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**Project #: R. 059377.001**

**Okimaw OHCI Healing Lodge,  
Maple Creek, Saskatchewan,  
Spiritual Lodge Roof Replacement**  
Issued for Tender

**Solicitation # E0209-161959/A**



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**Part 1      General**

**1.1      WORK COVERED BY CONTRACT DOCUMENTS**

- .1      Work of this Contract, identified as project R.059377.001 Correctional Services Okimaw Ohci Healing Lodge, Maple Creek, Saskatchewan comprises general construction of the roofing replacement.

**1.2      CONSTRUCTION START**

- .1      Construction to occur Winter of 2015-2016. Contractor to include winter heating and hoarding in Bid.

**1.3      WORK SEQUENCE**

- .1      Construct Work in stages to accommodate CSC'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.
- .4      Salvage and protect components to be re-installed after the re-roofing is complete.
- .5      Demolish existing roofing system to the existing structure.
- .6      Install new roofing system.
- .7      Provide required meetings, reviews, and inspections as outlined throughout the specification.
- .8      Contractor to be registered with the SRCA and hire a Third Party Contractor who is also registered with the SRCA/RCI inc. to complete the Commissioning for this project.

**1.4      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.

**1.5 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.

**1.6 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 7 days 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 Client.
- .3 Contractor to establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.
- .4 Provide temporary services 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 and notify Departmental Representative immediately and then in writing within 24 hours.

**1.7 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each document as follows:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Shop Drawings.
  - .5 Change Orders.
  - .6 Other Modifications to Contract.
  - .7 Field Test Reports.
  - .8 Copy of Approved Work Schedule.
  - .9 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 – PRECONSTRUCTION START UP MEETING**

- .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): Tammy Kranzler: Email: [tammy.kranzler@pwgsc.gc.ca](mailto:tammy.kranzler@pwgsc.gc.ca). 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 CPIC 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 will require that ID cards be provided for all construction workers by CSC. 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, outside of property.
- .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 16:00 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 or CCC (Canadian Corps of Commissionaires).
- .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.
- .2 Debris to be removed from site daily.

**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 Drumheller Institution.
- .2        Within 10 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, etc. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .4        Requirements for laydown area, tool boxes, 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        Review Tender Docs, CSC Technical Criteria, and GP&S requirements.
  - .7        Review tool list, restrictive items list, communication protocol,
  - .8        Review progress claim and substantial performance submissions.

- .9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .10 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .12 Progress claims, administrative procedures, photographs, hold backs.
- .13 Appointment of inspection and testing agencies or firms.
- .14 Insurances, transcript of policies, WCB, and Bonds.

### **1.3 PROGRESS MEETINGS**

- .1 Site meetings are to be held at the PWGSC office at the Drumheller Institution.
- .2 Schedule progress meeting bi-weekly during course of Work and 2 weeks prior to project completion, schedule progress meetings bi-weekly.
- .3 Contractor, Subcontractors involved in Work and are to be in attendance.
- .4 Notify parties minimum 7 days prior to meetings.
- .5 Record minutes of meetings and circulate to Consultant for review and distribution to PWGSC 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 Health and Safety Talkgate meeting notes to be emails to Consultant and PWGSC prior to meeting.
  - .13 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 all submittals 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 and have received written approval from Departmental Representative.
- .3        Present stamped 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 Engineer registered or licensed in Province of Saskatchewan, Canada.
- .3        Indicate materials with MSDS, 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 14 days for Departmental Representative's review of each submission.
- .5 Adjustments made on shop drawings as per 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 electronic submissions with transmittal letter and a hard copy, 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 and approval, 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 not 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 "the Saskatchewan Roofing Contractors Association standards" of construction and Contract Documents to meet all codes and regulations of the Authority Having Jurisdiction (AHJ).
  - .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            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    Rubbish and waste material to be disposed at approved waste management site and provide documentation proof at end of the project prior to submittal of hold back invoice.
- .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 building interior work 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. Replace to pre-construction condition if stripping occurs.
- .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 and/or Consultant 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 7 days 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, the Contractor will correct such Work and pay costs of examination and correction.
- .5    Contractor to have work and his proposed construction confirmed and approved by a Third party Representative from SRCA (who is not an employee of the Contractor) with written copies to be sent to Departmental Representative and Consultant) at key points in demo. and construction.
- .6    A final inspection by a third party representative from SRCA (who is not an employee of the Contractor) must also be completed at the Contractors expense and the original written approval of work must be submitted with the Hold Back Invoice. Any issues raised by the SRCA representative in their report must be corrected prior to submission of the hold back invoice.
- .7    Contractor to pay for third party SRCA Inspections.
  - .1    SRCA directory of Roofing Inspectors is found at:
    - .1    <http://www.srca.ca/>
    - .2    <http://www.rci-online.org/headquarters.html>
    - .3    Contractor is responsible to contact associations and arrange third party inspections.
- .8    Contractor to coordinate testings and inspections and results are to be sent directly to the Departmental Representative.
- .9    Any deficiencies found by the third party inspections will be the cost and responsibility of the Contractor to resolve and correct before holdback payment is made.

**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 7 days 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, Contractor to return to correct work within 3 months and to replace all building components due to not completing building and components within the Structure due to not completing the Work as per the Contract.

### **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.
- .2 2015 CSC Technical Criteria Document.
- .3 PWGSC General Procedures and Standards – Latest Edition.
- .4 All applicable codes (National Building Code).
- .5 Saskatchewan Roofing Contractors Association as a body of reference and for testing/approvals.

**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, to be determined by Client during pre-tender walk through.

**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 tool boxes for storage of tools. Equipment and materials to be kept in locked laydown area.
- .2 Locate materials not required to be stored in weatherproof tool boxes 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 during the pre-tender construction walk through.
- .5 All storage will be located in the minimum security area.

**1.9 SANITARY FACILITIES**

- .1 Contractor to provide portable sanitary facilities with lockable doors to meet Institutional requirements.
  - .1 Must be cleaned weekly and sooner if needed.

**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 as well as by workers gear while going through buildings.
- .3 Store materials resulting from demolition activities that are salvageable (identified by Departmental Representative) all others are the responsibility 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 and replace with same to make good all trades prior to submitting hold back invoice.

**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 to protect personnel and property adjacent to work site and laydown area".
- .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. Photographic proof of before and after condition will be required by the Contractor.

**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 but it is the Contractors responsibility to provide proof of compliance.
- .4        Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

**1.2            QUALITY**

- .1        Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2        Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at Contractor 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 and/or to reschedule the work to the more appropriate times that would better suit the clients needs at no increase to the Contract cost.

#### **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 copies of this material is to be presented as part of the final documents (O&M Binders, As Built Drawings, Warranty paperwork, etc) to be approved and given to the Client prior to hold back payment..

- .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 Work is to be completed by a Contractor who is an Saskatchewan Roofing Contractor Association Member in good standing.
- .3 Contractor is to pay for a third party Contractor who is an SRCA member to visit the work site and approve work to be done and work to be completed at key dates during the demo., construction and post construction phases. Reports of his assessment are to be sent to the Consultant and Departmental Representative within 3 days of the assessment. The inspections should be completed during visits coordinated with the Consultant, Departmental Representative, and Client so all are present for the assessment Walk.
- .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 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.

**1.10 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.

**1.11 FASTENINGS**

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

**1.12 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.

**1.13 PROTECTION OF WORK IN PROGRESS**

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

**1.14 EXISTING UTILITIES**

- .1 When breaking into or connecting to existing services or utilities, coordinate with Departmental Representative and local AHJ to 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 7 days in advance 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 that proposed work could be executed.
  - .9        No work is to commence without written approval from Departmental Representative.

**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 work 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.
- .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.
- .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. To return to pre-construction condition.
- .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 maximum amount of 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    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.
- .3    Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .4    Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .5    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.
- .6    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.
- .7    Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .8    Separate Condition: refers to waste sorted into individual types.
- .9    Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

**1.3                SUBMITTALS**

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

- .2 Prepare and submit following prior to project start-up:
  - .1 2 copies of Materials Source Separation Program (MSSP) description.

#### **1.4 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 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.

#### **1.5 STORAGE, HANDLING AND PROTECTION**

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
- .2 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .3 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.
- .4 Protect surface drainage.
- .5 Separate and store materials produced during dismantling of structures in designated areas.
- .6 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.

#### **1.6 DISPOSAL OF WASTES**

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste into waterways, storm, or sanitary sewers.
- .3 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

**1.7 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
- .3 Site grounds to be returned to "pre-construction" condition prior to submission of hold back invoice.

**1.8 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's.

**3.2 APPLICATION**

- .1 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 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT**

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

Province	Address	General Inquires	Fax
Saskatchewan	Saskatchewan Environment and	306-787-2700	306-787-3941

	Resource Management 3211 Albert Street Regina SK S4S 5W6		
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**END OF SECTION**

**Part 1          General**

**1.1          ADMINISTRATIVE REQUIREMENTS**

- .1          Acceptance of Work Procedures:
  - .1          Contractor to be a SRCA Member in good standing.
  - .2          Contractor's Inspection: Contractor conduct inspection of Work, with Consultant, CSC Representative, Departmental Representative, third party Contractor, and Manufacturer Representative, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    - .1          Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
    - .2          Contractor to supply the services of a third party contractor who is a member of the SRCA. This third party contractor to attend these meetings.
    - .3          Request Departmental Representative inspection.
  - .3          Departmental Representative Inspection:
    - .1          Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
    - .2          Contractor to correct Work as directed.
  - .4          Completion Tasks: submit written certificates in English that tasks have been performed as follows:
    - .1          Work: completed and inspected for compliance with Contract Documents.
    - .2          Defects: corrected and deficiencies completed.
    - .3          Equipment and systems: tested, adjusted and fully operational.
    - .4          Certificates required by SRCA: submitted to Departmental Representative, and Consultant.
    - .5          Operation of systems: demonstrated to Owner's personnel.
    - .6          Work: complete and ready for final inspection.
  - .5          Final Inspection:
    - .1          When completion tasks are done, request final inspection of Work by Departmental Representative and Contractor.
    - .2          When Work is incomplete according to Departmental Representative complete outstanding items and request re-inspection.
  - .6          Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.

- .7 Commencement of Lien and Warranty Periods: date of Departmental Representative's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .8 Final Payment:
  - .1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
  - .2 Refer to Contract when Work deemed incomplete by Departmental Representative complete outstanding items and request re-inspection.
- .9 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement after all submitted items have been approved by Consultant, Client, and Departmental Representative.

## **1.2 FINAL CLEANING**

- .1 Clean in accordance with Section 01 74 11 – Cleaning.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**END OF SECTION**

**Part 1        General**

**1.1            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 4 hard copies and 4 electronic versions 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: R.059377.001 and Title  
City, Prov/Terr  
Date

Table of Contents

TAB A - Warranty information

Letter on letterhead providing warranty on installation from date of substantial completion

- Dated and signed.
- Project name, number and building / location.
- Contractors contract number; ie EW038-...
- Date of Warranty reviews of Work after completion of Work.
- 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
- Include SRCA Warranty Certificates.

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, equipment, sub-systems, systems, and integrated systems.
- .2 Acronyms:
  - .1 BMM - Building Management Manual.
  - .2 Cx - Commissioning.
  - .3 EMCS - Energy Monitoring and Control Systems.
  - .4 O M - Operation and Maintenance.
  - .5 PI - Product Information.
  - .6 PV - Performance Verification.
  - .7 TAB - Testing, Adjusting and Balancing.

**1.2                GENERAL**

- .1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:
  - .1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.
  - .2 Ensure appropriate documentation is compiled into the BMM.
  - .3 Effectively train O M staff.
- .2 Contractor to assist 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 Equipment, components and systems have been commissioned and documents from the Contractors third party SRCA company has been received and any issued noted on their report have been corrected to meet SRCA requirements..
  - .3 O M training has been completed.

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

- .1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the unfunctional system, including related systems as deemed required by Departmental Representative, to ensure effective performance.
- .2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be directly from Contractor.

#### **1.5 PRE-CX REVIEW**

- .1 Before Construction:
  - .1 Review contract documents, confirm by writing to Departmental Representative.
    - .1 Adequacy of approved provisions for Cx.
    - .2 Aspects of design and installation pertinent to success of Cx.
- .2 During Construction:
  - .1 Co-ordinate provision, location and installation of provisions for Cx.
- .3 Before start of Cx:
  - .1 Have completed Cx Plan up-to-date.
  - .2 Ensure installation of related components, equipment, sub-systems, systems is complete.
  - .3 Fully understand Cx requirements and procedures.
  - .4 Have Cx documentation shelf-ready.
  - .5 Understand completely design criteria and intent and special features.
  - .6 Submit complete start-up documentation to Departmental Representative.
  - .7 Have Cx schedules up-to-date.

- .8 Ensure systems have been cleaned thoroughly.
- .9 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 30%, 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 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS**

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

**1.14 TEST RESULTS**

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

**1.15 START OF COMMISSIONING**

- .1 Notify Departmental Representative at least 21 days prior to start of Cx.
- .2 Start Cx as soon as demo stage of construction is started so it can be witnessed by the third party SRCA representative.

**1.16 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.

**1.17 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.

**1.18 WITNESSING COMMISSIONING**

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

**1.19 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.

**1.20 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.

**1.21 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.

**1.22 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.

**1.23 DEFICIENCIES, FAULTS, DEFECTS**

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

**1.24 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.

**1.25 ACTIVITIES UPON COMPLETION OF COMMISSIONING**

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

**1.26 TRAINING**

- .1 Contractor to provide onsite personnel safety training.

**1.27 OCCUPANCY**

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

**1.28 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        REFERENCES**

- .1    American Water Works Association (AWWA)
- .2    Public Works and Government Services Canada (PWGSC)
  - .1    PWGSC - Commissioning Guidelines.
- .3    Underwriters' Laboratories of Canada (ULC)
- .4    Requirements by SRCA.

**1.2        GENERAL**

- .1    Provide a fully functional facility:
  - .1    Systems, equipment and components meet user's functional requirements before date of acceptance, and operate consistently at peak efficiencies and within specified energy budgets under normal loads.
  - .2    Facility user and O M personnel have been fully trained in aspects of installed systems.
  - .3    Optimized life cycle costs.
  - .4    Complete documentation relating to 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.

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

- .1 Cx Plan to be 95% completed by Departmental Representative and transmit to 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 to Departmental Representative and obtain written approval.

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

- .1 During construction phase, revise, refine and update Cx Plan to include:
  - .1 Changes resulting from Client program modifications.
  - .2 Approved design and construction changes.
- .2 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.

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

- .1 Departmental Representative to maintain overall responsibility for project and is sole point of contact between members of commissioning team.
- .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: ensure Cx processes, Cx forms and checklists are developed by the Departmental Representative to deliver a fully functional and operational project:
    - .1 Review of Cx documentation from operational perspective.

- .2 Review for performance, reliability, durability of operation, accessibility, maintainability, operational efficiency under conditions of operation.
- .3 Protection of health, safety and comfort of occupants and O M personnel.
- .3 Departmental Representative 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 Monitoring of Cx activities, training, development of Cx documentation.
  - .8 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.

## 1.6 CX PARTICIPANTS

- .1 Employ the following Cx participants to verify performance of equipment and systems:
  - .1 Installation contractor/subcontractor:
    - .1 Equipment and systems except as noted.
  - .2 Equipment manufacturer: equipment specified to be installed and started by manufacturer.
    - .1 To include performance verification.
  - .3 Specialist subcontractor: equipment and systems supplied and installed by specialist subcontractor.
  - .4 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.
- .5 Client: responsible for intrusion and access security systems.
- .6 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.
- .7 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.

### **1.7 EXTENT OF CX**

- .1 Cx Structural and Architectural Systems:
  - .1 Architectural and structural:
    - .1 Roof.

### **1.8 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 SRCA Inspections
  - .7 SRCA Warranty Certificates.

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

- .1 General:
  - .1 Start-up, testing and Cx requirements, conditions for acceptance and specifications form part of relevant technical sections of these specifications.
- .2 Definitions:
  - .1 Cx as used in this section includes:
    - .1 Cx of components, equipment, systems, subsystems, and integrated systems.
    - .2 Factory inspections and performance verification tests.

- .3 Deliverables: provide:
  - .1 Cx Specifications.
  - .2 Startup, pre-Cx activities and documentation for systems, and equipment.
  - .3 Completed installation checklists (ICL).
  - .4 Completed product information (PI) report forms.
  - .5 Completed performance verification (PV) report forms.
  - .6 Results of Performance Verification Tests and Inspections.
  - .7 Description of Cx activities and documentation.
  - .8 Description of Cx of integrated systems and documentation.
  - .9 Tests of following witnessed by Departmental Representative, and Consultant.
  - .10 Tests performed by Contractor.
  - .11 Training Plans.
  - .12 Cx Reports.
  - .13 Prescribed activities during warranty period.
- .4 Departmental Representative to witness tests.

#### **1.10 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.

#### **1.11 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.
- .5 Departmental Representative reserves right to verify a percentage of reported results at no cost to contract.

#### **1.12 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, equipment, sub-systems, systems.

### **1.13 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.

### **1.14 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.

### **1.15 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.

### **1.16 DELIVERABLES RELATING TO ADMINISTRATION OF CX**

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

### **1.17 CX SCHEDULES**

- .1 Prepare detailed critical path Cx Schedule and submit to Departmental Representative for review and approval same time as project Construction Schedule. Include:
  - .1 Milestones, testing, documentation, training and Cx activities of components, equipment, subsystems, systems and integrated systems, including:
    - .1 Design criteria, design intents.
    - .2 Cx agents' credentials: 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.

**1.18 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.

**1.19 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.

**1.20 TESTS TO BE PERFORMED BY OWNER/USER**

- .1 None is anticipated on this project.

**1.21 TRAINING PLANS**

- .1 Contractor to provide onsite personnel safety training documentation.

**1.22 FINAL SETTINGS**

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

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                SUMMARY**

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

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

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

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

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

**1.4                PERFORMANCE VERIFICATION (PV) FORMS**

- .1    PV report forms include those developed by Contractor records measured data and readings taken during functional testing and Performance Verification procedures.
- .2    Prior to PV of integrated system, complete PV forms of related systems and obtain Departmental Representative and Consultant's approval.

**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 provided after Contract Award.

**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.

<b>Project: R059377.001 Okimaw OHCI Healing Lodge, Spiritual Lodge Roof Replacement</b>				
<b>Sequence of Operation</b>	<b>Verified</b>	<b>Acceptable/Non Acceptable/ Not Applicable</b>	<b>Provided Documentation for Maintenance</b>	<b>Comments</b>
<b>Installation of New Roof Membrane</b>				
<b>Installation of New Asphalt Shingles</b>				
<b>Installation of New Metal Shakes</b>				
<b>Installation of New Downspout Extension</b>				
<b>Installation of New Trench Drain &amp; New Concrete</b>				
<b>Installation of Roof Drains, and Cap Vents</b>				
<b>Reinstallation of Existing Mechanical Components</b>				
<b>Reinstallation of Existing Electrical Components</b>				

**Additional Comments:**

**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 33 00 - Submittal Procedures.

**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      Visit and examine the site and note all characteristics and irregularities affecting the work of this Section.

**1.4      PROTECTION**

- .1      Protect interior office equipment and spaces from debris that may fall as a result of roofing operations.
- .2      Prevent movement or settlement of adjacent work. Provide and place bracing or shoring and be responsible for safety and support of such work. Be liable for any such movement or settlement, and any damage or injury caused.
- .3      Cease operations and notify Departmental Representative if safety of any adjacent work or structure appears to be endangered. Take all precautions to support the structure. Do not resume operations until reviewed with the Departmental Representative.
- .4      Ensure safe passage of building occupants around area of demolition.
- .5      Cease operations and notify the Departmental Representative immediately for special protective and disposal instructions when asbestos materials or other hazardous materials are uncovered during the work of this project.
- .6      Prevailing weather conditions and weather forecasts shall be considered. Demolition work shall not proceed when weather conditions constitute a hazard to the workers and site.

- .7 Prevent debris from blocking surface drainage inlets and mechanical and electrical systems which remain in operation.
- .8 Temporarily suspended work that is without continuous supervision, shall be closed off to prevent entrance of unauthorized persons.

### **1.5 TEMPORARY PARTITIONS**

- .1 Erect and maintain dustproof partitions, seal off ducts as required to prevent spread of dust and fumes to other parts of the building. On completion, remove partitions and make good surfaces to match adjacent surfaces.

### **1.6 SALVAGEABLE AND RECYCLABLE MATERIALS**

- .1 Except where otherwise specified, all materials indicated or specified to be permanently removed from the Place of the Work shall and become Contractor's property. Maximize to the fullest extent possible, the salvage and recycling of such materials, consistent with proper economy and expeditious performance of the Work.
- .2 To reduce the quantity of material otherwise destined for disposal at a landfill, the Contractor is encouraged to consider utilizing the services of businesses and non-profit organizations that specialize in salvage and recycling of used building materials, but does so at his own option and risk.

## **Part 2 Products**

### **2.1 MATERIALS AND EQUIPMENT**

- .1 Provide materials and equipment as required to perform work of this Section.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Inspect building 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.

### **3.2 EXISTING SERVICES**

- .1 Disconnect all existing mechanical and electrical lines in the areas where existing roof membrane is to be demolished. Post warning signs on all electrical lines and mechanical equipment.
- .2 Disconnect and cap all mechanical services in accordance with requirements of local authority having jurisdiction. Natural gas supply lines shall be removed by

the gas company or by a qualified tradesman in accordance with gas company instructions.

### **3.3 PREPARATION**

- .1 Protection of In-Place Conditions:
  - .1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features 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.

### **3.4 DEMOLITION**

- .1 Carry out demolition work in accordance with CSA S350, unless otherwise specified.
- .2 Remove from the site all materials indicated to be removed.
- .3 Carry out demolition in a manner to minimize inconvenience to adjacent occupied space.
- .4 Carry out demolition in an orderly and careful manner.
- .5 Sprinkle exterior debris with water to minimize dust. Do not cause flooding, contaminated runoff or icing. Do not allow waste material, rubbish, and windblown debris to reach and contaminate adjacent properties.
- .6 Lower waste materials in a controlled manner; do not drop or throw materials from heights.
- .7 Burning of materials on site is not permitted.

### **3.5 RESTORATION**

- .1 Restore to its original condition any portion of the building demolished unnecessarily, at no expense to the Departmental Representative.

### **3.6 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Refer to demolition drawings and specifications for items to be salvaged for reuse.
- .4 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.

**END OF SECTION**

**Part 1      General**

**1.1      REFERENCES**

- .1    ASTM International
  - .1    ASTM A53/A53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - .2    ASTM A269-08, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
  - .3    ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2    CSA International
  - .1    CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2    CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3    CSA S16-09, Design of Steel Structures.
  - .4    CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
  - .5    CSA W59-M03(R2008), Welded Steel Construction (Metal Arc Welding) [Metric].
- .3    Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1    Material Safety Data Sheets (MSDS).
- .4    The Master Painters Institute (MPI)
  - .1    Architectural Painting Specification 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 sections, pipe, tubing, and bolts and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2    Submit two copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures.
    - .1    For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.
- .3    Shop Drawings:
  - .1    Submit drawings stamped and signed by professional engineer registered or licensed in Province of Saskatchewan, Canada.
  - .2    Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

### **1.3 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements, 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 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of crates, padding, packaging materials as specified in Construction Waste Management Plan Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Steel sections and plates: to CSA G40.20/G40.21, Grade 300W.
- .2 Steel pipe: to ASTM A53/A53M Standard weight, black finish.
- .3 Welding materials: to CSA W59.
- .4 Welding electrodes: to CSA W48 Series.
- .5 Bolts and anchor bolts: to ASTM A307.
- .6 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

### **2.2 FABRICATION**

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

### **2.3 FINISHES**

- .1 Shop coat primer: MPI- EXT 5.1A MPI- EXT 5.1B in accordance with chemical component limits and restrictions requirements and no VOC.
- .2 Zinc primer: zinc rich, ready mix to MPI- EXT 5.2C in accordance with chemical component limits and restrictions requirements and no VOC.

### **2.4 SHOP PAINTING**

- .1 Apply two shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
- .3 Clean surfaces to be field welded; do not paint.

### **2.5 ACCESS LADDERS**

- .1 Heavy Duty Welded Ladder: Steel, with 10 x 50 mm side rails spaced at 500 mm rungs of 25 mm diameter, tubular rod spaced 300 mm on centre; space rungs with steel mounting brackets and attachments; prime paint finish.
- .2 Provide self retracting lifeline system with the ladder.
- .3 Provide a 1500 mm high extending safety post at the top of the ladder.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications 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 ERECTION**

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Departmental Representative as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.

- .5 Supply components for work by other trades in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CSA S16.
- .7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion of:
  - .1 Primer: maximum VOC limit 250 g/L to GS-11.

### **3.3 LADDERS**

- .1 Install ladders in locations as indicated.
- .2 Fasten ladder as detailed on the drawings.

### **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 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 Repair damage to adjacent materials caused by metal fabrications installation.

**END OF SECTION**

**Part 1      General**

**1.1          REFERENCES**

- .1      CSA International
  - .1      CAN/CSA 080 Series - 08 (R2012), Wood Preservation.
  - .2      CSA 0121 - 08 (R2013), Douglas Fir Plywood.
  - .3      CSA-O141-05 (R2009) - Softwood Lumber.
  - .4      CSA 0151 - 09, Canadian Softwood Plywood
  - .5      CSA 0153 - 13, Poplar Plywood
  - .6      CSA 0437 Series - 93 (R2011), Standards on OSB and Waferboard
  - .7      National Lumber Grades Authority (NGLA), Standard Grading Rules for Canadian Lumber, 2010 edition.
  - .8      CSA 0151, CSA 0121, CSA 0153, CSA 0437, CSA G164-M92, and CSA 080.15

**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 wood products and accessories and include product characteristics, performance criteria, physical size, finish and limitations.

**1.3          QUALITY ASSURANCE**

- .1      Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2      Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI 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      Protect materials from weather upon delivery to job site.
  - .2      Store materials on raised supports. Cover materials with waterproof covering. Provide adequate air circulation and ventilation.
  - .3      Do not store seasoned materials in wet or damp areas.

- .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 FRAMING STRUCTURAL AND PANEL MATERIALS**

- .1 Lumber: to CAN/CSA 0141, softwood, S-P-F, S4S, surface-dry, graded and stamped in accordance with current National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber.
  - .1 Moisture Content: maximum 19% at time of installation.
  - .2 Finger jointed lumber is not acceptable.
- .2 Framing and Board Lumber: in accordance with NBC and as specified in schedules.
- .3 Furring, Blocking, Nailing Strips, Grounds, Rough Bucks, Cants, Curbs Fascia Backing and Sleepers: S4S, "Standard" or better grade for board, post and timber sizes, "Standard" light framing or better for dimension sizes.
- .4 Canadian Softwood Plywood: to CSA 0151.
- .5 Douglas Fir Plywood: to CSA 0121.
- .6 Poplar Plywood: to CSA 0153, standard construction.
- .7 Oriented Strand Board: to CSA 0437.0.

### **2.2 ACCESSORIES**

- .1 Nails and Spikes:
  - .1 Use common spiral nails and spiral spikes except where indicated otherwise.
  - .2 Use hot dip galvanized finished steel for exposed exterior work, highly humid interior areas and for pressure - preservative and fire-retardant treated lumber.
- .2 Bolt, nut, washer, screw and pin type fasteners: hot dip galvanized finish to CSA G164-M92.
- .3 Surface applied wood preservative: copper naphthanate base or pentachlorophene, prepared in accordance with CSA O80.15, coloured green.
- .4 Sealing Tape: minimum 60 mm width, polypropylene sheathing tape with acrylic adhesive, or duct tape of same width.

**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.
  - .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 one minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

**3.3 WOOD FURRING AND BLOCKING**

- .1 Provide wood furring and blocking at locations indicated on drawings and as specified.

**3.4 CARPENTRY IN CONNECTION WITH ROOFING**

- .1 Carefully remove existing flashing, and trim neatly as required to suit new details in order to install panel facing and roof membrane applications.
- .2 Replace deteriorated wood blocking at the discretion of the Departmental Representative with materials of the same style, type, and dimensions.

**3.5 SCHEDULE OF DIMENSION LUMBER**

- .1 Non-structural wall components, spruce species, and construction grade.

**3.6 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

- .3 Waste Management: separate waste materials for reuse 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.

**3.7 PROTECTION**

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

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES**

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-37.4-M89, Fibrated, Cutback Asphalt, Lap Cement for Asphalt Roofing.
  - .2 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
  - .3 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
  - .4 CAN/CGSB-51.34-M86, Vapour Barrier Polyethylene Sheet, for Use in Building Construction.
- .2 Canadian Roofing Contractors' Association (CRCA)
  - .1 CRCA Roofing Specification Manual.
- .3 CSA International
  - .1 CSA A123.1/A123.5-05(R2010), Asphalt Shingles Made From Organic Felt and Surfaced With Mineral Granules/Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules.
  - .2 CAN/CSA-A123.2-03(R2008), Asphalt-Coated Roofing Sheets.
  - .3 CSA A123.3-05(2010), Asphalt Saturated Organic Roofing Felt.
  - .4 CAN3-A123.51-M85(R2006), Asphalt Shingle Application on Roof Slopes 1:3 and Steeper.
  - .5 CAN3-A123.52-M85(R2006), Asphalt Shingle Application on Roof Slopes 1:6 to Less Than 1:3.
  - .6 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .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 shingles and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit proof of manufacturer's CCMC listing and listing number.
  - .3 Manufacturer's Instructions: provide to indicate special handling criteria, installation sequence, and cleaning procedures.
  - .4 Provide proof of SRCA material approval.
- .3 Samples:
  - .1 Submit duplicate samples of full size specified shingles.

- .4 Test and Evaluation Reports: submit laboratory test reports certifying compliance of bitumens, roofing felts, and membrane with specification requirements.
- .5 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
- .6 Provide Roofing Inspections as required by CRCA or SRCA.
- .7 Manufacturer's field report: in accordance with Section 01 45 00 - Quality Control.
- .8 Reports: indicate procedures followed, ambient temperatures and wind velocity during application.

### **1.3 QUALITY ASSURANCE**

- .1 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
  - .2 Construct and submit 3000 x 3000 mm mock-up. Apply to illustrate component application.
  - .3 Mock-up will be used:
    - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
  - .4 Locate where directed.
  - .5 Allow 48 hours for inspection of mock-up before proceeding with work.
  - .6 When accepted, mock-up will demonstrate minimum standard of quality required for this work.
  - .7 Approved mock-up may remain as part of finished Work.
  - .8 SCRA or RCI Inc members to provide inspection services.

### **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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Remove only in quantities required for same day use.
  - .3 Store and protect shingles from nicks, scratches, and blemishes.
  - .4 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer of packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**1.5 EXTRA STOCK MATERIALS**

- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 All unused shingles remain property of Departmental Representative.

**1.6 INSPECTIONS**

- .1 Provide Third Party Inspections required by SRCA.
- .2 Contractor to pay for Inspections.

**1.7 WARRANTY**

- .1 Provide 5 year Contractor Warranty Certificate steep roof warranty on workmanship and material.

**Part 2 Products**

**2.1 MATERIALS**

- .1 All materials and application techniques are to be approved by SRCA.
- .2 Asphalt shingles:
  - .1 Material: SBS Polymer Modified Laminated Architectural Asphalt Shingle.
  - .2 Basic Wind Warranty: 177 kph.
  - .3 Class 4 Impact Resistant.
  - .4 Exposure: 142.9 mm.
  - .5 Embedded granular finish.
  - .6 5 stealing strips/shingle
  - .7 6 nail holds/shingle.
- .3 Ice and water Membrane: Self adhered fibreglass mat blended with asphalt with a non-slip sanded surface.
- .4 Roofing felt: to CSA A123.3.
- .5 Asphaltic Cement:
  - .1 Plastic cement: to CAN/CGSB-37.5.
  - .2 Lap cement: to CAN/CGSB-37.4.
- .6 PVC drip edge: extruded profile of unplasticized polyvinyl chloride of minimum thickness of 0.8 mm.
- .7 Nails: to CSA B111, of galvanized steel sufficient length to penetrate 19 mm into deck.
- .8 Staples: chisel point galvanized steel 25 mm crown 1.5 mm thick, sufficient length to penetrate 20 mm into deck lock nails for soffit substrates.

**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 asphalt shingles 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 REMOVAL OF EXISTING ROOFING**

- .1 Remove existing roofing, flashings and underlay, and expose sheathing of roof.
- .2 Withdraw existing shingle and flashing nails, set those which break off. Leave surfaces free from dirt and loose material.
- .3 Departmental Representative to inspect roof sheathing.
- .4 Remove portion of sheathing affected by fungal or insect attack as directed by Departmental Representative.
- .5 Replace damaged portions of existing sheathing with sheathing of equal sectional dimensions, and specified grade. Seat each end on rafter, with 25 mm bearing, and secure to rafter. Include 590 sheathing replace in Bid.

**3.3 APPLICATION**

- .1 Do asphalt shingle work to CRCA Specification except where specified otherwise.
- .2 Install drip edge along eaves, overhanging 12 mm, with minimum 50 mm flange extending onto roof decking.
  - .1 Nail to deck at 400 mm on centre.
- .3 Install bottom step flashing (soaker base flashing) interleaved between shingles at vertical junctions.
- .4 Install asphalt shingles on roof slopes 1:3 and steeper in accordance with CAN3-A123.51.
- .5 Install asphalt shingles on roof slopes 1:6 to less than 1:3 to CAN3-A123.52 .

**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 reuse or 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 Repair damage to adjacent materials caused by asphalt shingles installation.

**END OF SECTION**

**Part 1      General**

**1.1          REFERENCES**

- .1      CAN/ULC-S107-11 – Methods of Fire Tests of Roof Coverage.
- .2      CRCA (Canadian Roofing Contractors Association) - Technical Bulletins.
- .3      CRCA Manual of Good Roofing Practice.
- .4      SRCA (Saskatchewan Roofing Contractors Association) – Technical Bulletins.
- .4      ULC (Underwriters Laboratories of Canada).
- .5      2015 CSC Technical Criteria Document.
- .6      CSC General Procedures and Standards – Latest Edition.
- .7      All applicable codes (National Building Code).

**1.2          ADMINISTRATIVE REQUIREMENTS**

- .1      Convene pre-installation meeting two weeks prior to beginning waterproofing Work, with roofing contractor's representative, Departmental Representative, and Consultant in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart 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.

**1.3          ACTION AND INFORMATIONAL SUBMITTALS**

- .1      Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2      Product Data:
  - .1      Provide two copies of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2      Provide two copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures, and indicate VOC content for:
    - .1      Primers.
    - .2      Asphalt.
    - .3      Sealers.
  - .3      Provide proof of SRCA material approval.
- .3      Provide shop drawings:
  - .1      Indicate flashing, control joints, tapered insulation details.
  - .2      Provide layout for tapered insulation.

- .4 Manufacturer's Certificate: certify that products meet or exceed specified requirements.
- .5 Test and Evaluation Reports: submit laboratory test reports certifying compliance of bitumens, roofing felts, and membrane with specification requirements.
- .6 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
- .7 Provide Roofing Inspections as required by CRCA or SRCA.
- .8 Manufacturer's field report: in accordance with Section 01 45 00 - Quality Control.
- .9 Reports: indicate procedures followed, ambient temperatures and wind velocity during application.

#### **1.4 QUALITY ASSURANCE**

- .1 Installer qualifications: company or person specializing in application of modified bituminous roofing systems approved by manufacturer with 5 years documented experience.
- .2 Installer to be a member in good standing with the CRCA (Canadian Roofing Contractors Association) or SRCA (Saskatchewan Roofing Contractors Association).

#### **1.5 FIRE PROTECTION**

- .1 Prior to the start of work, conduct a site inspection to ensure its safety in order to minimize fire risks and hazards.
- .2 Respect safety measures recommended by the related local authorities.
- .3 At the end of each workday, use a heat detector gun to spot any smouldering or concealed fire. Job planning must be organized to ensure workers are still on location at least 2 hours after welding works. An inspection must be performed by an employee of the roofing contractor who specializes in this kind of job at the end of works and, if necessary, with the help of a member of the fire protection service of the city.
- .4 Never apply the torch directly to flammable materials.

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

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.
- .2 Storage and Handling Requirements:
  - .1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.
  - .2 Provide and maintain dry, off-ground weatherproof storage.

- .3 Store rolls of felt and membrane in upright position. Store membrane rolls with salvage edge up.
- .4 Remove only in quantities required for same day use.
- .5 Place plywood runways over completed Work to enable movement of material and other traffic.
- .6 Store sealants at +5 degrees C minimum.
- .7 Store insulation protected from weather and deleterious materials.
- .3 Packaging Waste Management: remove for reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
  - .2 Fold up metal banding, flatten and place in designated area for recycling.
- .4 Materials delivered in rolls will be carefully stored upright; flashings will be stored to avoid wrinkling, buckling, scratches or any other possible damage.
- .5 Avoid gathering construction materials on the roof, which may affect the structural integrity by imposing loads exceeding what is admissible.

## **1.7 SITE CONDITIONS**

- .1 Ambient Conditions
  - .1 Do not install roofing when temperature remains below -18 degrees C for torch application, or -to manufacturers' recommendations.
  - .2 Minimum temperature for solvent-based adhesive is -5 degrees C.
- .2 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

## **1.8 COMPATIBILITY**

- .1 All waterproofing materials will be provided by the same manufacturer.

## **1.9 DESCRIPTION**

- .1 Clean all metal surfaces down to bare metal where the fluid applied system will be applied
- .2 Prepare and apply self adhesive sanded underlayment membrane at the low slope to steep slope transition
- .3 Install steep slope roofing product as required over the sanded underlayment membrane
- .4 Mechanically fasten the metal drip edge flashing at the low to steep slope transition

- .5 Prime the cleaned metal with roofing primer.
- .6 Apply the first coat of fluid applied product over the cured primer
- .7 Apply the fluid applied fleece in to the first ply of the fluid applied product.
- .8 Apply the second coat of the fluid applied over the fleece.

#### **1.10 INSPECTIONS**

- .1 Provide Third Party Inspections required by SRCA.
- .2 Contractor to pay for Inspections.

#### **1.11 WARRANTY**

- .1 The Contractor shall, at no additional expense to the Departmental Representative, repair any actual leaks or deficiencies in the roofing system, occurring within the warranty period, and which have resulted from faulty or improper workmanship.
- .2 Stop leaks which have resulted from a deficiency, within a time reasonably determined by Departmental Representative.
- .3 Correct deficiencies within 15 working days of notification by Departmental Representative, or as otherwise determined by the Departmental Representative.
- .4 Contractor shall obtain, on behalf of the Departmental Representative, a Five Year Warranty Certificate, for the workmanship and material.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 All materials and application techniques to be approved by SRCA.

#### **2.2 PRIMER**

- .1 Translucent cloudy two-component polymethyl methacrylate-based (PMMA) primer.

#### **2.3 FIELD SURFACE MEMBRANE**

- .1 Two-component polymethyl methacrylate-based (PMMA) liquid membrane combined with fleece fabric to form a reinforced field membrane.

#### **2.4 FLASHING AND PARAPET MEMBRANES**

- .1 Two-component polymethyl methacrylate-based (PMMA) liquid membrane combined with fleece fabric to form a reinforced membrane for flashings and parapets.

**2.5 SELF LEVELING MORTAR**

- .1 Two-component polymethyl methacrylate-based (PMMA) and cement powder-based liquid resin used for leveling or smoothing substrate surfaces and as a protective layer for trafficable surfaces.

**2.6 TEXTURED FINISH**

- .1 Two-component polymethyl methacrylate-based (PMMA) liquid resin infused with aggregates (pre-mixed additive). This resin is used as a finish or protective non-slip coating.

**2.7 FINISH**

- .1 Two-component polymethyl methacrylate-based (PMMA) clear liquid resin to which a coloured paste is added. This resin is used as coating of the selected colour.

**2.8 WATER PROOFING DETAILER**

- .1 Two-component polymethyl methacrylate-based (PMMA) liquid resin with microfibers used as the waterproofing paste, where it is difficult to install a reinforced liquid membrane system.

**2.9 FILLING PASTE**

- .1 Two-component polymethyl methacrylate-based (PMMA) liquid resin used as a sealant to fill cracks, voids and depressions before installation of liquid membranes Membrane thickness: 2.2 mm.

**2.10 CATALYST**

- .1 Dibenzoyl peroxide-based reactive agent used to induce curing of resin products during membrane application.

**2.11 FABRIC REINFORCEMENT**

- .1 Non-woven, needle-punched polyester fabric used as fabric reinforcement in liquid-applied membrane systems.

**Part 3 Execution**

**3.1 QUALITY OF WORK**

- .1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual, CRCA Roofing Specification Manual.
- .2 Do priming in accordance with manufacturers written recommendations.
- .3 Assembly, component and material connections will be made in consideration of appropriate design loads, with reversible mechanical attachments.

### **3.2 EXAMINATION OF ROOF DECKS**

- .1 Surface examination and preparation must be completed in conformance with instructions in the membrane manufacturer's technical documentation.
- .2 Before roofing work begins, the owner's representative and roofing foreman will inspect and approve deck conditions (including slopes and wood grounds) as well as flashings at parapets, roof drains, plumbing vents, ventilation outlets and other construction joints. If necessary, a non-conformity notice will be issued to the contractor so that required corrections can be carried out. The start of roofing work will be considered as acceptance of conditions for work completion.
- .3 Do not begin any portion of work before surfaces are clean, smooth, dry, and free of ice and debris. Use of calcium or salt is forbidden for ice or snow removal.
- .4 Be sure plumbing, carpentry and all other works have been duly completed.

### **3.3 METHOD OF EXECUTION**

- .1 Roofing work must be completed in a continuous fashion as surfaces are readied and as weather conditions allow it.
- .2 Follow the membrane manufacturer's instructions for application restrictions depending on weather conditions.
- .3 No materials will be installed during rain or snowfall.

### **3.4 SITE PROTECTION**

- .1 Protect the exposed surfaces of finished work to avoid damage during roof installation and material transportation. Assume full responsibility for any damage.
- .2 Observe local regulations regarding the disposal of unused product.
- .3 Consult the manufacturer's data sheets for restrictions applicable to the construction site.

### **3.5 PREPARATION WORK – WOOD DECK**

- .1 Cover the plywood joints with a waterproofing membrane strip of 100 mm (4 in).
- .2 Cover any cracks or holes with a waterproofing membrane strip.

### **3.6 INSTALLATION OF FILLING PASTE**

- .1 Apply resin where required using rollers, brushes or notched squeegees provided for this purpose. Follow manufacturer's instructions for the surface preparation and the use of primer.

### **3.7 APPLICATION OF LIQUID MEMBRANE PRIMER**

- .1 Using a slow-speed mechanical agitator, thoroughly mix the entire container of resin for two minutes before the addition of catalyst.
- .2 Pour the resin into a second container if you make a batch mix.
- .3 Add pre-measured catalyst to the resin component according to the amounts indicated in manufacturer's Catalyst Mixing Chart.
- .4 Add catalyst only to the amount of material that can be used within 10 to 15 minutes.
- .5 Stir again for two minutes before applying.
- .6 Apply the resin to the substrate using rollers, brushes or notched squeegees provided for this purpose.
- .7 The primer should be spread evenly so that the substrate is completely saturated with a single application.
- .8 See the manufacturer's data sheet for minimum quantities required.

### **3.8 INSTALLATION OF MEMBRANE AND REINFORCEMENT ON FLASHINGS AND PARAPETS**

- .1 Wherever possible, install flashing membranes BEFORE installing field-surface membranes to minimize traffic on the surfaces already installed.
- .2 All flashing membranes must be installed together with the surface membranes as the work progresses.
- .3 If water leakage should occur under a new waterproofing membrane caused by the incomplete installation of a flashing, the affected area should be removed and replaced at the contractor's expense.
- .4 All flashing membranes must be at least 200 mm (8 in).
- .5 Using a low-speed mechanical agitator, thoroughly mix the entire container of resin for two minutes before the addition of catalyst.
- .6 Pour the resin into a second container if you make a batch mix.
- .7 Add pre-measured catalyst to the resin component according to the amounts indicated in manufacturer's Catalyst Mixing Chart.
- .8 Add catalyst only to the amount of material that can be used within 10 to 15 minutes.
- .9 Stir again for two minutes before applying.
- .10 Apply the first layer of resin to the substrate using rollers, brushes or notched squeegees provided for this purpose. The first layer thickness must be 1.3 to 1.5 mm when wet.
- .11 Lay out the polyester reinforcement on the resin to prevent the formation of wrinkles, swellings or fishmouths.
- .12 Use rollers, brushes or notched squeegees in order to fully saturate resin reinforcement and remove wrinkles and air bubbles under the reinforcement. The

- appearance of the reinforcement should be slightly opaque without any white trace. It is important to correct these defaults before the resin cures.
- .13 Apply the second resin layer on top of the reinforcement using rollers, brushes or notched squeegees provided for this purpose. The second layer thickness must be 0.6 to 0.7 mm when wet.
  - .14 Excess resin which is not absorbed should be used to saturate adjacent reinforcement.
  - .15 The final resin coating should be smooth and even.
  - .16 Each reinforcement shall overlap the previous one by a minimum of 50 mm (2 in).

### **3.9 INSTALLATION OF MEMBRANE AND REINFORCEMENT ON FIELD SURFACE**

- .1 Using a slow-speed mechanical agitator, thoroughly mix the entire container of resin for two minutes before the addition of catalyst.
- .2 Pour the resin into a second container if you make a batch mix.
- .3 Add pre-measured catalyst to the resin component according to the amounts indicated in manufacturer's Catalyst Mixing Chart.
- .4 Add catalyst only to the amount of material that can be used within 10 to 15 minutes.
- .5 Stir again for two minutes before applying.
- .6 Apply the first resin layer to the substrate using rollers, brushes or notched squeegees provided for this purpose. The thickness of the first layer must be 1.3 to 1.5 mm when wet.
- .7 Lay out the polyester reinforcement on the resin to prevent the formation of wrinkles, swellings or fishmouths.
- .8 Use rollers, brushes or notched squeegees in order to fully saturate resin reinforcement and remove wrinkles and air bubbles under the reinforcement. The appearance of the reinforcement should be slightly opaque without any white trace. It is important to correct these defaults before the resin cures.
- .9 Apply the second resin layer on top of the reinforcement using rollers, brushes or notched squeegees provided for this purpose. The second layer thickness must be 0.6 to 0.7 mm when wet.
- .10 Excess resin which is not absorbed should be used to saturate adjacent reinforcement.
- .11 The final resin coating should be smooth and even.
- .12 Each reinforcement shall overlap the previous one by 50 mm (2 in) laterally, and by 100 mm (4 in) at the ends.

### **3.10 INSTALLATION OF SELF-LEVELING MORTAR**

- .1 Using a slow-speed mechanical agitator, thoroughly mix the entire container of resin for two minutes.
- .2 Before the addition of the catalyst, add the cement powder while continuing to mix for at least two minutes.
- .3 Pour the resin into a second container if you make a batch mix.
- .4 Add pre-measured catalyst to the resin component according to the amounts indicated in manufacturer's Catalyst Mixing Chart.
- .5 Add catalyst only to the amount of material that can be used within 10 to 15 minutes.
- .6 Stir again for two minutes before applying.
- .7 Apply the finish resin coating on the existing membrane using rollers, brushes or notched squeegees provided for this purpose. The thickness must be 2.2 to 2.4 mm when wet.
- .8 The final resin coating should be smooth and even.

### **3.11 INSTALLATION OF WATERPROOFING DETAILER**

- .1 Apply the waterproofing detailer where required using a brush or a notched squeegee in areas where it is difficult to install the reinforced liquid membrane system.

### **3.12 INSTALLATION OF TEXTURED FINISH**

- .1 Add finishing colour additive to the clear resin.
- .1 Pour the resin into a second container if you make a batch mix.
- .2 Add pre-measured catalyst to the resin component according to the amounts indicated in manufacturer's Catalyst Mixing Chart.
- .3 Add catalyst only to the amount of material that can be used within 10 to 15 minutes.
- .4 Stir again for two minutes before applying.
- .5 Apply the finish resin coating on the existing membrane using rollers, brushes or notched squeegees provided for this purpose. The thickness must be 0.6 to 0.8 mm when wet.
- .6 The final resin coating should be smooth and even.

### **3.13 WATERPROOFING FOR VARIOUS DETAILS**

- .1 Install waterproofing membranes at various roofing details in conformance with typical details indicated in technical documentation of the manufacturer.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES**

- .1 Aluminum Association (AA)
  - .1 DAF-45-R03, Designation System for Aluminum Finishes - 9th Edition.
  - .2 ASM-35-October 2000, Specifications for Aluminum Sheet Metal Work in Building Construction, Section 5.
- .2 ASTM International
  - .1 ASTM A167-99(2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .2 ASTM A653/A653M-10, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .3 ASTM A792/A792M-10, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.
  - .4 ASTM B32-08, Standard Specification for Solder Metal.
- .3 CSA International
  - .1 CSA A123.3-05(2010), Asphalt Saturated Organic Roofing Felt.
- .4 CRCA (Canadian Roofing Contractors Association) - Technical Bulletins.
- .5 CRCA Manual of Good Roofing Practice.
- .6 SRCA (Saskatchewan Roofing Contractors Association) – Technical Bulletins.
- .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .2 Material Safety Data Sheets (MSDS).
- .8 2015 CSC Technical Criteria Document.
- .9 CSC General Procedures and Standards – Latest Edition.
- .10 All applicable codes (National Building Code).

**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 sheet metal roofing and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Proof of manufacturer's CCMC listing and listing number.
  - .3 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Saskatchewan, Canada.

- .4 Samples:
  - .1 Submit duplicate samples of each sheet metal material.

### **1.3 QUALITY ASSURANCE**

- .1 Mock-ups:
  - .1 Submit mock-ups in accordance with Section 01 45 00 - Quality Control.
  - .2 Fabricate sample roofing panel using identical project materials and methods to include typical seam.
  - .3 Mock-up will be used:
    - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
  - .4 Locate where directed.
  - .5 Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with sheet metal flashing work.
  - .6 When accepted, mock-up will demonstrate minimum standard of quality required for this Work.
  - .7 Approved mock-up may remain as part of finished Work.
  - .8 Remove mock-up and dispose of materials when no longer required and when directed by Departmental Representative.

### **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 dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect sheet metal roofing from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

### **1.5 INSPECTIONS**

- .1 Provide Third Party Inspections required by SRCA.
- .2 Contractor to pay for Inspections.

### **1.6 WARRANTY**

- .1 Provide 5 year Contractor Warranty Certificate steep roof warranty on workmanship and material.

**Part 2**

**Products**

**2.1 MATERIALS**

- .1 All materials and application techniques are to be approved by SRCA.

**2.2 SHEET METAL MATERIALS**

- .1 Aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, grade with AZ180 coating:
  - .1 Pattern: emulate the architectural detail of thick, wood shakes.
  - .2 Panel size: 360mm x .1323mm.
  - .3

**2.3 ACCESSORIES**

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB-37.5.
- .3 Underlay No.15 perforated asphalt felt to CSA A123.3.
- .4 Slip sheet: reinforced sisal paper or a heavy felt kraft paper.
- .5 Sealant: Asbestos-free sealant, compatible with systems materials, recommended by system manufacturer.
- .6 Rubber-asphalt sealing compound: to CAN/CGSB-37.29.
- .7 Cleats: of same material, and temper as sheet metal: 50mm minimum wide.
- .8 Fasteners: concealed.
- .9 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .10 Solder: to ASTM B32.
- .11 Flux: rosin, cut muriatic acid, or commercial preparation suitable for materials to be soldered.
- .12 Touch-up paint: as recommended by sheet metal roofing manufacturer.
- .13 Ridge Caps: of same material and colour as sheet metal shake roofing.

**2.4 FABRICATION**

- .1 Fabricate aluminum sheet metal in accordance with AA ASM-35.
- .2 Make allowances for expansion at joints.
- .3 Hem exposed edges on underside 12 mm, mitre and seal.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply minimum 0.2 mm dry film thickness coat of plastic cement to both faces of dissimilar metals in contact.
- .6 Protect metals against oxidization by backpainting with isolation coating where indicated.

**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 sheet metal roofing installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

**3.2 INSTALLATION**

- .1 Install roofing as per manufacturer instructions.
- .2 Use concealed fastenings except where approved in writing by Departmental Representative before installation.
- .3 Include underlay under sheet metal roofing.
  - .1 Secure in place and lap joints 100 mm minimum.
- .4 Apply slip sheet over asphalt felt underlay to prevent bonding between sheet metal and felt.
  - .1 Secure with anchorage and lap joints 50 mm minimum in direction of waterflow.
- .5 Install sheet metal roof panels using cleats.
- .6 Secure cleats with 2 fasteners each and cover with cleat tabs.
- .7 Stagger transverse seams in adjacent panels.
- .8 Flash roof penetrations with material matching roof panels, and make watertight.
- .9 Form seams in direction of water-flow and make watertight.
- .10 Perform soldering with well heated coppers, heat seam thoroughly and sweat solder through its full width.
- .11 Clean and flux metals before soldering.
- .12 Follow sheet metal manufacturer's recommendations for soldering procedures.
- .13 As work progresses, neutralize excess flux with 5% to 10% washing soda solution, and thoroughly rinse. Leave work clean and free of stains.

**3.3 FLAT SEAM ROOFING**

- .1 Use aluminum rectangular sheets to make flat seam roofing.
  - .1 Notch corners and turn up pretinned edges 20 mm.
- .2 Lay sheets with long dimension parallel to eaves.
- .3 Lock cleats into seams and flatten smooth in direction of flow.

- .4 At eaves and gable ends, terminate roofing by hooking over previously installed edge strip.

**3.4 FINISH**

- .1 Rub exposed surfaces with clean rags soaked in boiled linseed oil until desirable shade of brown is obtained.
- .2 Touch up solder with copper bronze.

**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.

**3.6 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by sheet metal roofing installation.

**END OF SECTION**

**Part 1        General**

**1.1            REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A653/A653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2 ASTM B32-04, Standard Specification for Solder Metal.
- .2 Canadian Roofing Contractors Association (CRCA)
  - .1 Roofing Specifications Manual – current version.

**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.
- .3 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, cleaning procedures.

**1.3            DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**Part 2        Products**

**2.1            SHEET METAL MATERIALS**

- .1 Galvanized Sheet Steel: Commercial quality sheet to ASTM A653/A653M, Z275 zinc coating to ASTM A525M. 26 gauge, thickness equivalent 0.5512 mm, tolerance 0.08 mm.
- .2 Galvanized Sheet Steel: Commercial quality sheet to ASTM A653/A653M, Z275 zinc coating to ASTM A525M. 24 gauge, thickness equivalent 0.7010 mm, tolerance 0.1 mm.

- .3 Prepainted Steel: Commercial quality to ASTM A653/A653M with Z275 zinc coating to ASTM A525M, to CSSBI Technical Bulletins No. 5 & 7 (8000 Series). 26 gauge, thickness equivalent 0.5512 mm, tolerance 0.08 mm.

## 2.2 FABRICATION

- .1 Form sections true to shape, accurate in size, square, and free from distortion or defects.
- .2 Form pieces in maximum 1500 mm lengths.
- .3 Hem exposed edges on underside 12.5 mm; mitre and seam corners.
- .4 Form all cap flashing and base flashing corners with standing seams.
- .5 Fabricate vertical faces with bottom edge formed outward 12.5 mm and hemmed to form drip.
- .6 Fabricate cap flashings to lap 50 mm over base flashings.
- .7 Fabricate cap flashings to have a drip leg with a fascia a maximum of 100 mm.
- .8 Flashings to extend past the bottom of the blocking on the wall a minimum of 50 mm, or to cover the existing "fade" lines on walls visible from the ground level.
- .9 No fascia portion of the metal cap is to exceed 150 mm. Switch to a two-piece detail.
- .10 All fascias with a depth greater than 150 mm to have a reinforcing "V" break.
- .11 Where specified, fabricate roof scuppers or overflow scuppers from 0.70 mm (24 gauge) pre-finished sheet steel with one piece deck flange, minimum 150 mm. Scupper outlet shall be a minimum 100 mm in diameter.
- .12 Flashings visible from ground level to be fabricated from pre-painted metal. (Choice of colour by Departmental Representative from standard colours available.)
- .13 Flashings for expansion joints, control joints, curbs and other miscellaneous items to be fabricated from galvanized steel unless otherwise directed in writing prior to tender closing.

## 2.3 EAVES TROUGHS AND DOWNPIPES

- .1 Form eaves troughs and downpipes from prefinished aluminum sheet metal.
- .2 Sizes and profiles to match existing.
- .3 Trench drain: stainless steel conforming to ASTM A-240, with a radiused self cleaning bottom and stainless steel grate on the top. The grate to be complete with vandal proof lockdown.

**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 CRCA details.
- .2 Install flashings not later than seven days after the installation of the membrane on any particular section of the roof.
- .2 Install flashings so maximum distances between joints is 1500 mm.
- .3 Fasten flashings through the extended "S" locks with annular ringed nails and secure with mechanical fasteners on fascia face, and mechanical fasteners on opposite face, mid-length of each panel.
- .4 Install anchors using annular ringed nails.
- .5 Fit flashings together so that one end of each section is free to move in the joint. Do not use any caulking or other sealant at joints.
- .6 Lap, cap, or counter flashings with base flashing, minimum 50 mm.
- .7 Where possible, do not set base flashing screws lower than 200 mm from top of the roof membrane.

**3.3 EAVES TROUGHS AND DOWNPIPES**

- .1 Install downpipes extensions as noted on the drawings.
- .2 Install trench drains as detailed on the drawings.

**3.4 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.

**3.5 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    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    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 Silicones one part: to CAN/CGSB-19.13.
- .2 Single component elastomeric sealant without isocyanates.

**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 Silicone Sealant: use at metal flashing joints.
- .2 Elastomeric Sealant: use around drains and vents.

**END OF SECTION**

**Part 1      General**

**1.1      ACTION AND INFORMATIONAL SUBMITTALS**

- .1      Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2      Product Data: Submit manufacturer's instructions, printed product literature and data sheets 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 Saskatchewan, Canada.
  - .2      Drawings to show:
    - .1      Mounting arrangements.
    - .2      Operating and maintenance clearances.
  - .3      Drawings and product data accompanied by:
    - .1      Detailed drawings of bases, supports, and anchor bolts.
    - .2      Acoustical sound power data, where applicable.
    - .3      Points of operation on performance curves.
    - .4      Manufacturer to certify current model production.
    - .5      Certification of compliance to applicable codes.
  - .4      In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.
- .4      Closeout Submittals:
  - .1      Submit in accordance with Section 01 78 00 - Closeout Submittals.

**1.2      MAINTENANCE MATERIAL SUBMITTALS**

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

**1.3      DELIVERY, STORAGE, AND HANDLING**

- .1      Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2      Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3      Storage and Handling Requirements:
  - .1      Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2      Replace defective or damaged materials with new.

## **Products**

### **2.1 SCOPE**

- .1 The contractor shall examine all drawings and specifications to ascertain the scope of work.
- .3 Provide labour and equipment to disconnect and replace mechanical vents on the roof in accordance with applicable codes and ordinances.
- .5 Prior to commencing work, check locations of piping, conduits inside and outside building. Ensure all work carried out on site will not affect the existing building and equipment. Any damage to conduit or plumbing by the Contractor to be repaired in a complete and proper manner at no cost to the Departmental Representative.
- .6 In the event mechanical installations are installed improperly or in a substandard manner, the Contractor will be required to reinstall deficient mechanical equipment in a complete and proper manner to the satisfaction of the Departmental Representative at no additional cost.
- .7 Install materials and equipment in a neat and workmanlike manner by competent journeymen tradesmen.
- .9 Provide twenty-four hours notice to Departmental Representative to coordinate removal and reinstallation of mechanical equipment. Inform Departmental Representative of schedule to allow opportunity to be present during removal and reinstallation procedure.

### **2.2 MATERIALS**

- .1 Materials installed shall be new, full weight and of the best quality specified. Use same brand or manufacturer for each specific application.
- .2 Provide additional material for required modifications to meet new height requirements.

### **2.3 EQUIPMENT PROTECTION AND CLEAN-UP**

- .1 Protect equipment and materials in storage on site, during and after installation until final acceptance. Leave factory covers in place and take special precautions to prevent entry of foreign material into working parts of piping and duct systems.
- .2 Protect equipment with polyethylene covers.
- .3 Thoroughly clean piping, ducts and equipment of dirt, cuttings and other foreign substances.

**2.5 FINAL INSPECTION**

- .1 Perform the following items prior to final inspection:
  - .1 Inform Departmental Representative and Maintenance Personnel of schedule to allow opportunity to be present during a final inspection.

**Part 3 Execution**

**3.1 EXAMINATION**

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

**3.2 PROTECTION**

- .1 Protection equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C117-04, Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM D698-00ae1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft<sup>3</sup>) (600 kN-m/m<sup>3</sup>).
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-3.3-99(March 2004), Kerosene, Amend. No. 1, National Standard of Canada.
  - .2 CAN/CGSB-8.1-88], Sieves, Testing, Woven Wire, Inch Series.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1-04/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Inform Departmental Representative of proposed source of materials at least 1 week prior to commencing work. A copy of the material testing report showing the concretes oxygen content must be provided to the Departmental Representative before commencing the concrete pour. If the Departmental Representative is not on the site, this can be done via email and a follow up phone call. The report of the slump test results must be provided as part of the final documents included in the Operations and Maintenance Manual.

**1.3                DELIVERY, STORAGE AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Separate waste materials for recycling in accordance with Section 01 47 21 - Construction/Demolition Waste Management and Disposal.

**Part 2            Products**

**2.1                MATERIALS**

- .1 Concrete mixes and materials:
  - .1 Portland Cement: to CSA A3001, Type GU.
  - .2 Water: to CSA A23.1.
  - .3 Aggregates: to CSA A23.1/A23.2.
  - .4 Admixtures:

- .1 Air entraining admixture: to ASTM C260, oxygen level 4-7%.
- .2 Chemical admixture: to ASTM C494.
- .2 Reinforcing steel: in accordance with:
  - .1 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
  - .2 Substitute different size bars only if permitted in writing by Departmental Representative.
- .3 Granular base: material to:
  - .1 Crushed stone or gravel.
  - .2 Gradations: within limits specified when tested to ASTM C136. Sieve sizes to CAN/CGSB-8.1.
- .4 Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water-soluble soap.
- .5 Boiled linseed oil: to ASTM D260.
- .6 Kerosene: to CAN/CGSB-3.3.

### **Part 3 Execution**

#### **3.1 GRADE PREPARATION**

- .1 Construct sidewalks using excavated material free from organic matter or other objectionable materials.
  - .1 Dispose of surplus and unsuitable excavated material off site.

#### **3.2 GRANULAR BASE**

- .1 Obtain Departmental Representative's approval of subgrade before placing granular base.
- .2 Place granular base material to lines, widths, and depths as indicated.
- .3 The area excavated to receive the new trenching must be stabilized to a compaction of 95% corrected max. Dry density with crushed stone above it as per drawings.

#### **3.3 CONCRETE**

- .1 Place reinforcing steel as indicated on placing drawings in accordance with CSA-A23.1/A23.2.
- .2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .3 Ensure cover to reinforcement is maintained during concrete pour.
- .4 Obtain Departmental Representative approval of granular base and reinforcing steel prior to placing concrete.
- .5 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .6 Immediately after floating, give sidewalk surface uniform broom finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom in direction normal to centre line.

- .7 Top of the new concrete/steel grate assembly must not create a slip or trip hazard.

**3.4 TOLERANCES**

- .1 Finish surfaces to within 3 mm in 3 m as measured with 3 m straightedge placed on surface.

**3.5 CURING**

- .1 Cure concrete by adding moisture continuously in accordance with CSA-A23.1/A23.2 to exposed finished surfaces for at least 1 day after placing, or sealing moisture in by curing compound as directed by [Departmental Representative.
- .2 Where burlap is used for moist curing, place two prewetted layers on concrete surface and keep continuously wet during curing period.
- .3 Apply curing compound evenly to form continuous film, in accordance with manufacturer's requirements.

**3.6 CLEANING**

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

**END OF SECTION**