to reduce water tension to allow thorough wetting of fibres.

.3 Asbestos-Containing Materials (ACMs): materials that contain 0.5 per cent or more asbestos by dry weight and are identified under Existing Conditions including fallen materials and settled dust.

.4 Asbestos Work Area: area where work takes place which will, or may, disturb ACMs.

.5 Authorized Visitors: Engineers, Consultants or designated representatives, and representatives of regulatory agencies.

.6 Competent worker person: in relation to specific work, means a worker who:

.1 Is qualified because of knowledge, training and experience to perform the work.

.2 Is familiar with the federal laws and with the provisions of the regulations that apply to the work.

.3 Has knowledge of all potential or actual danger to health or safety in the work.

.7 Friable material: means material that:

.1 When dry, can be crumbled, pulverized or powdered by hand pressure, or

.2 is crumbled, pulverized or powdered.

.8 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.

.9 Occupied Area: any area of the building or work site that is outside Asbestos Work Area.

.10 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.

.11 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for work.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of asbestos-containing waste in accordance with requirements of authority having jurisdiction.

.3 Submit Provincial/Territorial and/or local requirements for Notice of Project Form.

.4 Submit proof of Contractor's Asbestos Liability Insurance.

.5 Submit to Consultant necessary permits for transportation and disposal of asbestos-containing waste and proof that asbestos-containing waste has been received and properly disposed.

.6 Submit proof that all asbestos workers and/or supervisor have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene and work practices while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing.

.7 Submit proof satisfactory to Departmental Representative that employees have respirator fitting and testing. Workers must be fit tested (irritant smoke test) with respirator that is personally issued.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial/Territorial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications, more stringent requirement applies. Comply with regulations in effect at time Work is performed.

.2 Health and Safety:

.1 Perform construction occupational health and safety in accordance with Section 01 35 26 - Health and Safety Requirements.

.2 Safety Requirements: worker protection.

.1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:

.1 Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction. The respirator to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. The respirator to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location. The employer to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator. A worker not to be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.

.2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing shall consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing to include suitable footwear, and to be repaired or replaced if torn.

.2 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.

.3 Before leaving Asbestos Work Area, the worker can decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, or, if the protective clothing will not be reused, place it in a container for dust and waste. The container to be dust tight, suitable for asbestos waste, impervious to asbestos, identified as asbestos waste, cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before removal from the work area, and removed from the work area frequently and at regular intervals.

.4 Facilities for washing hands and face shall be provided within or close to the Asbestos Work Area.

.5 Ensure workers wash hands and face when leaving Asbestos Work Area. Facilities for washing are located as indicated on drawings.

.6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.

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.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Separate for recycling and place in designated containers metal waste in accordance with Waste Management Plan.

.5 Place materials defined as hazardous or toxic in designated containers.

.6 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.7 Fold up metal banding, flatten and place in designated area for recycling.

.8 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 6 mils bags or leak proof drums. Label containers with appropriate warning labels.

.9 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.6 EXISTING CONDITIONS

.1 Reports and information pertaining to ACMs to be handled, removed, or otherwise disturbed and disposed of during this project are available for inspection.

.2 Notify Departmental Representative of friable material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from Consultant.

1.7 PERSONNEL TRAINING

.1 Before beginning Work, provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.

.2 Instruction and training related to respirators includes, following minimum requirements:

.1 Fitting of equipment.

.2 Inspection and maintenance of equipment.

.3 Disinfecting of equipment.

.4 Limitations of equipment.

.3 Instruction and training must be provided by a competent, qualified person.

Part 2 Products

2.1 MATERIALS

.1 Drop Sheets:

.1 Polyethylene: 0.15 mm thick.

.2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.

.2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in a concentration to provide thorough wetting of asbestos-containing material.

.3 Waste Containers: contain waste in two separate containers.

.1 Inner container: 0.15 mm thick sealable polyethylene waste bag.

.2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or second 0.15 mm thick sealable polyethylene bag.

.3 Labelling requirements: affix pre-printed cautionary asbestos warning in both official languages that is visible when ready for removal to disposal site.

.4 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual asbestos fibres.

.5 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under both dry conditions and wet conditions using amended water.

Part 3 Execution

3.1 PROCEDURES

.1 Do construction occupational health and safety in accordance with Section 01 35 26 - Health and Safety Requirements.

.2 Before beginning Work, isolate Asbestos Work Area using, minimum, preprinted cautionary asbestos warning signs in both official languages that are visible at access routes to Asbestos Work Area.

.1 Remove visible dust from surfaces in the work area where dust is likely to be disturbed during course of work.

.2 Use HEPA vacuum or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate.

.3 Do not use compressed air to clean up or remove dust from any surface.

.3 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.

.1 Use FR polyethylene drop sheets over flooring such as carpeting that absorbs dust and over flooring in Asbestos Work Area where dust and contamination cannot otherwise be safely contained. Drop sheets are not to be reused.

.4 Wet materials containing asbestos to be cut, ground, abraded, scraped, drilled, or otherwise disturbed unless wetting creates hazard or causes damage.

.1 Use garden reservoir type low - velocity fine - mist sprayer.

.2 Perform Work to reduce dust creation to lowest levels practicable.

.3 Work will be subject to visual inspection and air monitoring.

.4 Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.

.5 Frequently and at regular intervals during Work and immediately on completion of work:

.1 Dust and waste to be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a waste container, and

.2 Drop sheets to be wetted and placed in a waste container as soon as practicable.

.6 Cleanup:

.1 Place dust and asbestos containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste; wet and fold these items to contain dust, and then place in plastic bags.

.2 Clean exterior of each waste-filled bag using damp cloths or HEPA vacuum and place in second clean waste bag immediately prior to removal from Asbestos Work Area.

.3 Seal waste bags and remove from site. Dispose of in accordance with requirements of Provincial/Territorial and Federal Authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that the appropriate guidelines and regulations for asbestos disposal are followed.

.4 Perform final thorough clean-up of Work areas and adjacent areas affected by Work using HEPA vacuum.

3.2 SCHEDULE

.1 Refer to Schedule A for the Hazardous Material Report.

.2 Contractor is responsible for removal of hazardous materials from the areas receiving work.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM A775/A775M-07b, Standard Specification for Epoxy-Coated Steel Reinforcing Bars.

.3 ASTM D412-06ae2, Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.

.4 ASTM D2240-05(2010), Standard Test Method for Rubber Property - Durometer Hardness.

.5 ASTM C494/C494M-11, Standard Specification for Chemical Admixtures for Concrete.

.2 CSA International

.1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.

.3 CSA A23.4-09, Precast Concrete-Materials and Construction.

.4 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.5 CSA G30.18-09, Carbon and Steel Bars for Concrete Reinforcement.

.6 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.7 CSA G279-M1982(R1998), Steel for Prestressed Concrete Tendons (Metric Version).

.8 CAN/CSA-S6-06 + S6S1-10, Consists of CAN/CSA-S6, Canadian Highway Bridge Design Code and S6S1, Supplement #1 to CAN/CSA-S6.

.9 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel Structures.

.10 CSA W48-06(R2011), Filler Metals and Allied Materials for Metal Arc Welding.

.11 CSA W59-03(R2008), Welded Steel Construction (Metal Arc Welding).

.12 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.

.3 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - current edition.

.1 MPI #18 Primer, Zinc Rich Organic.

.2 MPI #79 Primer, Alkyd, Anti-Corrosive for Metal.

.4 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

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 concrete mixes and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.

.2 Submit 2 copies of detailed calculations and design drawings for typical precast elements and connections for Departmental Representative for 2 weeks prior to manufacture.

.3 Indicate on drawings:

.1 Design calculations for items designated by manufacturer.

.2 Tables and bending diagrams of reinforcing steel.

.3 Camber.

.4 Finishing schedules.

.5 Methods of handling and erection.

.6 Openings, sleeves, inserts and related reinforcement.

.4 Submit evidence of welding certification including welding procedures before commencing work.

1.3 QUALITY ASSURANCE

.1 Fabricate and erect precast concrete elements using manufacturing plant certified by CSA International in appropriate category to CSA A23.4.

.2 Only precast elements fabricated in such certified plants to be acceptable to owner, and plant certification to be maintained for duration of fabrication, erection until warranty expires.

.3 Welder Qualification: certified to CSA W47.1 and for weld type required.

.4 Submit evidence of welding certification including welding procedures before commencing work.

1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect precast product from damage.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Cement, white cement, aggregates, water, admixtures: to CSA A23.4.

.2 Use same brands and source of cement and aggregate for entire project to ensure uniformity of colouration and other mix characteristics.

.3 Reinforcing steel: to CSA A23.4.

.4 Forms: to CSA A23.4.

.5 Hardware and miscellaneous materials: to CSA A23.1/A23.2.

.6 Anchors and supports: to CSA A23.4.

.7 Shims: steel.

.8 Sealant: Refer to Section 07 92 00.

2.2 DESIGN REQUIREMENTS

.1 Design precast elements to CSA A23.4 and to resist handling, stockpiling, shipping and erection stresses.

2.3 FABRICATION

.1 Manufacture units to CSA A23.4.

.2 Mark each precast unit to correspond to identification mark on shop drawings for location with date cast on part of unit which will not be exposed.

.3 Design and attach anchors and inserts to precast concrete elements to carry design loads.

.4 Shop prime anchors after fabrication and touch up primer on anchors after welding. Do not apply primer to embedded portion of anchors or inserts.

.5 Galvanize anchors after fabrication and touch up with zinc-rich primer after welding.

2.4 FINISHES

.1 Finish and colour of precast units to match approved existing concrete sills.

Part 3 Execution

3.1 GENERAL

.1 Do precast concrete work to CSA A23.4 and CAN/CSA-A23.3.

3.2 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for precast concrete installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.3 ERECTION

.1 Erect precast elements within allowable tolerances as indicated.

.2 Non-cumulative erection tolerances in accordance with [CSA A23.4].

.3 Set elevations and alignment between units to within allowable tolerances before connecting units.

.4 Fasten precast panels in place as indicated on reviewed shop drawings.

.5 Uniformly tighten bolted connections with torque.

.6 Do not weld or secure bearing plates at sliding joints.

.7 Set units dry, without mortar, attaining specified joint dimension with shims.

.8 Remove shims and spacers from joints of non-load bearing panels after fastening but before sealant is applied.

.9 Apply sealant to precast products to manufacturer's recommendations unless specified otherwise.

3.4 CLEANING

.1 Obtain approval of cleaning methods from Departmental Representative before cleaning soiled precast concrete surfaces.

.2 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

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

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by precast concrete installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Definitions:

.1 Low-pressure water soaking: less than 350 kPa (50 psi), measured at nozzle tip.

.2 Medium-pressure water soaking: minimum 350 kPa (50 psi) and maximum 2700 kPa (400 psi), measured at nozzle tip.

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

.1 Material Safety Data Sheets (MSDS).

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Provide time and allow attendance of relevant employees at environmental briefing session arranged by Departmental Representative prior to beginning work of this Section.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Provide WHMIS MSDS - Material Safety Data Sheets documentation in accordance with Section01 33 00 - Submittal Procedures.

.3 Provide proposed cleaning method and type of protection from cleaning residue for in-place conditions.

.4 Samples:

.1 Provide samples of cleaning materials for approval of Departmental Representative.

.2 Demonstrate machinery, tools and nozzles for approval by Department Representative.

.5 Test and Evaluation Reports:

.1 Provide test results.

.1 Provide digital or 6 hard copies of test results describing tools used for cleaning of test patches.

.2 Proceed with cleaning upon receiving written approval by Departmental Representative concerning tested cleaning methods.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements: ensure work is performed in compliance with CEPA.

.2 Comply with requirements of Workplace Hazardous Materials Information Sheet (WHMIS).

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 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.

1.6 AMBIENT CONDITIONS

.1 Do not use wet cleaning methods when there is threat of frost.

.2 Do not use chemical cleaners when temperature is below 10 degrees C.

.3 Follow manufacturer's written instructions on use of chemical cleaners in accordance with product's temperature range application.

.4 Provide shading to wall to avoid cleaning in full, hot sunlight.

.5 Do not clean if there is risk of chemical spray being blown onto surrounding historic material, publicly accessible areas or plants.

1.7 EXISTING CONDITIONS

.1 Report to Departmental Representative conditions of deteriorated masonry or pointing found during cleaning.

.2 Record existing conditions, using photographs, before and after cleaning. Advise Departmental Representative of potential cleaning problems.

.3 Do not clean areas of deteriorated masonry without prior written approval of Departmental Representative.

.4 Clean existing masonry are repointing locations.

Part 2 Products

2.1 MATERIALS

.1 Use clean potable water free from contaminants.

.2 Use a solution best suited to remove existing and new splatters and will not damage the existing brick

.3 Treat water which has high metal content before use in cleaning.

.4 Use air free from oil or other contaminants.

.5 Use masking material polyethylene to approval of Departmental Representative.

.6 Use non-ionic surfactant (detergent) in concentration less than 2 % by volume.

.7 Use hydrofluoric acid (HF) based cleaner in concentration less than 5 % by volume. Include Orthophosphoric acid 0.25 % by volume.

.8 Use ammonium hydroxide (ammonium) based cleaner for calcareous stone.

.9 Use sodium hexametaphosphate (Calgon or NaHMP) to dissolve gypsum-bound soiling.

.10 Use Perchloroethylene to remove graffiti and other stains.

.11 Use 2-5% ammonium carbonate solution in water in poultice pack to treat copper stains.

.12 Use Kaolin Clay as poultice medium.

.13 Use non-ferrous or plastic mesh as support mechanism for poultice.

.14 Use glycerine as thickener to slow evaporation.

.15 Use Aluminum Oxide grits for fine work.

.16 Prepare poultices to treat iron stains on sandstone and granite using:

.1 10 % solution by weight of orthophosphoric acid or oxalic acid and 2% sodium salt of EDTA

.17 Prepare poultices to treat iron stains on limestone and marble using:

.1 7 parts glycerine, 1 part sodium citrate and 6 parts warm water.

.18 Use ammonium hydroxide in poultices to remove grease stains.

.19 Use 80 mesh grit free from iron oxide.

2.2 TOOLS AND EQUIPMENT

.1 Use brushes with natural or soft plastic bristles.

.2 Use scrapers of wood or plastic.

.3 Use water pumps fitted with accurate pressure regulators and gauges capable of being preset and locked at maximum specified levels.

.4 Use air compressors equipped with on-line oil filters to avoid spraying oil onto masonry.

.5 Use gun equipped with pressure gauge at nozzle end.

.6 Use plastic or non-ferrous metal piping and fittings.

.7 Use nozzles that give nebulized droplet spray. Use nozzles with 375 mm spread.

Part 3 Execution

3.1 SITE VERIFICATION OF CONDITIONS

.1 Record existing conditions, by means of photographs, before and after cleaning. Advise Departmental Representative of potential complications.

.2 Report to Departmental Representative conditions of deteriorated masonry or pointing not noted on Contract Drawings found before and during cleaning.

.3 Obtain written approval of Departmental Representative before cleaning areas of deteriorated masonry.

3.2 PREPARATION

.1 Protect operatives and other site personnel from hazards.

.1 Ensure good ventilation in work area.

.2 Ensure workers wear protection, respirator to MSHA/NIOSH standard.

.2 Place safety devices and signs near work areas as indicated and directed.

.3 Seal or repair openings and joints where there is potential risk of water/chemical infiltration.

.4 Provide a shelter around work area as Departmental Representative.

.1 Obtain approval of sheltering method from Departmental Representative before commencing cleaning procedure.

3.3 PROTECTION OF IN-PLACE CONDITIONS

.1 Cover and protect surfaces and non-masonry finishes not to be cleaned.

.1 Obtain approval of protection method from Department Representative before commencing cleaning procedure.

.2 Protect vents, windows, and other openings, to prevent water entry.

.1 Protect masonry openings from water/chemical infiltration with polyethylene during cleaning.

.3 Protect wood, glass, and metal adjacent to masonry.

.4 Protect plants, gardens, shrubs from watering and chemicals. Lime soil to neutralize effects of acid cleaners.

.5 Hang sheeting material from scaffolding to enclose water spray.

.6 Protect cleaned surfaces to be painted from contact with rain and snow.

.7 Protect rainwater leaders, eaves troughs and gutters from being blocked by residue.

.8 Protect adjacent Work from spread of dust and dirt beyond work areas.

3.4 EXECUTION OF CLEANING

.1 Proceed with cleaning in accordance with written instructions of methods, systems, tools and equipment approved by Departmental Representative.

.2 Dry brush or scrape accumulations from walls, ledges and cornices.

.3 Pre-wet masonry surface when necessary. Work from bottom of wall upwards.

.4 Do not exceed maximum pressure at nozzle or have nozzle closer to masonry than approved by Departmental Representative at tests.

.5 Stop work when cleaning has detrimental effect on surrounding material and plants.

.6 Avoid prolonged wetting and excessive water penetration.

.1 Protect building envelope from water infiltration.

.7 Use chemical cleaners approved by Department Representative. Follow manufacturer's recommended dwell time.

.8 Use brushing and scraping only to supplement water washing.

.9 Soften and loosen heavy deposits with prolonged water spray, then brush. Remove thick incrustations with plastic scrapers.

.10 Use chemical cleaners approved by Departmental Representative for stain and soil removal.

.11 Apply poultices as approved by Departmental Representative based on tests.

.12 Removal of vegetation or organic growth growing in or on masonry.

.1 Soak masonry with low-pressure water.

.2 Follow soaking by scraping with soft plastic or wood spatulas.

.13 Low-Pressure Water Soaking:

.1 Remove stains with low-pressure maximum 50 psi kPa wash-down at flow rate of 0.25 L/s.

.2 Hold nozzle minimum 450 mm from masonry surface.

.3 Follow soaking by gentle scrubbing with natural bristle brushes.

3.5 CLEANING

.1 Rinse off masonry until no indications of chemicals are present.

.2 Rinse from bottom to top and from top to bottom.

.3 Clean up work area as work progresses. At end of each work day remove debris and waste from site.

.4 Upon completion, clean and restore areas used for work to condition equal to that previously existing.

3.6 PROTECTION OF WORK

.1 Protect finished Work from damage until take-over.

3.7 SCHEDULE

.1 All exterior masonry surfaces to be cleaned on the Administration, Multicultural, and Chapel Buildings.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Definitions:

.1 Raking: removal of loose/deteriorated mortar to a depth suitable for repointing until sound mortar, and/or 4x joint thickness and/or a specified mm depth mm is reached.

.2 Repointing: filling and finishing of masonry joints from which mortar is missing has been raked out or has been omitted.

.3 Tooling: finishing of masonry joints using tool to provide final contour.

.4 Low-pressure water cleaning: water soaking of masonry using less than 350 kPa (50 psi) water pressure, measured at nozzle tip of hose.

.2 CSA International

.1 CAN/CSA A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.

.2 CAN/CSA A179-2014, Mortar and Grout for Unit Masonry.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Provide manufacturer's printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:

.1 Provide labelled samples of materials used on project for approval before work commences.

.4 Test and Evaluation Reports:

.1 Provide certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Provide laboratory test reports certifying compliance of mortar ingredients with specifications requirements.

1.3 QUALITY ASSURANCE

.1 Masonry Contractor:

.1 Use single Masonry Contractor for masonry work.

.2 Masonry contractor to have 3 years experience minimum in historic brick masonry work on projects of similar size and complexity to Work of this Contract.

.3 Masonry contractor to have good level of understanding of structural behaviour of masonry walls when masonry work involves replacing or repairing brick which are part of structural masonry work.

.2 Masons:

.1 Mason to have certificate of qualification with 5 years minimum experience in historic brick masonry work.

.2 Masons to have proof of license certification for propriety restoration mortars.

.3 Cement grouting: grouting activities should be undertaken by experienced workers in manipulation and cement grouting methods.

.4 Obtain approval from Departmental Representative for changes to qualified personnel.

.5 Mock-ups:

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up 2 m x 2 m to demonstrate raking and repointing procedures for each type of exterior masonry material specified in locations designated by Departmental Representative.

.3 Notify Department Representative minimum of 24 hours prior to construction of the mock-up.

.4 Perform mock-up of masonry cleaning with low pressure 1 to 3 bar clean water and soft natural bristle brush.

.5 Construct mock-up under supervision of Departmental Representative to demonstrate a full understanding of specified procedures, techniques and formulations is achieved before work commences.

.6 Construct mock-up where directed by Departmental Representative.

.7 Work not to proceed prior to approval of mock-up. Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with masonry repointing work.

.8 Accepted mock-up will demonstrate minimum standard for this work. Mock-up will not remain as part of finished work.

1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements:

.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.2 Store cementitious materials and aggregates in accordance with CAN/CSA A23.1.

.3 Store lime putty in plastic lined sealed drums.

.4 Keep material dry. Protect from weather, freezing and contamination.

.5 Ensure that manufacturer's labels and seals are intact upon delivery.

.6 Remove rejected or contaminated material from site.

.3 Packaging Waste Management: remove for reuse and return of padding, in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.5 AMBIENT CONDITIONS

.1 Maintain masonry temperature between 10 degrees C and 25 degrees C for duration of work.

.2 When ambient temperature is below 10 degrees C:

.1 Store mortar materials for immediate use within heated enclosure. Allow mortar materials to reach minimum temperature of 10 degrees C before use.

.2 Ensure only aggregate and water are heated before use:

.1 Heat and maintain sand temperature to minimum 10 degrees C and maximum 30 degrees C.

.2 Heat and maintain water temperature to minimum of 20 degrees C and maximum of 30 degrees C:

.3 Provide hot water to a maximum 40 degrees C on site during cold weather.

.3 Maintain sand temperature between 10 degrees C and 30 degrees.

.4 Do not mix cement with water or with aggregate or with water-aggregate mixtures having higher temperature than 30 degrees C.

.5 Maintain mortar mix temperature between 10 degrees C and 30 degrees C.

Part 2 Products

2.1 MORTAR

.1 Mortar: in accordance with CAN/CSA A179 Section 04 03 08 - Historic - Mortaring.

.2 Proportion Specification:

.1 In accordance with CAN/CSA A179, Table 3.

.2 Mortar compressive strength at 28 days: minimum 10 MPa, maximum 12.5 MPa.

.3 Air entrainment: 8-12%.

.4 Match existing mortar.

Part 3 Execution

3.1 SITE VERIFICATION OF CONDITIONS

.1 Report in writing to Departmental Representative areas of deteriorated masonry not previously identified.

.2 Stop work in that area and report to Departmental Representative immediately evidence of hazardous materials.

3.2 SPECIAL TECHNIQUES

.1 Examine mortar joints.

.1 Examine horizontal and vertical joints to determine which were struck first and whether they are the same style, as well as aspects of workmanship which establish authenticity of original work.

.2 Replicate the style selected by Departmental Representative.

.2 Test mortar joints.

.1 Procedure of testing: examine joints visually for obvious signs of deteriorated masonry.

.2 Test joints not visually deteriorated as follows:

.1 Test for voids and weakness by using hammers or other approved means.

.2 Perform testing in co-operation with Departmental Representative so that unsound joints can be marked and recorded.

3.3 RAKING JOINTS

.1 Use manual raking tool to obtain clean masonry surfaces.

.1 Remove deteriorated and adhered mortar from masonry surfaces to sound mortar leaving square corners and flat surface at back of cut.

.2 Clean out voids and cavities encountered.

.2 Remove mortar without chipping, altering or damaging masonry units.

.3 Clean surfaces of joints with non-ferrous brush without damaging texture of exposed joints or masonry units.

.4 Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining blow clean with compressed air.

.5 Leave no standing water.

3.4 REPOINTING:

.1 Dampen joints and porous masonry units.

.2 Keep masonry damp while pointing is being performed.

.3 Completely fill joint with mortar.

.1 If surface of masonry units has worn rounded edges keep pointing back from surface to keep same width of joint

.2 Avoid feather edges.

.3 Pack mortar solidly into voids and joints.

.4 Build-up pointing in layers not exceeding 12 mm in depth.

.1 Allow each layer to set before applying subsequent layers.

.2 Maintain joint width.

.5 Tool joints as shown on drawings.

.1 Tool, compact and finish using mason's slick to force mortar into joint.

.6 Remove excess mortar from masonry face before it sets.

3.5 PROTECTION DURING CURING PROCESS

.1 Cover completed and partially completed work not enclosed or sheltered at end of each work day.

.1 Membranes should extend to 0.5 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly.

.2 Cover with waterproof tarps to prevent weather from eroding recently repointed material.

.1 Maintain tarps in place for minimum of 4 weeks after repointing.

.2 Ensure that bottoms of tarps permit airflow to reach mortar in joints.

.3 Anchor coverings securely in position.

.4 Damp cure:

.1 Provide damp cure for pointing mortars.

.2 Install and maintain wetted burlap protection during the curing process:

.1 Minimum 3 days.

.3 Wet mist burlap only - ensure no direct spray reaches surface of curing mortar.

.4 Shade areas of work from direct sunlight and maintain constant dampness of burlap.

.5 Protect from drying winds. Pay particular attention at corners of structure.

.6 Maintain ambient temperature of minimum 10 degrees C after repointing masonry for:

.1 Minimum 7 days in summer.

.2 Minimum 15 days in cold weather conditions using dry heated enclosures.

3.6 CLEANING

.1 Clean surfaces of mortar droppings, stains and other blemishes resulting from work of this contract as work progresses.

.2 Remove droppings and splashings using clean sponge and water.

.3 Do further cleaning using stiff natural bristle brushes after mortar has attained its initial set and has not fully cured.

.4 Clean masonry with stiff natural bristle brushes and plain water only if mortar has fully cured.

.5 Clean masonry with low pressure 1 to 3 bar clean water and soft natural bristle brush.

.6 Obtain approval of Departmental Representative prior to using other cleaning methods for persistent stains.

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

3.7 PROTECTION OF COMPLETED WORK

.1 Protect adjacent finished work against damage which may be caused by on-going work.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM C5-10, Standard Specification for Quicklime for Structural Purposes.

.2 ASTM C144-11, Standard Specification for Aggregate for Masonry Mortar.

.3 ASTM C185-08, Standard Test Method for Air Content of Hydraulic Cement Mortar.

.4 ASTM C207-06(2011), Standard Specification for Hydrated Lime for Masonry Purposes.

.5 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.

.6 ASTM C270-12a, Standard Specification for Mortar for Unit Masonry.

.7 ASTM C780-12, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.

.8 ASTM C1072-11, Standard Test Method for Measurement of Masonry Flexural Bond Strength.

.2 CSA International

.1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A179-04(R2009), Mortar and Grout for Unit Masonry.

.3 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

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 mortar and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Prior to mixing or preparation of mortars submit for review to Departmental Representative confirmation of source or product data sheet of:

.1 Aggregate.

.2 Cement.

.3 Lime.

.4 Premixed products.

.5 Pigments.

.3 Samples:

.1 Provide samples in quantity and size in accordance with CAN/CSA-A179.

.4 Test reports:

.1 Submit test results during site work as directed by Departmental Representative's as follows:

.1 Sieve analysis: sand.

.2 Bulking analysis: sand.

.3 Air content: mortar mix in plastic state.

.4 Vicat cone penetration: mortar mix.

.5 Mortar compressive strength: at 7 and 28 days or otherwise required.

1.3 QUALITY ASSURANCE

.1 Qualifications:

.1 Installers to have minimum of 3 years experience in lime mortar preparation.

.2 Mortar to be mixed by same mechanics throughout project.

.2 Mock-ups:

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Submit methods of reproducing existing mortar colour, texture and pointing types, and samples.

.3 Construct mock-up 2000 x 2000 mm.

.4 Mock-up will be used:

.1 To judge quality of work, substrate preparation, and material application.

.2 For testing to determine compliance with performance requirements.

.5 Locate as directed by Departmental Representative.

.6 Notify Departmental Representative 48 hours before commencing mock-up.

.1 Obtain approval from Departmental Representative before commencing mock-up.

.7 Allow 48 hours for inspection of mock-up before proceeding with work.

.8 When accepted, mock-up will demonstrate minimum standard for this Work. Approved mock-up will remain as part of finished work.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 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 off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store cementitious materials and aggregates in accordance with CSA A23.1/A23.2.

.3 Store lime putty in plastic lined sealed drums.

.4 Protect from weather, freezing and contamination.

.5 Remove rejected or contaminated material from site.

.6 Store and protect mortar materials from nicks, scratches, and blemishes.

.7 Replace defective or damaged materials with new.

1.5 SITE CONDITIONS

.1 Ambient Conditions:

.1 Provide weather-tight enclosure to store materials and mix mortars, maintain air temperature above 10 degrees C at all times.

.2 Maintain maximum/minimum thermometers and relative humidity gauges on site and in enclosures.

.1 Maintain a daily record of temperature and humidity.

.2 Install relative humidity and temperature equipment, record temperature and relative humidity and submit report to Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Water: potable, clean and free from contaminants.

.2 Sand: to CAN/CSA-A179.

Sieve Size	% By Weight Passing Each Sieve	% By Weight Retained on Each Sieve
No. 4 (4.75 mm)	100	0
No. 8	90	10
No. 16 (1.18 mm)	70	20
No. 30 (600 µm)	50	20
No. 50 (300 µm)	30	20
No. 100 (150 µm)	15	15
No. 200 (75 µm)	0	15

.1 Sharp, screened and washed pit sand, free of organic material, with final grading and colour to approval of Departmental Representative.

.2 Custom blend sands where necessary to provide appropriate colour match and gradation to approval of Departmental Representative.

.3 Provide samples and receive approvals prior to commencing Work.

.3 Portland cement: to CAN/CSA-A3000.

.4 Masonry cement: to CAN/CSA-A3000.

.5 Lime:

.1 Processed Lime (Quicklime): to ASTM C5, fresh, finely ground and crushed; high calcium, 3/16" fines, dry bagged.

.2 Hydrated Lime:

.1 Dolomitic finishing lime, Type "S", to ASTM C207.

.2 Hydrated, high calcium, Type "N" masons' lime to ASTM C207.

.3 Air-entrained dolomitic lime, Type SA lime, Type SA lime contains air-entraining agent.

.4 Lime putty.

.6 Colour:

.1 metallic oxide pigments,. Use minimum amount necessary.

.2 Maximum colour: 2% of total volume of aggregate.

.3 Match core of freshly broken sample of original mortar.

.4 Coloured admixtures: maximum 15% of binder content by mass.

.7 Additives:

.1 Obtain written approval of Departmental Representative before using additives.

.8 Air entrainment:

.1 Vinsol resin type: to ASTM C260/C260M.

.9 Mortar mill:

.1 Mortar mill comprising mortar pan with adjustable cast iron sprung rollers on cranked roller shaft, steel scrapers and blades for lime putty mixing.

.10 Spiral paddle mill comprising a mechanically driven rotating barrel with integral internal paddles for other than lime putty mixing

.1 Each batch add up to 6 large stones to tumble and pound mortar during mixing process.

.11 Plasterer's metal troughs.

2.2 MORTAR MIXES

.1 Masonry cement mortar:

.1 For normal exterior pointing: based on proportion specifications, consisting of part grey masonry cement, and part sand.

.2 Lime mortar:

.1 For normal exterior bedding: based on proportion specifications, consisting of part lime, and part sand.

.2 Property requirements:

.1 Mixes: as required to achieve specified performance criteria, functionally compatible with adjacent materials and components.

.2 Obtain written approval of Department Representative before changing mix proportions. Change mix proportions only as directed by Department Representative.

2.3 COLOURED MORTAR

.1 Use sand as colouring agent.

.2 Maintain one mortar mixer exclusively for coloured mortar.

2.4 ALLOWABLE TOLERANCES

.1 Mortar compression strength maximum 12.5 MPa, cured for 28 days.

.2 If mortar fails to meet the 7 day compressive strength requirements, but meets the 28 day compressive strength requirement, it is acceptable. If mortar fails to meet the 7 day compressive strength requirement, but its strength at 7 days exceeds two thirds of the value required for the 7 day strength, contractor may elect to continue work at his own risk while awaiting the results of the 28 day tests, or to take down the work affected.

Part 3 Execution

3.1 GENERAL PREPARATIONS

.1 Traditional Mortar:

.1 Prepare measuring boxes to ensure accurate proportioning of materials.

.2 Maintain separate measuring boxes for each component.

.3 Ensure sand is tested and volume corrected for bulking.

.4 Ensure air entraining agent is available together with a graduated container for accurate volume measurements.

.5 Ensure testing equipment is ready and in working order.

.6 Apply Vicat cone test to ensure desirable performance of the mortar and record results.

.7 Department Representative to apply Vicat cone test to ensure desirable performance of mortar and record results.

.2 Premixed Mortar:

.1 Follow manufacturer's written instructions.

.2 Whole bag has to be prepared.

.3 Apply Vicat cone test to ensure desirable performance of the mortar and record results.

.4 Department Representative to apply Vicat cone test to ensure desirable performance of mortar and record results.

3.2 BULKING OF SAND

.1 Test sand for bulking:

.1 At start of work.

.2 After each new delivery of sand.

.3 After severe change in weather.

.2 Test and adjust sand quantities for bulking:

.1 Obtain sample of sand which accurately reflects average condition of pile of damp sand, as follows:

.1 Take 4 shovels full of sand, each from a different level of the pile, and mix thoroughly.

.2 Place sand in a conical pile and divide into 4 quarters with a board. Remove 2 opposite quarters from pile, and combine remaining 2 quarters and mix thoroughly.

.3 Repeat quartering and mixing procedure until a sample of size required for testing remains.

.2 Fill a 1-litre capacity jar, about two-thirds full with damp sand to be tested. Drop sand in loosely. Do not pack it in. Level off surface, measure depth of damp sand (D).

.1 Carefully empty sand into another container, and half fill first container with water.

.2 Pour back about half of test sample of sand slowly into water so it is entirely saturated. Rod it thoroughly to remove air.

.3 Add rest of sand, rodding again to remove air and level off surface. Measure depth of saturated sand (S), which will be less than depth of damp sand.

.4 Calculate percentage bulking using formula: (D-S) x 100%/S = percentage bulking; where D = depth of damp sand, and S = depth of saturated sand.

.3 Increase volume of sand by percentage bulking shown in test.

3.3 PREPARATION OF MORTAR

.1 Lime Mortar:

.1 Prepare measuring boxes to ensure accurate proportioning of dry lime putty and sand.

.2 Mix dry lime and sand thoroughly in mortar mill, spiral- blade mechanical mixer for maximum 10 minutes. Do not add water. No spots or streaks of lime to remain upon completion of mixing.

.3 Add water as required.

.2 Lime-Cement Mortar:

.1 Prepare measuring boxes to ensure accurate proportioning of dry lime putty and sand.

.2 Mix dry lime and sand thoroughly in mortar mill, spiral- blade mechanical mixer for minimum 3 minutes. Do not add water. No spots or streaks of lime to remain upon completion of mixing.

.3 Add water as required.

.3 Lime Putty Mortar:

.1 Prepare lime putty from hydrated mason's lime by adding dry bagged hydrated lime to water. Stir and hoe the mass to form a thick cream.

.2 Seal containers.

.3 Label and date all containers.

.4 Keep prepared material from freezing. Discard frozen material.

.5 Allow to stand at least 48 hours in covered containers before use, preferably longer.

.6 Take lime putty from bins, siphon off water by screening lime through muslin, or cheesecloth, to remove excess water. Rework lime without adding water until it regains its plasticity by beating, ramming and chopping.

.7 Adjust sand for bulking as described in article 3.2.

.8 Mix lime putty with sand as required.

3.4 PREPARATION OF LIME-SAND ROUGHAGE (COARSE STUFF)

.1 Store lime sand roughage in air-tight plastic bins.

.2 Keep prepared material from freezing. Discard frozen material.

.3 Maintain measuring containers for correct quantity of materials for use in batches.

.4 Thoroughly clean mortar boards, measuring boxes and mixers between batches.

3.5 MIXING

.1 General:

.1 Use batching box.

.2 Follow proper batching procedure.

.3 Monitor mixing time.

.2 Mortar:

.1 Mix Characteristics:

.1 Pointing mortar: slightly stiffer than bedding mortar with a consistency such that the mortar can be hand-formed into a stiff ball.

.2 Record amount of water required to reach this consistency and use for subsequent mixes.

.2 Prepare only enough mortar to be used within two hours. Do not retemper mortar beyond this time.

.3 Follow manufacturer instructions when premixed mortar is used.

.4 Contractor to appoint 1 individual to mix mortar for duration of project. If this individual must be changed, mortar mixing must cease until new individual is trained, and mortar mix is tested.

3.6 CONSTRUCTION

.1 Do masonry mortar and grout work in accordance with CAN/CSA-A179 except where specified otherwise.

3.7 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 Remove droppings and splashings using clean sponge and water.

.4 Clean masonry with low pressure 1 to 3 bar clean water and soft natural bristle brush.

.5 Obtain approval of Department Representative prior to using other cleaning methods for persistent stains.

.6 Waste Management: separate waste materials for 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.

3.8 PROTECTION OF COMPLETED WORK

.1 Cover completed and partially completed work not enclosed or sheltered at end of each work day.

.2 Enclose and protect work using wetted burlap.

.3 Cover with waterproof tarps to prevent weather from eroding recently laid material.

.1 Maintain tarps in place for minimum of 1 week after laying.

.2 Ensure that bottoms of tarps permit airflow to reach mortar in joints.

.4 Anchor coverings securely in position.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA A23.1-04/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CAN/CSA-A179-04, Mortar and Grout for Unit Masonry.

.3 CAN/CSA-A3000-03(R2006), Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.2 DEFINITIONS

.1 Grout: cementitious or epoxy mixture of liquid consistency suitable for pouring or pumping, to fill voids between masonry elements.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.

.3 Provide cementitious grout samples to CAN/CSA A179.

.4 Provide upon request of Departmental Representative purchase orders, invoices, supplier's test certificates and documents to prove materials used in contract meet requirements of specification. Allow free access to source where materials procured.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

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

.2 Store materials in dry area and support free of ground.

.3 Deliver materials in sealed containers with labels legible and intact.

.4 Handle materials in safe manner in accordance with manufacturer's instructions. Avoid breaking container seals.

.5 Store materials at temperatures between 5 degrees C to 38 degrees C unless otherwise stated by manufacturer.

.2 Waste Management and Disposal:

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

.2 Divert unused concrete materials from landfill to local facility approved by Departmental Representative.

.3 Divert unused additive materials from landfill to official hazardous material collections site approved by Departmental Representative.

1.5 AMBIENT CONDITIONS

.1 Maintain temperature of masonry elements to be grouted above 5 degrees C throughout their thickness, during and 48 hours after grouting.

.2 Maintain temperature of elements to be grouted between 21 degrees C to 24 degrees C throughout its thickness during and 48 hours after grouting.

Part 2 Products

2.1 MATERIALS

.1 Grout: to CSA A179.

.2 Portland cement : to CAN/CSA-A3000.

.3 Water: clean and free from contaminants and organic material in accordance to CAN/CSA A23.1/A23.2.

2.2 EQUIPMENT

.1 Mechanical mixer: size compatible with volume of mortar grout prepared.

.2 Mechanical regulator to prevent segregation of ingredients after mixing and ensure injection continuity.

.3 Injection pump to include motor, gears and two separate reservoirs for resin and hardener. Set gear ratio to feed injection gun to recommended proportions, using two separate conduits.

.4 Maintain mixing equipment in good working order. Ensure that necessary spare parts are available on site.

2.3 GROUT MIXES

.1 Mix resin and catalyst in accordance with manufacturer's instructions.

Part 3 Execution

3.1 SITE VERIFICATION OF CONDITIONS

.1 Report to Departmental Representative before start of work possible structural masonry problems and conditions that do not conform to those specified including existing voids or possible openings which risk being compromised when grout will flow.

3.2 INSPECTION

.1 Mixing operations: continuously inspected by Departmental Representative. Provide required assistance to facilitate taking of grout samples and inspection work.

3.3 CONDITION OF SURFACES

.1 Evaluate moisture content of masonry work by taping 3 x 3 m polyethylene sheet to masonry surface. If moisture collects on underside of sheet before epoxy would cure, allow masonry work to dry sufficiently before commencing injection work.

3.4 MEASUREMENT AND MIXING

.1 Make volume measurement using suitably gauged hopper of size compatible with volume of grout prepared.

.2 Keep volume measures clean and free from crusting.

.3 Periodically check the shovel count against gauge box.

.4 Use manufacturer's mass density information in making mass measurement to proportion mortar grout.

.5 Mix cementitious materials, admixtures and aggregates in mechanical mixer for period of not less than 5 minutes nor more than 10 minutes with specified amount of water.

.6 Use grout before it has begun to set.

.7 Mix resin and hardener by feeding injection gun in controlled proportions using two conduits according to manufacturer's instructions.

3.5 PREPARATION

.1 Ensure substrate is free from loose material.

.2 Prepare voids around doors and windows to control flow of grout.

.3 Prepare joints before grout injection:

.1 Insert hemp ropes into joints.

.2 Point joints.

.4 Wet surfaces, deep into substrate.

3.6 INSTALLATION

.1 Safety:

.1 Epoxy materials may be skin irritants or sensitizers. Avoid contact with eyes, skin, inhalation of vapours and ingestion.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Definitions:

.1 Repair: using adhesives to re-bond sections of fractured masonry.

.2 Consolidation: strengthening masonry units to prevent deterioration (spalling).

.3 Descaling: removal of loose portions of masonry (usually spalled area) through appropriate specialized masonry tools or similar device.

.2 Reference Standards:

.1 CSA International

.1 CAN/CSA-A82-06, Fired Masonry Brick Made From Clay or Shale.

.2 CSA A82.3-M1978(R1999), Calcium Silicate (Sand-Lime) Building Brick

.3 CAN/CSA-A179-04, Mortar and Grout for Unit Masonry.

.4 CSA-S304.1-04, Design for Masonry Structures.

.5 CAN/CSA A-370-04(R2009), Connectors for Masonry.

.6 CAN/CSA A-371-04(R2009), Masonry Construction for Buildings.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meeting:

.1 Conduct pre-installation meeting to verify project requirements and procedures, manufacturer's installation instructions and manufacturer's warranty requirements.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Provide manufacturer's printed product literature and data sheets for brick and materials and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Alberta, Canada.

.2 Indicate method of brick removal.

.4 Samples:

.1 Submit samples:

.1 Two of each type of masonry unit specified.

.2 One of each type of masonry accessory specified.

.3 One of each type of masonry reinforcement and tie proposed for use.

.4 As required for testing purposes.

.5 Certificates:

.1 Provide certificates signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements.

.6 Test Reports:

.1 Provide certified test reports showing compliance with specified performance characteristics and physical properties.

1.4 QUALITY ASSURANCE

.1 Mock-ups:

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up panel of masonry wall construction 1200 x 1800 mm showing brick removal, masonry textures use of reinforcement, ties, through-wall flashing, weep holes, jointing, coursing, mortar, joint finishing, cleaning and workmanship.

.3 Construct mock-up where directed by Department Representative .

.4 Notify Departmental Representative minimum of 48 hours prior to construction of the mock-up.

.5 Construct mock-up under supervision of Department Representative to demonstrate understanding of specified procedures, techniques and formulations is achieved before work commences.

.6 Work not to proceed prior to approval of mock-up. Allow 24 hours for inspection of mock-up by Department Representative . Accepted mock-up becomes standard for this Work.

.7 When mock-up accepted, proceed with pointing and repair work. Mock-up will remain as part of the finished Work.

1.5 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements:

.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.2 Provide weather protection and construction protection in accordance with CSA-S304.1.

.3 Provide weather protection to newly opened sections in assembly.

.4 Protect bricks and store bricks to facilitate their resetting.

.1 Store dismantled masonry units on wood pallets , protected from exposure to water, elements, and potential mechanical damage fully covered under polyethylene.

.2 Submit storage and identification system to Departmental Representative for review.

.3 Store detached face bricks, back-up bricks and bricks showing evidence of soluble salts on separate pallets.

.5 Place detached bricks on wood surfaces during handling. Prevent contact with metal.

.6 When bricks are lowered to ground, place directly on wooden platform that will be used for transport or storage.

.7 Transport and keep bricks on wooden platforms.

.8 Ensure that sharp edges of bricks do not come into contact with hard objects.

.9 At request of Departmental Representative, turn over any remaining salvaged bricks to Owner at completion of contract.

.3 Packaging Waste Management: remove for reuse and return of crates, in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 AMBIENT CONDITIONS

.1 Maintain materials and surrounding air to minimum 10 degrees C prior to and for minimum 72 hours after completion of brick repairs.

.2 Maintain temperature of mortar materials in accordance with Section 04 03 07 - Historic - Masonry Repointing.

.3 Maintain masonry temperature between 10 degrees C and 25 degrees C for duration of the Work in accordance with Section 04 05 00 - Common Work Results for Masonry.

Part 2 Products

2.1 NEW FACE BRICK

.1 To match existing brick colour, texture, and size.

2.2 EXISTING BRICK

.1 Use hard, sound, and clean old bricks salvaged on site only with Departmental Representative's approval. Use only bricks without evidence of soluble salts

2.3 MORTAR

.1 Mortar: in accordance with CAN/CSA A179, Section 04 03 08 - Historic - Mortaring.

.2 Proportion Specification:

.1 In accordance with CAN/CSA A179.

Part 3 Execution

3.1 SITE VERIFICATION OF CONDITIONS

.1 Check for evidence of repairs, cracks, moisture, soluble salts contamination and other defects not noted on Contract Drawings, and report to Departmental Representative before starting Work.

.2 Stop work and report to Departmental Representative immediately evidence of hazardous materials.

3.2 PREPARATION

.1 Place safety devices and signs near work area as directed in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

.2 Install and remove shoring or other supports in accordance with Section 01 52 00 - Construction Facilities.

.3 Install and remove self-supporting scaffolding in accordance with Section 01 52 00 - Construction Facilities.

3.3 BRICK REMOVAL

.1 Verify locations and dimensions of areas of Work with Departmental Representative.

.2 In areas of work, identify salvageable bricks with Departmental Representative.

.3 Remove identified areas of salvageable brickwork as follows:

.1 Cut through unsupported load bearing brickwork in accordance with approved shop drawings.

.2 Cut out non-loadbearing brickwork in length as practicable.

.3 During removal, protect sound areas to remain. Use mechanical hand methods of removal. Obtain Departmental Representative's approval for use of power tools before commencing work.

.4 Remove adhered mortar from surface of adjacent bricks that remain in place.

3.4 BRICK SALVAGE

.1 Carefully clean, and store bricks for re-use. Store and protect bricks in accordance with article 1.5, DELIVERY, STORAGE AND HANDLING.

3.5 RAKING JOINTS

.1 Use manual raking tool to obtain clean masonry surfaces.

.1 Remove deteriorated and adhered mortar from masonry surfaces to sound mortar leaving square corners and flat surface at back of cut.

.2 Clean out voids and cavities encountered.

.2 Remove mortar without chipping, altering or damaging masonry units.

.3 Clean surfaces of joints by compressed air without damaging texture of exposed joints or masonry units.

.4 Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining blow clean with compressed air.

.5 Leave no standing water.

3.6 BRICK REPLACEMENT

.1 Build in flashings in masonry in accordance with CSA A371.

.2 Install masonry ties and connectors in accordance with CSA A370 and CSA A371 unless indicated otherwise. Prior to placing mortar, obtain approval of Department Representative of placement of ties and connectors.

.3 Co-ordinate bond pattern, coursing height and joint width with existing brickwork in area selected by Department Representative.

.4 Mix and blend brick units within each pallet and with other pallets to ensure uniform blend of colour and texture.

.5 Except in cold weather, pre-wet bricks having an initial rate of absorption exceeding 30 g/minute-194 cm^2 to uniform degree of saturation, 3 to 4 hours before laying. Do not lay until surface is dry or damp only, with no standing water.

.6 Clean dust and brick fragments from slot. Before proceeding with Work, inspect cleaned surface with Departmental Representative.

.7 Dampen slot's surfaces before applying mortar.

.8 Apply mortar and lay bricks.

.1 Lay bricks on full beds of mortar.

.2 Fill vertical joints buttered and placed full in face and back-up bricks, and at vertical joint between wythes.

.3 Lay bricks and tool joints in one operation, tooling with a round jointer to provide smooth joints compressed uniformly concave.

.4 Rake bedding mortar back to a minimum depth of 25 mm and make ready for pointing with pointing mortar in separate operation.

.1 Provide minimum 3 day damp cure to bedding mortar prior to pointing.

.9 Apply pointing mortar:

.1 Fill raked joints with pointing mortar.

.10 Finish joints to match those of existing brickwork, in area identified by Departmental Representative.

.11 Clean finished brickwork as work progresses.

.1 Remove mortar splashings on exposed brickwork.

.2 Leave no mortar on face of bricks.

.3 Remove mortar staining before it sets.

.4 Clean masonry with clean water and soft bristle brush only.

.12 Inspect finished brickwork with Departmental Representative.

3.7 REPOINTING:

.1 Do pointing work in accordance with Section 04 03 07 - Historic - Masonry Repointing.

.2 Dampen joints and porous masonry units.

.3 Keep masonry damp while pointing is being performed.

.4 Completely fill joint with mortar.

.1 Masonry units with worn rounded edges: maintain joint width by pointing back from exterior face.

.2 Avoid feather edges.

.3 Pack mortar solidly into voids and joints.

.5 Build-up pointing in layers not exceeding 12 mm in depth.

.1 Allow each layer to set before applying subsequent layers.

.2 Maintain joint width.

.6 Tool joints to match existing profile.

.1 Tool, compact and finish using jointing tool to force mortar into joint.

.7 Remove excess mortar from masonry face before it sets.

3.8 CLEANING

.1 Clean brick work surfaces after repairs have been completed and mortar has set.

.2 Clean brick surfaces of adhesive or mortar residue resulting from work performed without damaging bricks or joints.

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

3.9 PROTECTION OF WORK

.1 Cover completed and partially completed work not enclosed or sheltered at end of each work day.

.1 Membranes should extend to 0.5 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly.

.2 Cover with waterproof tarps to prevent weather from eroding recently repointed material.

.1 Maintain tarps in place for minimum of 4 weeks after repointing.

.2 Ensure that bottoms of tarps permit airflow to reach mortar in joints.

.3 Anchor coverings securely in position.

.4 Damp cure:

.1 Provide damp cure for pointing mortars.

.1 Install and maintain wetted burlap protection during the curing process:

.1 Minimum 3 days.

.2 Wet mist burlap only - ensure no direct spray reaches surface of curing mortar.

.3 Shade areas of work from direct sunlight and maintain constant dampness of burlap.

.5 Protect from drying winds. Pay particular attention at corners of structure.

.6 Maintain ambient temperature of minimum 10 degrees C after repointing masonry for:

.1 Minimum 7 days in summer.

.2 Minimum 30 days in cold weather conditions using dry heated enclosures.

.7 Protect adjacent finished work against damage which may be caused by on-going work.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA-A165 Series-[04], Standards on Concrete Masonry Units.

.2 CSA A179-[04], Mortar and Grout for Unit Masonry.

.3 CSA-A371-[04], Masonry Construction for Buildings.

.2 International Masonry Industry All-Weather Council (IMIAC)

.1 Recommended Practices and Guide Specification for Hot and Cold Weather Masonry Construction.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation meetings: comply with Section 01 31 19 - Project Meetings. Conduct pre-installation meeting one week prior to commencing on-site installations to:

.1 Verify project requirements, including mock-up requirements.

.2 Verify substrate conditions.

.3 Co-ordinate products, installation methods and techniques.

.4 Sequence work of related sections.

.5 Co-ordinate with other building subtrades.

.6 Review manufacturer's installation instructions.

.7 Review masonry cutting operations, methods and tools and determine worker safety and protection from dust during cutting operations.

.8 Review warranty requirements.

.2 Sequencing: sequence with other work in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart. Comply with manufacturer's written recommendations for sequencing construction operations.

.3 Scheduling: schedule with other work in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

1.3 ACTION SUBMITTALS

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

.2 Product Data:

.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, limitations and colours.

.2 Provide two copies of Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS) in accordance with Section 01 35 29 - Health and Safety Requirements.

.3 Samples:

.1 Provide samples as follows:

.1 Two cured, coloured samples of mortar and grout, illustrating mortar colour and colour range.

.4 Shop Drawings:

.1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.

.2 Provide shop drawings detailing temporary bracing required, designed to resist wind pressure and lateral forces during installation.

1.4 INFORMATION SUBMITTALS

.1 Certificates: provide manufacturer's product certificates certifying materials comply with specified requirements.

.2 Installer Instructions: provide manufacturer's installation instructions, including storage, handling, safety and cleaning.

.3 Manufacturer's Reports: provide written reports prepared by manufacturer's on-site personnel to include:

.1 Verification of compliance of work with Contract.

.2 Site visit reports providing detailed review of installation of work, and installed work.

1.5 CLOSEOUT SUBMITTALS

.1 Provide manufacturer's instructions for care, cleaning and maintenance of prefaced masonry units for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.6 EXTRA MATERIALS

.1 Provide manufacturer's instructions in accordance with Section 01 78 00 - Closeout Submittals covering maintenance requirements and parts catalogue, with cuts and identifying numbers.

1.7 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturer: capable of providing field service representation during construction and approving application method.

.2 Installer: experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

.3 Masons: company or person specializing in masonry installations with 5 years documented experience with masonry work similar to this project.

.1 Masons employed on this project must demonstrate ability to reproduce mock-up standards.

.2 Mock-ups:

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

.2 Mock-up used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.2 For testing to determine compliance with performance requirements. Perform following tests.

.1 For clay units, in addition to requirements set out in referenced CSA and ASTM Standards include data indicating initial rate of absorption.

.3 Construct mock-up where directed by Departmental Representative.

.4 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with work.

.5 When accepted by Departmental Representative, mock-up will demonstrate minimum standard for this work. Mock-up may not remain as part of finished work.

.6 Start work only upon receipt of written acceptance of mock-up by Departmental Representative.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Deliver materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.3 Storage and Handling Protection:

.1 Keep materials dry until use except where wetting of bricks is specified.

.2 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

.3 Packaging Waste Management:

.1 Remove for reuse and return of pallets, crates, padding, packaging materials in accordance with Section 01 74 21 - Construction/ Demolition Waste Management And Disposal.

1.9 SITE CONDITIONS

.1 Ambient Conditions: assemble and erect components when temperatures are above 4 degrees C.

.2 Weather Requirements: to CSA-A371.

.3 Cold weather requirements:

.1 To CSA-A371 with following requirements.

.1 Maintain temperature of mortar between 5 degrees C and 50 degrees C until batch is used or becomes stable.

.2 Maintain ambient temperature of masonry work and it's constituent materials between 5 degrees C and 50 degrees C and protect site from windchill.

.3 Maintain temperature of masonry above 0 degrees C for minimum of 7 days, after mortar is installed.

.4 Preheat unheated wall sections in enclosure for minimum 72 hours above 10 degrees C, before applying mortar.

.2 Hot weather requirements:

.1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

.2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.

.3 Spray mortar surface at intervals and keep moist for maximum of three days after installation.

Part 2 Products

2.1 MANUFACTURERS

.1 Ensure manufacturer has minimum 5 years experience in manufacturing components similar to or exceeding requirements of project.

2.2 MATERIALS

.1 Masonry materials are specified elsewhere in related Sections.

2.3 REINFORCEMENT AND CONNECTORS

.1 Bar reinforcement: to CAN/CSA-A371 Grade 400.

.2 Wire reinforcement: to CAN/CSA-A371, truss type.

.3 Connectors shall be corrosion resistant: to CAN/CSA-A370.

.4 Bolts: 12 mm diameter x 150 mm long with ends bent 50 mm at 90 degrees.

Part 3 Execution

3.1 INSTALLERS

.1 Experienced and qualified masons to carry out erection, assembly and installation of masonry work.

3.2 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.3 EXAMINATION

.1 Examine conditions, substrates and work to receive work of this Section.

.1 Co-ordinate with Section 01 71 00 - Examination and Preparation.

.2 Examine openings to receive masonry units. Verify opening size, location, and that opening is square and plumb, and ready to receive work of this Section.

.1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.2 Proceed with installation after unacceptable conditions have been remedied and after receipt of written approval from Departmental Representative.

.3 Verification of Conditions:

.1 Verify that:

.1 Substrate conditions which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of brick.

.2 Field conditions are acceptable and are ready to receive work.

.3 Built-in items are in proper location, and ready for roughing into masonry work.

3.4 PREPARATION

.1 Surface Preparation: prepare surface in accordance with manufacturer's written recommendations and co-ordinate with Section 01 71 00 - Examination and Preparation.

.2 Establish and protect lines, levels, and coursing.

.3 Protect adjacent materials from damage and disfiguration.

3.5 INSTALLATION

.1 Do masonry work in accordance with CSA-A371 except where specified otherwise.

.2 Build masonry plumb, level, and true to line, with vertical joints in alignment, respecting construction tolerances permitted by CSA-A371.

.3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.6 CONSTRUCTION

.1 Exposed masonry:

.1 Remove chipped, cracked, and otherwise damaged units, in accordance with CSA A-165, in exposed masonry and replace with undamaged units.

.2 Jointing:

.1 Allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, joints true to line, compressed, uniformly concave joints where concave joints are indicated.

.2 Allow joints to set just enough to remove excess water, then rake joints uniformly to 6 mm depth and compress with square tool to provide smooth, compressed, raked joints of uniform depth where raked joints are indicated.

.3 Strike flush joints concealed in walls and joints in walls to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating.

.3 Cutting:

.1 Cut out for electrical switches, outlet boxes, and other recessed or built-in objects.

.2 Make cuts straight, clean, and free from uneven edges.

.4 Building-In:

.1 Build in items required to be built into masonry.

.2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.

.3 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.

.5 Wetting of bricks:

.1 Except in cold weather, wet bricks having initial rate of absorption exceeding 1 g/minute/1000 mm^2: wet to uniform degree of saturation, 3 to 24 hours before laying, and do not lay until surface dry.

.2 Wet tops of walls built of bricks qualifying for wetting, when recommencing work on such walls.

.6 Support of loads:

.1 Use grout to CSA A179 where grout is used in lieu of solid units.

.7 Provision for movement:

.1 Leave 3 mm space below shelf angles.

.2 Leave 6 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.

.3 Built masonry to tie in with stabilizers, with provision for vertical movement.

.8 Loose steel lintels:

.1 Install loose steel lintels. Centre over opening width.

.9 Control joints:

.1 Construct continuous control joints in existing locations.

.10 Movement joints:

.1 Build-in continuous movement joints existing locations.

.11 Interface with other work:

.1 Cut openings in existing work as indicated.

.2 Openings in walls: reviewed by Departmental Representative.

.3 Make good existing work. Use materials to match existing.

3.7 SITE TOLERANCES

.1 Tolerances in notes to CSA-A371 apply.

3.8 FIELD QUALITY CONTROL

.1 Site Tests, Inspection:

.1 Perform field inspection and testing in accordance with Section 01 45 00 - Quality Control.

.2 Notify inspection agency minimum of 24 hours in advance of requirement for tests.

.2 Manufacturer's Services:

.1 Have manufacturer of products supplied under this Section review work involved in handling, installation/application, and protection of its product[s], and submit written reports in acceptable format to verify compliance of work with Contract.

.2 Manufacturer's field services: provide manufacturer's field services, consisting of product use recommendations and periodic site visits for inspection of product installation, in accordance with manufacturer's instructions.

.3 Schedule site visits to review work as installation is about to begin.

.4 Schedule site visits to review work at stages listed:

.1 After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.

.2 Twice during progress of work at 25% and 60% complete.

.3 Upon completion of work, after cleaning is carried out.

.5 Obtain reports within three days of review and submit immediately to Departmental Representative.

3.9 CLEANING

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

.2 Progress Cleaning: in accordance with related masonry sections.

.3 Final Cleaning:

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Upon completion of installation and verification of performance of installation, remove surplus materials, rubbish, tools and equipment barriers.

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

.1 Divert unused or damaged masonry units and glass block from landfill as specified in Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.10 PROTECTION

.1 Temporary Bracing:

.1 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

.2 Bracing approved by Departmental Representative.

.3 Brace masonry walls as necessary to resist wind pressure and lateral forces during construction.

.2 Moisture Protection:

.1 Keep masonry dry using waterproof, nonstaining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until completed and protected by flashing or other permanent construction.

.2 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.

.3 Air Temperature Protection: protect completed masonry as recommended in 1.10 SITE CONDITIONS.

END OF SECTION

Approved: 2008-12-31

Part 1 General

1.1 REFERENCES

.1 ASTM International Inc.

.1 ASTM D2240-[05], Standard Test Method for Rubber Property - Durometer Hardness.

.2 Canadian Standards Association (CSA International)

.1 CAN/CSA A371-[04], Masonry Construction for Buildings.

.2 CAN/CSA-ISO 14021-00(R2204), Environmental Labels and Declarations - Self Declared Environmental Claims (Type II Environmental Labelling).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Provide manufacturer's printed product literature, specifications and datasheets. Include product characteristics, performance criteria, and limitations.

.3 Shop Drawings:

.1 Provide shop drawings in accordance with Section [01 33 00 - Submittal Procedures].

.1 Provide drawings stamped and signed by professional engineer registered or licensed in Provinces of Alberta, Canada.

.2 Shop drawings consist of flashing and installation details. Indicate sizes, spacing, location and quantities of fasteners.

.4 Samples:

.1 Provide masonry accessory samples in accordance with Section01 33 00 - Submittal Procedures, supplemented as follows:

.1 Two moisture control material samples, illustrating colour and colour range, size, and shape. Include:

.1 Weep hole vents.

1.3 FIELD MEASUREMENTS

.1 Make field measurements necessary to ensure proper fit of members.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle masonry accessories in accordance with, Section 01 61 00 - Common Product Requirements supplemented as follows:

.1 Keep fillers and adhesives dry, protected against dampness, and freezing.

.2 Store packaged materials off ground and in accordance with manufacturer's written instructions.

.2 Packaging Waste Management:

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

Part 2 Products

2.1 MOISTURE CONTROL

.1 Weep Hole Vents: galvanized steel.

.2 Colour: to be selected by Departmental Representative from manufacturer’s standard colour range.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION: MOISTURE CONTROL

.1 Install weep hole vents in vertical joints immediately over flashings, in exterior wythes of cavity wall and masonry veneer wall construction, at maximum horizontal spacing of 1000 mm on centre.

3.3 CLEANING

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

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 CSA International

.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.2 CSA O121-08, Douglas Fir Plywood.

.3 CSA O141-05(R2009), Softwood Lumber.

.4 CSA O151-09, Canadian Softwood Plywood.

.5 CAN/CSA-O325.0-07, Construction Sheathing.

.6 CAN/CSA-Z809-08, Sustainable Forest Management.

.2 CAN/CSA-G164-M92 (R2003) – Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2010.

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 rough carpentry work and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 QUALITY ASSURANCE

.1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood identification: by grade mark in accordance with applicable CSA standards.

.3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.

1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect wood from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:

- .1 Board sizes: "Standard" or better grade.
- .2 Dimension sizes: "Standard" light framing or better grade.
- .3 Post and timbers sizes: "Standard" or better grade.

2.2 ACCESSORIES

.1 Fasteners: to CAN/CSA-G164, for exterior work pressure- preservative.

.2 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for rough carpentry installation in accordance with manufacturer's written instructions.

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

3.2 PREPARATION

.1 Treat surfaces of material with wood preservative, before installation.

.2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and 1 minute soak on plywood.

.3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

.4 Treat material as follows :

- .1 Wood furring for on outside surface of exterior masonry and concrete walls.
- .2 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

3.3 INSTALLATION

.1 Comply with requirements of NBC, supplemented by the following paragraphs.

.2 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.

.3 Align and plumb faces of furring and blocking to tolerance of 1:600.

.4 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.5 Use caution when working with particle board. Use dust collectors and high quality respirator masks.

.6 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.7 Countersink bolts where necessary to provide clearance for other work.

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 Waste Management: separate waste materials for recycling in accordance with

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Aluminum Association (AA)

.1 AA-DAF-45-03, Designation System for Aluminum Finishes.

.2 ASTM International

.1 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM E96/E96M-10, Standard Test Methods for Water Vapor Transmission of Materials.

.3 Canadian General Standards Board (CGSB)

.1 CGSB 41-GP-6M, Sheets, Thermosetting Polyester Plastics, Glass Fibre Reinforced.

.4 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act (CEPA), 1999 (R2008)

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

.1 Material Safety Data Sheets (MSDS).

.6 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - current edition.

.7 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act (TDGA), 1992.

.8 Underwriters Laboratories' of Canada (ULC)

.1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.2 CAN/ULC-S702-09, Standard for Thermal Insulation, Mineral Fibre for Buildings.

.3 CAN/ULC-S704-2011, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

.4 CAN/ULC-S706-09, Standard for Wood Fibre Insulating Boards for Buildings.

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 [cementitious materials] and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 26 - Health and Safety Requirements. Indicate VOC's for cementitious materials.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta Canada.

.1 Indicate dimensions, wall openings, head, jamb, sill and mullion detail, materials and finish, anchor details, compliance with design criteria and requirements of related work.

.4 Samples:

.1 Submit duplicate 100 x 150 mm samples of wall system, representative of materials, finishes and colours.

1.3 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 off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect cementitious panels from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

1.4 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets (MSDS) acceptable to Labour Canada.

Part 2 Products

2.1 DESIGN REQUIREMENTS

2.2 MATERIALS

.1 Cementitious Board:

.1 Consist of cement, recycled content and cellulose fiber formed under high pressure into boards with integral surface texture; complying with ASTM C 1186 Type A Grade ll; machined edges; for nail attachment.

.2 Surface Burning Characteristics: Flame spread index of 0, smoke developed index of 5, maximum; when tested in accordance with ASTM E 84 (Class I/A).

.3 Flammability: Noncombustible, when tested in accordance with ASTM E 136.

.4 Flexural Strength: At least 1450 psi (10 MPa) when in equilibrium condition, and at least 1015 psi (7 MPa) when in wet condition, tested in accordance with ASTM C 1185.

.5 Coefficient of Thermal Expansion: Less than 1 x 10 -5/inch/inch/degree F (0.5 x 10 -5/degree C), when tested in accordance with ASTM E 228.

.6 Freeze Thaw Resistance: At least 80 percent flexural strength retained, when tested in accordance with ASTM C 1185.

.7 UV Resistance: No cracking, checking, or erosion, when tested for 2000 hours in accordance with ASTM G 26.

.8 Water Tightness: No water droplets on underside, when tested in accordance with ASTM C 1185.

.9 Field Finish Paint: 100 percent acrylic latex as specified in Section 09 91 10.

.10 Factory Finish: Factory applied.

.2 SPEC NOTE: For aged thermal resistance values of various closed-cell insulating foam products including extruded polystyrene, polyurethane and polyisocyanurate, spec writer may refer to CAN/ULC-S770 Standard Test Method For Determination of Long-Term Thermal Resistance (LTTR) of Closed-Cell Thermal Insulating Foams.

.3 Provide the following trim:

.1 Starter strip for lap siding.

.2 Outside corners, butted to siding.

.3 Outside corners, overlapping siding.

.4 Fascia board.

.4 Sealant: Paintable, 100 percent acrylic latex caulk complying with ASTM C 920, and as per Section 07 92 00.

.5 Sheet Metal Flashing: Minimum 26 gauge hot-dipped galvanized steel sheet, or coated aluminum, and as per Section 07 62 00.

.6 Nails: Length as required to penetrate minimum 32 mm into solid backing; hot-dipped galvanized or stainless steel.

.7 Air Barrier: As per Section 07 27 00.

.8 Field Finish Paint: 100 percent acrylic latex as recommended by the manufacturer.

.9 Sealant: Refer to Section 07 92 00, 100% percent acrylic latex caulk complying with ASTM C920.

.10 Sheet Metal Flashing: Refer to Section 07 62 00.

.11 Install battens and trims boards as per Manufacturer written instructions.

.12 Fasteners: cadmium plated steel, purpose made, self tapping.

.13 Gaskets: soft pliable vinyl extruded profile.

.14 Adhesive: purpose made, waterproof, contact type, cured resilient without final set.

.15 Adhesives: VOC limit 250 g/L maximum to GS-36.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable in accordance with manufacturer's written instructions.

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

3.2 INSTALLATION

.1 Protect surface of metals in contact with concrete, mortar, plaster or other cementitious surface with isolation coating.

.2 Touch up building framing members with primer as required.

.3 Apply compression gaskets to framing members.

- .1 Do not stretch gaskets during application.

.4 Install framing mullions and battens.

- .1 Secure to building framing system with screws. Install sub-girt supports at panel joints.
- .2 Ensure flatness and alignment to specified tolerances.

.5 Install head and sill flashings, edge trim, cap pieces and fillers.

.6 Insert prefinished panels and plastic sheets into framing system, tight and flush against gasket, ensuring full contact.

- .1 Glaze and seal weathertight.

.7 Install cap/trim pieces after panels are centred in framing opening, corner mullions and control/expansion joints as indicated.

.8 Seal joints weathertight and airtight.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.

- .1 Wash down exposed acrylic exterior surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.
- .2 Wash down exposed aggregate exterior surfaces using fine water spray.
- .3 Remove excess sealant with recommended solvent.
- .4 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.

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by mineral fibre reinforced panel installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 The Aluminum Association Inc. (AAI)

.1 AAI-Aluminum Sheet Metal Work in Building Construction-2002.

.2 AAI DAF45-03, Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM A167-99(2004), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.2 ASTM A240/A240M-07e1, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

.3 ASTM A606-04, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.

.4 ASTM A653/A653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.5 ASTM A792/A792M-06a, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.6 ASTM B32-04, Standard Specification for Solder Metal.

.7 ASTM D822-01(2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.2 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

.4 Canadian Standards Association (CSA International)

.1 AAMA/WDMA/CSA 101/I.S.2/A440-2008, Standard/Specification for Windows, Doors, and Unit Skylights.

.2 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

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

.1 Material Safety Data Sheets (MSDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 29 - Health and Safety Requirements.

.3 Shop Drawings:

.1 Shop drawings: submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.

.4 Samples:

.1 Submit duplicate mm samples of each type of sheet metal material, finishes and colours.

.5 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

.2 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3, FIELD QUALITY CONTROL.

1.3 QUALITY ASSURANCE

.1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning on-site installation, with Department Representative in accordance with Section 01 32 16.06 - Construction Progress Schedule - Critical Path Method (CPM) to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

1.4 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:

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

Part 2 Products

2.1 SHEET METAL MATERIALS

.1 Zinc coated steel sheet: commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.

.2 Aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, grade 33 with AZ150 coating, extra smooth surface, chemically treated for unpainted finish.

2.2 PREFINISHED STEEL SHEET

.1 Prefinished steel with factory applied polyvinyl chloride.

.1 Class F1S.

.2 Colour selected by Departmental Representative from manufacturer's standard range.

.3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.

.4 Coating thickness: not less than 200 micrometres.

2.3 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Plastic cement: to CAN/CGSB 37.5.

.1 Maximum VOC limit 50 g/L to GSES GS-36.

.3 Underlay for metal flashing: asphalt laminated 3.6 to 4.5 kg kraft paper.

.4 Sealants: Refer to Section 07 92 00 Joint Sealants.

.1 Maximum VOC limit 50 g/L to GSES GS-36.

.5 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

.6 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.

.7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

.8 Flux: rosin, cut hydrochloric acid, or commercial preparation suitable for materials to be soldered.

.9 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

.1 Fabricate aluminum flashings and other sheet aluminum work in accordance with AAI-Aluminum Sheet Metal Work in Building Construction.

.2 Form pieces in 2400 mm maximum lengths.

.1 Make allowance for expansion at joints.

.3 Hem exposed edges on underside 12 mm.

.1 Mitre and seal corners with sealant.

.4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install sheet metal work in accordance with.

.2 Use concealed fastenings except where approved before installation.

.3 Provide underlay under sheet metal.

.1 Secure in place and lap joints 100 mm.

.4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs.

.1 Flash joints using standing seams forming tight fit over hook strips, as detailed.

.5 Lock end joints and caulk with sealant.

.6 Install surface mounted reglets true and level, and caulk top of reglet with sealant.

.7 Insert metal flashing under cap flashing to form weather tight junction.

.8 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.

.9 Caulk flashing at reglet with sealant.

.10 Install pans, where shown around items projecting through roof membrane.

3.3 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.4 CLEANING

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

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM C919-08, Standard Practice for Use of Sealants in Acoustical Applications.

.2 ASTM C834-10 - Standard Specification for Latex Sealants.

.3 ASTM C919-11 - Standard Practice for Use of Sealants in Acoustical Applications.

.4 ASTM C920-13 - Standard Specification for Elastomeric Joint Sealants.

.5 ASTM C1184-13 - Standard Specification for Structural Silicone Sealants.

.6 ASTM C1193-13 - Standard Guide for Use of Joint Sealants.

.7 ASTM C1311-10 - Standard Specification for Solvent Release Sealants.

.8 ASTM C1330-02(2007) - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

.2 Canadian General Standards Board (CGSB)

.1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).

.2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.

.3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).

.4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.

.5 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

.3 General Services Administration (GSA) - Federal Specifications (FS)

.1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.

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

.1 Material Safety Data Sheets (MSDS).

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 joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Manufacturer's product to describe:

.1 Caulking compound.

.2 Primers.

.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

.3 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29 - Health and Safety Requirements.

.3 Samples:

.1 Submit 2 samples of each type of material and colour.

.2 Cured samples of exposed sealants for each colour where required to match adjacent material.

.4 Manufacturer's Instructions:

.1 Submit instructions to include installation instructions for each product used.

1.3 CLOSEOUT SUBMITTALS

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

.2 Operation and Maintenance Data: submit operation and maintenance data 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.

.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 and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect joint sealants from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

1.5 SITE CONDITIONS

.1 Ambient Conditions:

.1 Proceed with installation of joint sealants only when:

.1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.

.2 Joint substrates are dry.

.3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.2 Joint-Width Conditions:

.1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

.1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Health Canada.

Part 2 Products

2.1 SEALANT MATERIALS

.1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.

.2 When low toxicity caulks are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.

.3 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Acrylic latex one part: to CAN/CGSB-19.17, and ASTM C834.

.2 Sealant: Polyurethane base, multi-component, to CAN/CGSB-19.24-M90 type 2, Shore A hardness 20-35.

.3 Preformed compressible and non-compressible back-up materials:

.1 Polyethylene, urethane, neoprene or vinyl foam:

.1 Extruded closed cell foam backer rod.

.2 Size: oversize 30 to 50 %.

.2 High density foam:

.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m^3 density, or neoprene foam backer, size as recommended by manufacturer.

.3 Bond breaker tape:

.1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.

.2 Primer: in accordance with sealant manufacturer's written recommendations.

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 joint sealants installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative .

3.2 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

.1 Sealant:

.1 Apply sealant in accordance with manufacturer's written instructions.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.3 Apply sealant in continuous beads.

.4 Apply sealant using gun with proper size nozzle.

.5 Use sufficient pressure to fill voids and joints solid.

.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 Tool exposed surfaces before skinning begins to give slightly concave shape.

.8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing:

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Clean adjacent surfaces immediately.

.3 Remove excess and droppings, using recommended cleaners as work progresses.

.4 Remove masking tape after initial set of sealant.

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

3.8 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by joint sealants installation.

3.9 SCHEDULE

.1 Remove existing joint sealants and replace with new joint sealant in the following locations:

.1 Penetrations through the walls,

.2 Around windows.

.3 Changes in the material (metal flashing to brick).

.4 Colour to joint sealant to be selected by Departmental Representative.

.2 Replace existing control joints with new backer rod, and joint sealants on all surfaces that are being repointed.

.1 Colour to joint sealant to be selected by Departmental Representative.

.3 Types:

.1 Windows: Polyurethane.

.2 Masonry: Polyurethane.

.3 Metal flashing: Acrylic.

END OF SECTION

1. General

1.1 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1	ASTM D412-2016	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension
.2	ASTM D903-98 (2004)	Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
.3	ASTM E96/E96M-05	Standard Test Methods for Water Vapor Transmission of Materials

.2 Canadian General Standards Board (CGSB):

.1	CAN/CGSB 37-GP-56M	Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Coordination:

.1 Select products to be compatible with adjoining membranes previously installed under related Sections.

.2 Select products from a single manufacturer, or products which are compatible, from different manufacturers.

.2 Sequencing and Scheduling:

.1 If climatic conditions may result in condensation between membranes and substrates, schedule installation of insulation to immediately follow installation of membranes.

.2 Install membranes over joints and gaps before installing membranes over adjacent substrates.

.3 Install membrane on sloped roofs after installation of membrane on walls, to provide a lap over wall membrane.

.4 Unless membrane will be adhered directly to window frames or other components fitted into openings, install membrane before installation of such components.

.5 Provide reasonable notice to Owner to allow inspection of completed installation prior to concealing work of this Section.

1.3 SUBMITTALS

.1 Comply with requirements of Division 01.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit product data illustrating membranes and accessory materials and indicating compliance with specified requirements.

.3 Submit statement from manufacturer(s), indicating products supplied under this Section are compatible with one another and with products previously installed under the work of related Sections.

.3 Samples:

.1 Provide duplicate 200 mm x 200 mm samples of membrane adhered to all project substrates, including adjoining membranes specified in other Sections.

1.4 QUALITY ASSURANCE

.1 Inspection Agencies:

.1 Owner will engage and pay for inspection services. This inspection is not intended to replace or limit, in any way, Contractor's quality control procedures.

.2 Provide reasonable notice to the Owner to allow for inspection of each stage of the work of this Section.

.2 Mock-ups

.1 Prior to installation of system, provide minimum 2.4 m x 2.4 m site mock-up showing methods of attachment, terminations at wall openings and penetrations, reveals, custom shapes, flashings, joints, colours and textures required.

.2 Approved mock-up will establish a minimum standard. Mock-up may be incorporated into finished work of this Section. Retain and maintain mock-up for reference during construction. Promptly remove rejected mock-ups from site.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Deliver and store materials, undamaged in original wrappings, in a suitable environment.

.2 Storage and Handling Requirements:

.1 Provide adequate protection of materials and work of this section from damage by weather and other causes.

.3 Waste Management and Disposal:

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

1.6 SITE CONDITIONS

.1 Apply materials under environmental conditions recommended by manufacturer.

.2 Ensure substrates temperatures and ambient air temperatures are within range recommended by membrane manufacturer. Provide hoarding and temporary heating if required.

2. Products

2.1 SHEET MEMBRANE

.1 Material: styrene-butadiene-styrene (SBS) modified bitumen, premanufactured sheet, with manufacturer's standard reinforcement, compatible with substrates and adjoining membranes, and specifically designed for air and vapour seal application.

.2 Sheet Seal- Self adhering, rubberized asphalt integrally bonded to high density polyethylene film.

.3 Liquid Seal: elastometric bitumen, synthetic rubber, or polymer-modified; either sprayed or rolled on.

.4 Sheet Retarder: to ASTM E1745 Class A, for horizontal use below grade, under concrete slabs, complete with manufacturer’s compatible joint tape and mastic.

2.2 JOINT MEMBRANE

.1 Material, Method of Adhesion, and Performance: same as Sheet Membrane, except elongation at break, in machine and cross-direction, shall be minimum 50%.

2.3 ACCESSORY MATERIALS

.1 Primers, Sealants, Adhesives, Surface Conditioners and Mastic: proprietary to self-adhesive membrane product and water-based, and as recommended by membrane manufacturer, compatible with substrates, including, but not limited to, the following:

.1 Metal substrates.

.2 Concrete which may contain form release agents.

.3 Wood substrates to which preservative or fire retardant treatment has been applied.

3. Execution

3.1 EXAMINATION AND PREPARATION

.1 Verify substrate conditions are acceptable before starting installation of membranes.

.2 Prepare substrate surfaces in accordance with membrane manufacturer's printed recommendations.

.3 Apply primer to substrates to receive membranes, in accordance with manufacturer's recommendations.

3.2 INSTALLATION, GENERALLY

.1 Install membranes in accordance with membrane manufacturer's recommendations, and to ensure continuity of air and vapour seal. Neatly trim membrane terminations.

.2 Lap horizontal membrane joints to shed water to exterior.

.3 Install Sheet Membrane over Joint Membrane installed over joints and gaps.

.5 The following are unacceptable:

.1 Fishmouths and folds.

.2 Blisters and bulges.

.3 Insufficient overlaps.

.4 Inadequate adhesion.

.5 Punctures, tears, cuts.

.6 Other similar defects.

3.3 INSTALLATION OVER JOINTS AND GAPS

.1 Install Joint Membrane, minimum 200 mm wide, centred over joints and gaps.

.2 Lap ends of Joint Membranes minimum 150 mm.

.3 Do not loop Joint Membranes into joints.

3.4 INSTALLATION ON WALLS

.1 Install Sheet Membrane on walls.

3.5 INSTALLATION AT PENETRATIONS

.1 Cut membrane to ensure it is installed tight to penetrations.

.2 Provide flanged membrane collar around mechanical and electrical penetrations. Flange shall be at plane of surrounding membrane.

.3 Apply mastic where membrane has been cut to fit around penetrations.

3.6 PROTECTION OF FINISHED WORK

.1 Do not permit adjacent Work to damage Work of this Section.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 AAMA/WDMA/CSA 101/I.S.2/A440 - NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights.

.2 CSA-A440S1 - Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS - North American Fenestration Standard/Specification for windows, doors, and skylights.

.3 AAMA 303 - Voluntary Specification for Rigid Polyvinyl Chloride (PVC) Exterior Profiles.

.4 ASTM D4726 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Exterior-Profile Extrusions Used for Assembled Windows and Doors.

.5 CAN/CSA-A440.4-07 (R2012) - Window, Door, and Skylight Installation.

1.2 SYSTEM DESCRIPTION

.1 Windows: Extruded tubular plastic sections, prefinished aluminum exterior trim, factory fabricated, vision glass, related flashings, anchorage, and attachment devices.

.2 Configuration: Refer to drawings.

.3 Forced Entry Resistance: Conform to ASTM F588, Type B, Type E.

1.3 PERFORMANCE REQUIREMENTS

.1 Conform to performance requirements of AAMA/WDMA/CSA 101/I.S. 2/A440, CSA A440S1 and National Building Code of Canada, 2015, Part 9, for region project is located in.

.2 Energy Star qualified for Zone 2: One of the following:

.1 Minimum Energy Rating (ER): 29 at maximum U-factor of 2.00 w/mP2P•K, .2 Maximum U-factor: 1.40 W/mP2P•K at minimum Energy Rating (ER) of 21.

.3 System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

.4 Air and Vapour Seal: Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound. Position thermal insulation on exterior surface of air barrier and vapour retarder.

.5 Thermal Movement: Design sections to permit movement caused by thermal expansion and contraction of plastic to suit glass, infill, and perimeter opening construction.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Submission procedures.

.2 Product Data: Provide component dimensions, anchorage and fasteners, glass, and internal drainage details.

.3 Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work; and installation requirements.

1.5 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submission procedures.

1.6 CLOSEOUT SUBMITTALS

.1 Section 01 78 00: Submission procedures.

1.7 QUALITY ASSURANCE

.1 Products of This Section: Manufactured to [ISO 9000] [ISO 14000] certification requirements.

.2 Comply with AAMA/WDMA/CSA-101/I.S.2/A440 and Canadian Supplement CSA-A440S1.

.3 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

.4 Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience and approved by the manufacturer.

1.8 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Protect finished surfaces. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

.3 Jig, brace, and box the window frame assemblies for transport to minimize flexing of members or joints.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Do not install sealants when ambient temperature is less than 5 degrees C.

.2 Maintain this minimum temperature during and after installation of sealants.

1.10 WARRANTY

.1 Correct defective Work within a five (5) year period after Date of Substantial Completion.

.2 Provide ten (20) year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same.

.3 Provide twenty (20) year manufacturer's warranty for vinyl component replacement against bowing, cracking, chipping, peeling, blistering or corrosion.

.4 Warranty: Provide (10) year manufacturer's warranty for degradation of exterior colour finish.

Part 2 Products

2.1 MANUFACTURERS

.1 Design, materials, construction and finish of casework and support structures specified are the minimum acceptable standard of quality.

.2 Acceptable manufacturers, subject to compliance with requirements:

.1 North Star 4000 Series Hybrid

.2 Ply Gem; Design Series

.3 All Weather Windows; Apex 9950 Series

2.2 MATERIALS

.1 Plastic windows can be specified by proprietary methods, AAMA or ASTM standard. NAFS requires compliance with the requirements of ASTM D4726 and AAMA 303 for colour hold and weatherability only.

.2 .1 Plastic: ASTM D4726, AAMA 303, hollow tubular sections of extruded polyvinyl chloride (PVC) with integral ultra-violet resistant colour coating.

.3 .2 Fasteners: Galvanized steel.

2.3 COMPONENTS

.1 Frames: 4T83 mm 4T wide profile; applied glass stops for interior glazing application.

.2 Mullion: 4T83 mm 4T profile.

.3 Perimeter Trim: Narrow, 32 mm deep profile, 1.0 mm nominal wall thickness, extruded aluminum with nailing fin; sloped for positive wash at sill; weathering fit into frame profile; one piece full width, height of opening.

.4 Frame extensions: tubular plastic, to suit wall thickness.

.5 Weep Holes: horizontal slotted holes with two piece hood and operable flap.

.6 Fasteners: Galvanized steel.

2.4 GLASS AND GLAZING MATERIALS

.1 Glass and Glazing Materials: Dual Pane 5 mm Tempered Glass, Low-e Hard Coat Surface Three, Argon filled sealed units

2.5 SEALANT MATERIALS

.1 Incorporate sealant materials by direct reference to Section 07 92 00. The following paragraphs only describe sealant type; coordinate with schedule in Section 07 92 00. Sealants used for glazing are specified in Section 08 80 50.

.2 Installation Sealant and Backing Materials: Pecora 896HIS (High Impact Silicone), Black, Aluminum Stone, Translucent

2.6 FABRICATION

.1 Fabricate in accordance with CSA-A440/A440

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 71 00: Verify existing conditions before starting work.

.2 Verify wall openings and adjoining air and vapour seal materials are ready to receive work of this Section.

3.2 INSTALLATION

.1 Install frames, glass and glazing to manufacturer's written instructions.

.2 Install window assembly in accordance with CAN/CSA-A440.4.

.3 Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

.4 Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

.5 Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

.6 Coordinate attachment and seal of perimeter air and vapour barrier materials.

.7 Install operating hardware.

3.3 ERECTION TOLERANCES

.1 Material and Unit Size Tolerances: As specified in AMA/WDMA/CSA/101/I.S.2/A440.

3.4 ADJUSTING

.1 Adjust hardware for smooth operation and secure weathertight closure.

3.5 CLEANING

.1 Remove protective material from pre-finished surfaces.

.2 Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.

.3 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 AA (Aluminum Association) DAF 45-2003 - Designation System for Aluminum Finishes.

.2 AAMA CW-10-12 - Care and Handling of Architectural Aluminum from Shop to Site.

.3 AAMA CW-11-85 - Design Windloads for Buildings and Boundary Layer Wind Tunnel Testing.

.4 AAMA/WDMA/CSA 101/I.S.2/A440-11 - NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights.

.5 AAMA 611-12 - Voluntary Specification for Anodized Architectural Aluminum.

.6 AAMA 1503-09 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections.

.7 AAMA 2603-02 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

.8 AAMA 2605-11 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

.9 ASTM A123/A123M-12 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.10 ASTM B209M-10 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.11 ASTM B209M-10 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.12 ASTM B221M-12a - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.13 ASTM B221-12a - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.14 ASTM E283-04(2012) - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.15 ASTM E330-02(2010) - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.16 ASTM E331-00(2009) - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

.17 ASTM F588-07 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact.

.18 CSA-A440S1-09 - Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS - North American Fenestration Standard/Specification for windows, doors, and skylights.

.19 CAN/CSA-A440.2-09/A440.3-09 - Fenestration Energy Performance/User Guide to CSA-A440.2-09, Fenestration Energy Performance.

.20 CAN/CSA-A440.4-07 (R2012) - Window, Door, and Skylight Installation.

.21 MPI (Master Painters Institute) - Architectural Painting Specifications Manual and Maintenance Repainting Manual.

1.2 SYSTEM DESCRIPTION

.1 Windows: Tubular aluminum sections, factory fabricated, factory finished, vision glass, infill panels, related flashings, anchorage and attachment devices.

.2 Configuration: Fixed sash.

.3 Glazing: Exterior.

1.3 PERFORMANCE REQUIREMENTS

.1 Windows: Conform to AAMA/WDMA/CSA/101/I.S.2/A440 and CSA-A440S1, Product Designation Class LC-PG25-HS; and labeled by AAMA, CSA or WDMA.

.2 Water Leakage: None, when measured in accordance with ASTM E331.

.3 System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

.4 Air and Vapour Seal: Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound. Position thermal insulation on exterior surface of air barrier and vapour retarder.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Submission procedures.

.2 Product Data: Provide component dimensions, anchorage and fasteners, glass, and internal drainage details.

.3 Shop Drawings: Indicate opening dimensions, framed opening tolerances, and affected related work; installation requirements.

1.5 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submission procedures.

.2 Manufacturer's Certificate: Certify that Products meet or exceed performance criteria tests.

1.6 CLOSEOUT SUBMITTALS

.1 Section 01 78 00: Submission procedures.

1.7 QUALITY ASSURANCE

.1 Comply with AAMA/WDMA/CSA-101/I.S.2/A440 and Canadian Supplement CSA-A440S1.

.2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

.3 Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience and approved by the manufacturer.

1.8 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Protect factory finished aluminum surfaces with [strippable coating] [wrapping]. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Section 01 35 43: Environmental conditions affecting products on site.

.2 Do not install sealants when ambient temperature is less than <5 degrees C

.3 Maintain this minimum temperature during and after installation of sealants.

1.10 WARRANTY

.1 Section 01 78 00: Warranties.

.2 Correct defective Work within a five (5) year period after Date of Substantial Completion.

.3 Provide five (5) year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same.

.4 Warranty: Include coverage for degradation of colour finish.

Part 2 Products

2.1 MATERIALS

.1 Extruded Aluminum: ASTM B221M; 6063-T5 alloy and temper.

.2 Sheet Aluminum: ASTM B209M; alloy and temper.

.3 Steel Sections: Profiled to suit mullion sections.

.4 Fasteners: Galvanized steel.

2.2 COMPONENTS

.1 Frames: Aluminum, thermally broken, profile size as required, applied glass stops of screw fastened type.

.2 Sills: extruded aluminum; sloped for positive wash; fit under sash leg to 13 mm beyond wall face; one-piece full width of opening jamb angles to terminate sill end.

.3 Fasteners: Galvanized steel.

2.3 GLASS AND GLAZING MATERIALS

.1 Glass and Glazing Materials: As specified in Section 08 80 50.

2.4 SEALANT MATERIALS

.1 Sealant and Backing Materials: As specified in Section 07 92 00.

2.5 FABRICATION

.1 Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

.2 Accurately fit and secure joints and corners. Make joints flush, hairline and weatherproof.

.3 Prepare components to receive anchor devices. Fabricate anchors.

.4 Arrange fasteners and attachments to ensure concealment from view.

.5 Permit internal drainage weep holes and channels to migrate moisture to exterior. Provide internal drainage of glazing spaces to exterior through weep holes.

.6 Factory glaze window units.

2.6 FINISHES

.1 Clear Anodic Coating: AAMA 611,[Class I, AA-M12C22A41.

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 70 00: Verify existing conditions before starting work.

.2 Verify wall openings and adjoining air and vapour seal materials are ready to receive work of this Section.

.3 Contractor to provide pictures of existing wall opening and concrete sill once existing windows are removed.

3.2 INSTALLATION

.1 Install window frames and glazing to manufacturer's written instructions.

.2 Install window assembly to CAN/CSA-A440.4.

.3 Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

.4 Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

.5 Install sill and sill end angles.

.6 Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

.7 Coordinate attachment and seal of perimeter air barrier and vapour retarder materials.

.8 Install operating hardware.

.9 Install glass and infill panels as specified in Section 08 80 50, to glazing method required to achieve performance criteria.

.10 Install glass and infill panels as specified in Section 08 80 50, exterior wet/dry method of glazing.

.11 Install perimeter sealant to method required to achieve performance criteria backing materials, and installation criteria as specified in Section 07 92 00.

3.3 ERECTION TOLERANCES

.1 Section 01 73 00: Tolerances.

.2 Material and Unit Size Tolerances: As specified in AAMA/WDMA/CSA/101/I.S.2/A440.

3.4 ADJUSTING

.1 Adjust hardware for smooth operation and secure weathertight closure.

3.5 CLEANING

.1 Section 01 74 00: Cleaning installed work.

.2 Remove protective material from factory finished aluminum surfaces.

.3 Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.

.4 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 AAMA 303-08 - Voluntary Specification for Rigid Polyvinyl Chloride (PVC) Exterior Profiles.

.2 AAMA/WDMA/CSA 101/I.S.2/A440-11 - NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights.

.3 CSA-A440S1-09 - Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS - North American Fenestration Standard/Specification for windows, doors, and skylights.

.4 ASTM D4726-09 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Exterior-Profile Extrusions Used for Assembled Windows and Doors.

.5 ASTM E283-04(2012) - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.6 ASTM E330-02(2010) - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.7 ASTM E331-00(2009) - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

.8 ASTM E1105-00 (2008) - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.

.9 ASTM F588-07 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact.

.10 CAN/CSA-A440.2-09/A440.3-09 - Fenestration Energy Performance/User Guide to CSA-A440.2-09, Fenestration Energy Performance.

.11 CAN/CSA-A440.4-07 (R2012) - Window, Door, and Skylight Installation.

.12 SMA 1201R-2012 - Specification for Insect Screens for Windows, Sliding Doors, and Swinging Doors.

.13 WDMA I.S.4-09 - Industry Specification for Preservative Treatment for Millwork.

1.2 SYSTEM DESCRIPTION

.1 Windows: Wood metal clad sections, factory fabricated, vision glass, related flashings, anchorage and attachment devices.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Section 01 31 00: Project management and coordination procedures.

.2 Pre-Installation Meeting: Convene one (1) week before starting work of this section.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Submission procedures.

.2 Product Data: Provide component dimensions, anchorage and fasteners, glass, internal drainage details.

.3 Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work; installation requirements.

1.5 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submission procedures.

.2 Test Reports: Submit substantiating engineering data, test results of previous tests [by independent laboratory] which purport to meet performance criteria, and other supportive data.

1.6 CLOSEOUT SUBMITTALS

.1 Section 01 78 00: Submission procedures.

1.7 QUALITY ASSURANCE

.1 Products of This Section: Manufactured to ISO 9000 certification requirements.

.2 Comply with AAMA/WDMA/CSA-101/I.S.2/A440 and Canadian Supplement CSA-A440S1.

.3 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

.4 Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience and approved by the manufacturer.

1.8 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Protect factory finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Section 01 35 43: Environmental conditions affecting products on site.

.2 Do not install sealants when ambient temperature is less than <5 degrees C.

.3 Maintain this minimum temperature during and after installation of sealants.

1.10 WARRANTY

.1 Section 01 78 00: Warranties.

.2 Correct defective Work within a five (5) year period after Date of Substantial Completion.

.3 Provide five (5) year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same.

.4 Warranty:

.1 Include coverage for degradation of colour finish.

.2 Warranty: Include coverage for delamination or separation of finish cladding from window member.

Part 2 Products

2.1 MATERIALS

.1 Wood: Clear cedar species, clear preservative treated to WDMA I.S.4, of type suitable for transparent or opaque interior finish.

.2 Metal Cladding (Exterior Surface): Formed aluminum factory finished, factory fit to profile of wood members, and exterior exposed surfaces.

2.2 COMPONENTS

.1 Frames: Wood, applied glass stops of screw fastened type.

.2 Exterior Sills: Brake formed aluminum, sloped for positive wash; fit under sash to project beyond wall face; one piece full width of opening.

.3 Interior Sills: Wood; one piece full width of opening.

.4 Insect Screens: To meet performance requirements with rolled aluminum frame of rectangular sections; 14/18 strands; mesh size.

.5 Operable Sash Weather Stripping: Nylon pile; permanently resilient, profiled to effect weather seal.

.6 Fasteners: Galvanized steel steel.

2.3 GLASS AND GLAZING MATERIALS

.1 Glass and Glazing Materials: As specified in Section 08 80 50.

2.4 SEALANT MATERIALS

.1 Sealant and Backing Materials: As specified in Section 07 92 00.

2.5 HARDWARE

.1 Hardware: Except as noted, comply with the the requirements of BHMA A156.18.

.2 Double Hung Sash: Metal and nylon spiral friction slide cylinder, each sash, each jamb.

.3 Sash lock: Lever handle with cam lock.

.4 Operator: Geared rotary handle fitted to projecting sash arms with limit stops.

.5 Projecting Sash Arms: Zinc plated steel, friction pivot joints with nylon bearings, removable pivot clips for cleaning.

2.6 FABRICATION

.1 Fabricate sash members joints. Glue and steel pin joints to hairline fit, weather tight.

.2 Form sills in one piece. Slope sills for wash.

.3 Form glass stops of match solid wood, sloped for wash.

.4 Provide weather stop flange for perimeter of unit.

.5 Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet allowing installation and dynamic movement of perimeter seal.

.6 Arrange fasteners to be concealed from view.

.7 Permit internal drainage weep holes and channels to migrate moisture to exterior. Provide internal drainage of glazing spaces to exterior through weep holes.

.8 Assemble insect screen frame, mitre and reinforced frame corners. Fit mesh taut into frame and secure. Fit frame with four (4) spring loaded steel pins.

.9 Double weatherstrip operable units.

.10 Factory glaze window units.

2.7 FINISHES

.1 Exterior Surfaces: Factory painted.

.2 Interior Surfaces: as specified in Section 09 91 99.

.1 Filler coat (for open grained wood only).

.2 Two (2) coats of polyurethane, gloss.

.3 Screens: Black.

.4 Operators: black baked enamel.

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 71 00: Verify existing conditions before starting work.

.2 Verify wall openings and adjoining air and vapour seal materials are ready to receive work of this section.

.3 Contractor to provide pictures of existing wall opening and concrete sill once existing windows are removed.

3.2 INSTALLATION

.1 Install frames, hardware, glass and glazing to manufacturer's written instructions.

.2 Install window assembly to CAN/CSA-A440.4.

.3 Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

.4 Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

.5 Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

.6 Coordinate attachment and seal of perimeter air and vapour barrier materials.

.7 Install operating hardware.

.8 Install glass and infill panels to Section 08 80 50, to glazing method required to achieve performance criteria.

.9 Install perimeter sealant to method required to achieve performance criteria backing materials, and installation criteria in accordance with Section 07 92 00].

3.3 ERECTION TOLERANCES

.1 Section 01 73 00: Tolerances.

.2 Material and Unit Size Tolerances: As specified in AAMA/WDMA/CSA/101/I.S.2/A440.

3.4 ADJUSTING

.1 Adjust hardware for smooth operation and secure weathertight closure.

3.5 CLEANING

.1 Section 01 74 11: Cleaning installed work.

.2 Remove protective material from factory finished surfaces.

.3 Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.

.4 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM):

.1 ASTM A653/A653M-15e1, Standard Specification for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvanannealed) by the Hot-Dip Process

.2 ASTM D3917-15a, Standard Specification for Dimensional Tolerance of Thermosetting Glass-Reinforced Plastic Pultruded Shapes

.3 ASTM D3918-2011, Standard Terminology Relating to Reinforced Plastic Pultruded Products

.4 ASTM E90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.2 Canadian Standards Association (CSA):

.1 AAMA/WDMA/CSA 101/I.S.2/A440 - NAFSCSA A440.2-2011, Energy Performance Evaluation of Windows and Other Fenestration Systems

.2 CSA G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles

.3 CAN/CSA-A440.2-09/A440.3-09 - Fenestration Energy Performance/User Guide to CSA-A440.2-2014, Fenestration Energy Performance.

.4 CAN/CSA-A440.4-07 (R2012) - Window, Door, and Skylight Installation.

.3 Insulating Glass Manufacturer's Alliance (IGMA):

.1 TM-3000 (97), Glazing Guidelines for Sealed Insulating Glass Units

.4 American Architectural Manufacturers Association

.1 AAMA CW-10-12 Care and Handling of Architectural Aluminum from Shop to Site.

.2 AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field

1.2 SYSTEM DESCRIPTION

.1 Windows: Pultruded tubular fibre glass sections, factory fabricated, vision glass, related flashings, anchorage and attachment devices.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Section 01 31 00: Project management and coordination procedures.

1.4 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Submission procedures.

.2 Product Data: Provide component dimensions, anchorage and fasteners, glass, internal drainage details.

.3 Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work; installation requirements.

1.5 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submission procedures.

1.6 CLOSEOUT SUBMITTALS

.1 Section 01 78 00: Submission procedures.

.2 Manufacturer's Certificate: Certify that Products meet or exceed performance criteria tests.

1.7 QUALITY ASSURANCE

.1 Standards And Tests:

.1 All tests of this Section do not need to be performed if documentation is submitted from a recognized testing agency showing relevant testing numbers.

.2 Glazing Unit and Frame:

.1 Submit, with shop drawings, test data, from a recognized testing agency, that shows the following window performance characteristics:

.1 Thermal transmission coefficient;

.2 Condensation resistance; and

.3 Sound transmission loss characteristic.

.2 Tests shall have been conducted in accordance with CAN/CSA-A440 and must meet the standards Item 2.3 Window Performance Ratings of this section on a representative sample of a complete window unit (frame plus glazing unit), Contractor responsibility.

.3 Submit with shop drawings data showing glazing unit shading coefficient and visible light transmission values.

.4 Pressure test each glazing unit to verify the air tightness of all joints such as those between glass panes and spacers and air vapour barrier; submit, upon request, reports showing test results for each glazing unit.

.2 Mock-Ups:

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

.2 Locate where directed by Consultant.

.3 Curtain Wall Mock-up:

.1 Testing shall comply with and be conducted in accordance with the procedures laid out in AAMA Standard 501, Method of Test for Metal Curtain Walls.

.2 Test mock-up curtain wall for resistance to air infiltration, resistance to static and dynamic water penetration and structural performance under uniform loading.

.3 The mock-up curtain wall will be assumed to have passed these tests if its performance is shown to be as good as, or better than, the following:

Air Infiltration AAMA/WDMA/CSA 101/I.S.2/A440 - NAFSCSA A440.2-04:	A3 Rating, or 0.2 L/s/m2 at 300 Pa differential
Water Penetration AAMA/WDMA/CSA 101/I.S.2/A440 - NAFSCSA A440.2-04	B7 Rating
Structural Performance - Deflection AAMA/WDMA/CSA 101/I.S.2/A440 - NAFSCSA A440.2-04:	C5 Rating

.4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

.3 Certification:

.1 Provide written certification by a Professional Engineer registered in the area having jurisdiction that the curtain wall system complies with the applicable Building Code and that it is suitable for use on this building.

1.8 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Protect finished surfaces with [rapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

.3 Jig, brace, and box the window frame assemblies for transport to minimize flexing of members or joints.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Section 01 35 26: Environmental conditions affecting products on site.

.2 If dry glazing methods are utilized, delete this article.

.3 Deliver, store, handle and protect materials in accordance with Section 01 61 00.

.4 Handle work of this section in accordance with AAMA CW-10-12 Care and Handling of Architectural Aluminum from Shop to Site.

.5 Protect prefinished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.10 WARRANTY

.1 Section 01 78 00: Warranties.

.2 Correct defective Work within a five (5) year period after Date of Substantial Completion.

.3 Provide five (5) year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same.

.4 Warranty: Include coverage for degradation of colour finish.

Part 2 Products

2.1 DESIGN CRITERIA

.1 Materials, fabrication, attachments, accessories, assembly and performance, other than thermal performance, shall meet or exceed applicable requirements of AAMA/WDMA/CSA 101/I.S.2/A440 - NAFSCSA A440.2.

.2 Thermal performance shall be determined in conformance with AAMA/WDMA/CSA 101/I.S.2/A440 - NAFSCSA A440.2.

.3 Design curtainwall to equalize both positive and negative pressure between outside air cavities surrounding insulating glass units.

.4 Design curtainwall to provide drainage from spaces around insulating glass units to exterior.

.5 Design windows to protect drainage openings from direct entrance of wind-driven rain by use of baffles or other protection.

.6 Design components to minimize and accommodate thermally induced movement.

.7 Curtain wall system constructed so that glazing unit can be removed and replaced from outside of building.

2.2 CURTAINWALL PERFORMANCE

.1 Values shall be derived using recognized computer analysis programs such as WINDOW 6

.2 Thermal Transmission Coefficient: per AAMA 1503.1;

.1 U-Value = 0.85 $W/m^2°C$ for overall window (glazing unit plus frame).

2.3 OPERABLE FRAME AND SASH PERFORMANCE

.1 Incorporate glass or plastic and glazing materials by direct reference to Section 08 80 50. The following paragraphs only describe glass or plastic types; coordinate with schedule in Section 08 80 50.

.2 Meet or exceed requirements of AAMA/WDMA/CSA 101/I.S.2/A440 - NAFS, and the following performance requirements:

.3 Air Tightness Rating, Operable Windows: A3.

.4 Water Tightness Rating: B7.

.5 Wind Load Resistance Rating: C4.

.6 Forced Entry: F2, pass test for resistance to forced entry.

.7 Glazing: as indicated in this Section.

.8 Overall Operable Window U-Value: maximum 1.0 W/m^2 °C.

2.4 MATERIAL AND CONSTRUCTION, CURTAINWALL FRAME

.1 Construction:

.1 General:

.1 Pultruded composite frame.

.2 Butt joints secured with screws into screw ports or spigot-blocks and sealed with sealant.

.3 Complete system to act as a rain screen so as to drain to exterior any water entering the frame cavity.

.2 Pressure Plate System:

.1 Pultruded composite pressure plate.

.2 Prefinished snap-on extruded aluminum cap.

.2 Flashings: aluminum finish to match curtain wall mullion sections where exposed, gravel stop edge to exterior parapet side, secured with concealed fastening method.

.1 Finish exposed surfaces of aluminum components in accordance with AA DAF45.

.1 Clear anodize finish to Architectural Class I.

.2 Appearance and properties of anodized finishes designated by the Aluminum Association as Architectural Class 1, Architectural Class 2, and Protective and Decorative shall meet requirements of CAN/CSA-A440/A440.1, for coating Classes 1, 2 and 3 respectively.

.3 Air/Vapour Barrier: Connect to existing air and vapour barrier systems.

.4 Material:

.1 Composite: Pultruded FRP

.2 Air Seal Gasket: EPDM extrusions.

.3 Compression and Wedge Gaskets: EPDM extrusions.

.4 Fasteners & Keys: Aluminum, stainless steel, die cast zinc, cadmium plated steel.

.5 Back Section: 145 mm x 61.5 mm

.6 Fibreglass pressure plates

.7 Caps: 63.5 mm x 19mm aluminum caps

.8 Finish:

.1 Exterior and Interior Caps, and sills: clear anodic finish, Architectural Class I.

.2 Back Sections: Raw Dark Grey

2.5 ACCESSORIES

.1 Steel Reinforcement: sheet steel to ASTM A653M, hot dip galvanized, minimum Z275 coating designation.

.2 Joint Sealants: Section 07 92 00.

.3 Insulating Foam Sealant: one-part polyurethane, closed cell foam, skin-forming type, expanding maximum 25%.

.4 Foam Backer Rod: extruded closed cell backer rod, oversize 30 to 50%.

.5 Flashing: prefinished sheet aluminum, brake formed as indicated on drawings, 1.5 mm thick, concealed fastened.

2.6 INSULATED SPANDREL AREAS

.1 Spandrel glass: to CAN/CGSB-12.9, back-painted glass, low-e, clear, and 6 mm thick.

.1 Type: 2-Heat strengthened.

.2 Class: A-Float.

.3 Organic – applied silicone elastomeric coated.

.4 Form: M-Monolithic

.5 Colour: Black.

.2 Maintain full thermal separation at frame section within spandrel areas to be same or better (lower conductance) than in vision areas.

.3 Back Pan: Satin coated steel in accordance with ASTM A653, 0.91 mm base metal thickness, formed into a pan shape to fit into glazing throat with back of pan flush with inside face of back section.

.4 Insulation: secure insulation in place with manufacturer's standard fixing system to back face of back pan, with front face of insulation at same depth as exterior face of frame thermal break.

.1 Thickness: minimum 125 mm.

.1 Sub-frame section: minimum 100 mm.

.2 Shoulder: minimum 25 mm.

.2 Thermal Insulation Core: high density semi-rigid board insulation.

2.7 FABRICATION, CURTAINWALL FRAME

.1 Difference in length between opposite parallel sides of curtain wall panel shall be no more than:

.1 1.5 mm for panels with a diagonal measurement of 1800 mm or less

.2 3.0 mm for panels with a diagonal measurement over 1800 mm.

.2 Difference in length between the two diagonal measurements of a curtain wall panel shall be no more than:

.1 3.0 mm for panels with a diagonal measurement of 1800 mm or less

.2 4.5 mm for panels with a diagonal measurement more than 1800 mm.

.3 Seal fibreglass framing joints with silicone sealant. Mitre and sash joints at corners.

.4 Steel reinforce vertical and horizontal components of FRP window units as required by Consultant and structural design.

.5 Continuously and uniformly compress length of gaskets during installation, to compensate for linear shrinkage.

Part 3 Execution

3.1 EXAMINATION

.1 Section 01 71 00: Verify existing conditions before starting work.

.2 Verify wall openings and adjoining air and vapour seal materials are ready to receive work of this Section.

.3 Contractor to provide pictures of existing wall opening and concrete sill once existing windows are removed.

3.2 INSTALLATION - GENERAL

.1 Erection Tolerances: Erect all component parts within the following tolerances:

.1 Variations from plumb or angle shown:

.1 3 mm maximum variation in storey height or 3050 mm run, non-cumulative.

.2 Variations from level or slopes shown:

.1 3 mm maximum variation in any column-to-column space or 6100 mm run, non-cumulative.

.3 Variations from theoretical calculated position as located in plan or elevation in relation to established floor lines, column lines and other fixed elements of the structure, including variations from plumb and level:

.1 6 mm maximum variation in any column-to-column space, floor-to-floor height or 6100 mm run.

.4 Offsets in end-to-end or edge-to-edge alignment of consecutive members:

.1 1.5 mm maximum offset in any alignment.

.5 Attach and seal building air-vapour barrier to curtain wall frame as detailed on drawings to maintain continuity of building envelope air-vapour barrier.

.2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

.3 Provide alignment attachments and shims to permanently fasten system to building structure. Clean weld surfaces; apply protective primer to field welds and adjacent surfaces.

.4 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.

.5 Provide thermal isolation where components penetrate or disrupt building insulation.

.6 Install sill flashings.

.7 Coordinate attachment and seal of perimeter air barrier and vapour retarder materials.

.8 Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

.9 Install operating sash in accordance with Section 08 80 50 - Glazing, to interior wet/dry method of glazing.

.10 Install glass and infill panels in accordance with Section 08 80 50 - Glazing, to exterior wet/dry method of glazing.

3.3 INSTALLATION - GLAZING

.1 Clean sealing surfaces at perimeter of glass and sealing surfaces of rabbets and stop beads before applying splines or gaskets. Use solvents and cleaning agents recommended by manufacturer of sealing materials.

.2 Install glazing gaskets uniformly with accurately formed corners and bevels. Ensure that proper contact is made with glass and rabbet interfaces.

.3 Support both lites of glass thermal units on leveled setting blocks, 4 or 6 mm minimum, spaced as recommended by glass manufacturer. Provide at least one setting block at quarter points from each corner. For casement windows, locate setting blocks closer to corners as recommended by manufacturer.

.4 Center glass thermal units in glazing rabbet to maintain 6 mm minimum clearance between edges of glazing and plastic framing at sill or 4 mm minimum clearance between edges of glazing and plastic framing at sill if glazing bite incorporates a drainage channel with a depth of 3 mm minimum.

.5 Size glass thermal units to ensure exposed face of spacer is in line with glazing stops.

.6 Use spacers and shims in accordance with glass manufacturer's recommendations.

3.4 MANUFACTURER’S FIELD SERVICES

.1 Curtainwall product manufacturer to provide field review of the installation of their Products.

.2 Monitor and report installation procedures – report any installation under unacceptable conditions to Departmental Representative.

3.5 CLEANING

.1 Section 01 74 11: Cleaning installed work.

.2 Remove all excess and scrap material and equipment involved in this installation

.3 Remove protective material from prefinished aluminum surfaces.

.4 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

.5 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

3.6 PROTECTION AND ADJUSTING

.1 Adjust operating sash for smooth operation.

.2 Protect finished Work from damage.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM C542-05, Standard Specification for Lock-Strip Gaskets.

.2 ASTM D790-07e1, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

.3 ASTM D1003-07e1, Standard Test Method for Haze and Luminous Transmittance of Plastics.

.4 ASTM D1929-96(R2001)e1, Standard Test Method for Determining Ignition Temperature of Plastics.

.5 ASTM D2240-05, Standard Test Method for Rubber Property - Durometer Hardness.

.6 ASTM E84-10, Standard Test Method for Surface Burning Characteristics of Building Materials.

.7 ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.8 ASTM F1233-08, Standard Test Method for Security Glazing Materials and Systems.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.

.2 CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass.

.3 CAN/CGSB-12.8-97, Insulating Glass Units.

.3 Glass Association of North American (GANA)

.1 GANA Glazing Manual - 2008.

.2 GANA Laminated Glazing Reference Manual - 2009.

.4 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Convene pre-installation meeting 1 week prior to beginning work of this Section on-site installation, with Contractor's Representative, Departmental Representative, Consultant in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's written installation instructions and warranty requirements.

.2 Arrange for site visit with Departmental Representative prior to start of Work to examine existing site conditions adjacent to demolition Work.

.3 Hold project meetings every week.

.4 Departmental Representative will submit written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for glass, sealants, and glazing accessories and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.

.4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 CLOSEOUT SUBMITTALS

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

.2 Operation and Maintenance Data: submit operation and maintenance data for glazing for incorporation into manual.

1.5 QUALITY ASSURANCE

.1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 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 off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect glazing and frames from nicks, scratches, and blemishes.

.3 Protect prefinished aluminum surfaces with wrapping.

.4 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan.

.5 Packaging Waste Management: remove for reuse and return of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.7 AMBIENT CONDITIONS

.1 Ambient Requirements:

.1 Install glazing when ambient temperature is 10 degrees C minimum. Maintain ventilated environment for 24 hours after application.

.2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

Part 2 Products

2.1 MATERIALS

.1 Design Criteria:

.1 Ensure continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:

.1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

.2 Size glass to withstand wind loads, dead loads and positive and negative live loads to ASTM E330.

.3 Limit glass deflection to flexural limit of glass with full recovery of glazing materials.

.2 Insulating Glass Units:

.1 Insulating glass units: to CAN/CGSB-12.8, triple unit.

.1 Glass: to CAN/CGSB-12.3.

.2 Glass coating: low "E".

.3 Inert gas fill: argon.

.3 Sealant: in accordance with Section 07 92 00 - Joint Sealants.

2.2 ACCESSORIES

.1 Setting blocks: neoprene, Shore A durometer hardness to ASTM D2240, to suit glazing method, glass light weight and area.

.2 Spacer shims: silicone, Shore A durometer hardness to ASTM D2240, Self adhesive on one face.

.3 Glazing splines: resilient silicone, extruded shape to suit glazing channel retaining slot, black colour.

.4 Glazing clips: manufacturer's standard type.

.5 Lock-strip gaskets: to ASTM C542.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for glazing installation in accordance with manufacturer's written instructions.

- .1 Verify that openings for glazing are correctly sized and within tolerance.
- .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.
- .3 Visually inspect substrate in presence of Departmental Representative.
- .4 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .5 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

.1 Clean contact surfaces with solvent and wipe dry.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

3.3 INSTALLATION: EXTERIOR - WET METHOD (SEALANT AND SEALANT)

.1 Perform work in accordance with GANA Glazing Manual for glazing installation methods.

.2 Place setting blocks at 1/4 points and install glazing light or unit.

.3 Install removable stops with glazing centred in space by inserting spacer shims both sides at 600 mm intervals, 6 mm below sight line.

.4 Fill gaps between glazing and stops with sealant to depth of bite on glazing, maximum 9 mm below sight line to ensure full contact with glazing and continue air and vapour seal.

.5 Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

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.
  - .1 Remove traces of primer, caulking.
  - .2 Remove glazing materials from finish surfaces.
  - .3 Remove labels.
  - .4 Clean glass and mirrors using approved non-abrasive cleaner in accordance with manufacturer's instructions.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.

.2 Waste Management: separate waste materials for reuse and recycling 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.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 After installation, mark each light with an "X" by using removable plastic tape or paste.

.1 Do not mark heat absorbing or reflective glass units.

.3 Repair damage to adjacent materials caused by glazing installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM C1396/C1396M-09a, Standard Specification for Gypsum Wallboard.

.2 ASTM C475/C475M-02(2007), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

.3 ASTM C514-04(2009)e1, Standard Specification for Nails for the Application of Gypsum Board.

.4 ASTM C645-09a, Standard Specification for Nonstructural Steel Framing Members.

.5 ASTM C754-09a, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

.6 ASTM C840-08, Standard Specification for Application and Finishing of Gypsum Board.

.7 ASTM C954-10, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.122 in. (2.84 mm) in Thickness.

.8 ASTM C1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

.9 ASTM C1047-10, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

.10 ASTM C1178/C1178M-08, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.

.2 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

.3 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S102-07, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

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 gypsum, framing, sealants, and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance 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 and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store materials inside, level, under cover. Protect from weather, damage from construction operations and other causes, in accordance with manufacturer's printed instructions.

.3 Handle materials to prevent damage to edges or surfaces. Protect metal accessories and trim from being bent or damaged.

.4 Store and protect [partition materials] from nicks, scratches, and blemishes.

.5 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

.1 Gypsum Board:

.1 Standard board: to ASTM C1396/C1396M regular, 12.7 mm thick, 1200 mm wide x maximum practical length, ends square cut, edges tapered.

.2 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, 0.5 mm base thickness, perforated flanges, one piece length per location.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions prior to partition installation.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 ERECTION OF GYPSUM BOARD AND ACCESSORIES

.1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.

.2 Install gypsum boards in direction that will minimize number of end-butt joints. Stagger end joints 250 mm minimum.

3.3 APPLICATION

.1 Apply gypsum board after bucks, anchors, blocking, sound attenuation, electrical and mechanical work are approved.

.2 Apply single layer gypsum board to metal furring or framing using screw fasteners. Maximum spacing of screws 300 mm on centre.

3.4 INSTALLATION

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges.

.2 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.

.4 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

3.5 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.

3.6 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by partition installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.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.

.3 Samples:

.1 Submit for review and acceptance of each unit.

.2 Submit 200 x 300 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 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 1 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 requirements.

1.4 SITE CONDITIONS

.1 Heating, Ventilation and Lighting:

.1 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.2 Co-ordinate use of existing ventilation system with Departmental Representative ensure its operation during and after application of paint as required.

.2 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.

.3 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 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

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 - Maintenance Repainting Manual "Approved Product" listing.

.4 Clean rusted components as indicated on the drawings.

.5 Colours:

.1 Submit proposed Colour Schedule to Departmental Representative for review.

.2 Base colour schedule on selection of 5 base colours.

.6 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.

.7 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.

.8 Exterior painting:

.1 Concrete Vertical and Horizontal Surfaces:

.1 EXT 3.1A - Latex gloss finish.

.2 Structural Steel and Metal Fabrications: exposed metal finishes.

.1 EXT 5.1D - Alkyd gloss finish.

.3 Dressed Lumber: doors, door and window frames, casings, battens, smooth facias, etc.

.1 EXT 6.3B - Alkyd gloss finish.

.9 Interior painting:

.1 Plaster and gypsum board: gypsum wallboard, drywall, "sheet rock" type material, etc.

.1 INT 9.2A – Latex semi finish (over latex sealer).

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 interior painting in accordance with 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, except test concrete floors for moisture using simple "cover patch test". 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 items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.2 Surface Preparation:

.1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories 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 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.

.4 Clean and prepare surfaces in accordance with MPI - Maintenance Repainting Manual specific requirements and coating manufacturer's recommendations.

.5 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.

.6 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.

.7 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.

.8 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.

.6 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.

3.5 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 recycling 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.

.4 Place paint defined as hazardous or toxic waste, including tubes and containers, in containers or areas designated for hazardous waste.

3.6 SCHEDULE

.1 Windows to be factory finished.

END OF SECTION