

**Part 1        PART 1 – GENERAL**

**1.1        GENERAL**

- .1        This site is a remote location and a visit by individual contractors is not required prior to tender close.
- .2        This is an operation military facility which will be actively utilized by the Client during roof repair work.
- .3        This facility is on an active airport and access to site, airport ramps and runways is strictly controlled by the Client and transport Canada regulations.

**1.2        SCOPE OF WORK**

- .1        This Section includes the provisions for the repair of the existing metal roof system along with removal and replacement of a designated area of the existing roof system as indicated on the drawings and specified herein.
- .2        This section of work includes all labour, materials, equipment and services necessary or required to complete the work specified.
- .3        Work included within the scope of work will need to be completed during the winter months. The Contractor shall include all costs necessary to complete the work during the winter months, this shall include protective enclosures, material and equipment.
- .4        In instances where more than one code, regulation or specification requirement may exist, the more restrictive requirement shall govern. Contractor shall provide written notification to the Owner and Consultant where clarification is required or conflict in governance exists.
- .5        Supply and installation of all required temporary safety systems, fencing, protective covered entrance hoarding, barriers, equipment and site security necessary to complete the work in a safe manner and in conformance with the contract documents.
- .6        In general the scope of work includes:
  - .1        Removal and replacement of the metal roof system in the area defined within the design documents.
  - .2        Removal of all existing perimeter and end lap seals, this work shall include removal of previously installed sealants, asphalt & mastic bitumen and painted finishes.
  - .3        Supply and installation of new MicroSealant tape. This work will include the requirement to use hot air guns to allow for the installation of the MicroSealant tape in cold weather. This work includes installation of tape seals at:
    - .1        All end laps within the entire roof deck.
    - .2        All standing seams within the entire roof deck.
    - .3        All perimeter joints along the north, south, east and west elevations.

- .4 New and existing joints within the rain gutters along the north and south elevations of the building.
- .5 All lighting arrest anchors, rods and cable securement straps within the entire metal roof system.
- .4 Installation of new exhaust and vent stack membrane flashing.
- .5 Replacement of 6.096 meters of damaged rain gutter and accessories necessary to install new length of rain gutter on the north elevation of the building.
- .6 Installations shall include all necessary material, equipment, accessories and trim required to complete the Scope of Work as defined within the Contract Documents.
- .7 The existing roof system has 49 panels on the short access and 5 panels (per side, total of 10) on the long access of the roof system. The roof deck has a total of 490 end laps to be repaired.
- .8 Removal and transport of all construction debris from the site and disposal of all construction debris at an approved landfill site. The Contractor's bid amount shall include all costs and fees related to and associated with the transportation and disposal of all construction waste and debris.
- .9 The Contractor shall be responsible for confirming the installation requirements. Errors and omissions in the Contractor's bid submissions do not relieve the Contractor of their responsibilities to supply the materials and services defined within the Contract Documents.

### **1.3 DESIGN REQUIREMENTS**

- .1 Design replacement roof system to resist
  - .1 Snow loads and snow build-up and rain load, expected in this geographical region NBCC climatic data, 50 year probability.
    - .1 Snow Load- 2.5 KPa
  - .2 Wind loads, positive and negative, expected in this geographical region NBCC climatic data, 50 year probability.
    - .1 (1/50)- 0.75 KPa
  - .3 Dead load of roof system.
  - .4 Maximum uplift centre / body of roof: 3.6 KPa
  - .5 Maximum uplift perimeter of roof: 4.6 KPa
- .2 Deflection of the roof system is not to exceed 1/180<sup>th</sup> of the span for the specified live loading.
- .3 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, overstressing of components, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.
  - .1 Temperature Change (Range): -40 deg C, ambient; 20 deg C, material surfaces

## **1.4 REFERENCES AND STANDARDS**

- .1 Design of cladding system in accordance to the latest edition of:
  - .1 CSA-S136 for the design of Cold Formed Steel Structural Members.
  - .2 CAN/CGSB-93.1, Sheet Aluminum Alloy, Prefinished, Residential.
  - .3 Canadian Sheet Steel Building Institute Standards 10M and 20M.
  - .4 National Building Code of Canada, latest edition.
- .2 Aluminum Association (AA).
  - .1 AA DAF-45, Designation System for Aluminum Finishes - 9th Edition.
  - .2 AA ASM-35, Specifications for Aluminum Sheet Metal Work in Building Construction, Section 5.
- .3 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
  - .2 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .3 ASTM A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.
- .4 Department of Justice Canada.
  - .1 Canadian Environmental Protection Act (CEPA), 1999.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .6 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC).
  - .1 CCMC, Registry of Product Evaluations.
- .7 Execute work to meet or exceed:
  - .1 National Building Code of Canada 2010 (Latest Edition), including all amendments up to project date.
  - .2 Canadian Construction Safety Code (Latest Edition).
  - .3 Rules and regulations of authorities having jurisdiction.
  - .4 In instances where more than one code, regulation or specification requirement may exist, the more restrictive requirement shall govern. Contractor to provide written notification where clarification is required or conflict in governance exists.

**1.5 DRAWINGS AND SPECIFICATIONS**

- .1 Dimensions shown on the design drawings were taken from the as-built documentation made available to the Consultant. Contractor to verify all dimensions prior to start of work on site.
- .2 The drawings shall serve as the working drawings, but absolute accuracy of dimensions is not guaranteed and no claim for extra payment on account of differences between actual and estimate dimensions will be allowed.

**1.6 EXAMINATION**

- .1 Verify building and roof system dimensions on site prior to start of work. Confirm tolerances, method of attachment and compatibility of materials included in the scope of work.
- .2 Verify access and operational requirements of the Owner on site prior to preparation of bid amount and start of work.
- .3 The existing roof system and new roof system design are based upon information provided and assumed conditions and assemblies. The Contractor shall include costs for minor adjustments to the final installation to accommodate as found conditions.
- .4 The Contractor shall be responsible for the safety of the building and equipment therein, Contractor's work force, occupants of the building and members of the public.
- .5 The Contractor shall supply and install temporary safety measures including:
  - .1 Covered hoarding at entrances, where necessary or requested by the Owner.
  - .2 Temporary perimeter guard rails at the roof level.
  - .3 Safety barricades.
  - .4 Safety signage.

**1.7 SUBMITTALS**

- .1 Product Data sheet:
  - .1 Manufacturer's printed product literature, specifications, installation instructions and data sheet.
  - .2 Pre-printed WHMIS / MSDS Data Sheets for all building components and materials, describing storage of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards, handling and safety precautions.
  - .3 Include installation instructions for the roofing materials specified.
- .2 At the completion of the stages listed below the Contractor shall:
  - .1 At the completion of the work, an affidavit indicating that only new material was used and that work (material and application workmanship) meets the manufacturer's requirements and standards.

- .2 Roofing work was completed in accordance with applicable standard in Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual.
- .3 Submit all required information promptly and in orderly sequence to not cause delay in Work. Failure to submit all required information or samples in time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed. Do not proceed with Work affected by submittal, until review is complete.
- .4 Contractor to review and verify all submittals prior to submission to Owner or Consultant. The Contractor's review and submission represents confirmation that all necessary requirements have been determined and verified by the Contractor on site, and that each submittal has been checked and coordinated with requirements of the Work, Contract Documents and their sub-trades or suppliers. Submittals not stamped, signed, dated and identified by the Contractor will be returned without being examined and considered rejected.
- .5 Keep one reviewed copy of each submission on site.

## **1.8 SHOP DRAWINGS**

- .1 The term "shop drawings" means drawings, diagrams, illustrations, manufacturers data sheets, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work. Provide shop drawings for:
  - .1 Design and installation of new metal roof system within the designated area of the existing metal roof deck.
- .2 Submit shop drawings for review prior to fabrication. The Contractor shall be responsible to verify field measurements and existing site conditions prior to start of work. Errors in field recording and shop drawing submissions are the sole responsibility of the Contractor and their sub-trades and suppliers. The Contractor's responsibility for errors and omissions within their submission is not relieved by the Owner's, Consultant's or a designated third party review.
- .3 Adjustments made on shop drawings by the Owner, Consultant or their designated agent is not intended to change the Contract Price. If adjustments affect value of Work, state such in writing to Owner and Consultant prior to proceeding with Work.
- .4 Make changes in shop drawings required, consistent with Contract Documents and review process. When resubmitting, notify Owner and Consultant in writing of revisions other than those requested. Do not make any changes to Shop Drawings after final review without written permission from the Owner and or Consultant.
- .5 Shop drawing submissions shall include but not be limited to:
  - .1 Project title and project number:  
**2015 FOL Hanger Roof Repair  
PWGSC – Iqaluit  
PWGSC Project No.: R.075595.001  
Concentric Project No: 14-5911B**

- .2 Indicate materials and details to scale for layout, installation and description of related components.
- .3 Indicate materials, methods of construction and attachment or anchorage details, erection diagrams, connections, explanatory notes and other information necessary for completion of Work Date and revision dates.
- .4 Name and address of (as applicable):
  - .1 Contractor
  - .2 Subcontractor.
  - .3 Supplier.
  - .4 Manufacturer.
  - .5 Other pertinent details including product or model numbers where applicable.
- .5 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .6 Details of appropriate portions of Work as applicable:
  - .1 Continuity of air and vapour barriers.
  - .2 All roof level equipment and systems.
  - .3 Transitions and slope.
  - .4 Relationship to adjacent work.
  - .5 Integration and installation of new and existing building systems and components.
- .6 If upon review, no errors or omissions are noted, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of revised shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .7 Contractor to review shop drawings prior to submission to the Owner. The Contractor is responsible for dimension which shall be confirmed on site and prior to fabrication. The Contractor shall also confirm the installation details, techniques and for the co-ordination of Work of all sub-trades and suppliers. Review of shop drawings by the Owner, Consultant or their designated agent is for the sole purpose of ascertaining conformance with the contract documents, specifications and general concept. Review by the Owner, Consultant or other parties does not represents or confirm that all necessary requirements and dimensions have been determined and verified by the Contractor. The Owner, Consultant or third party agent shall not be responsible for errors or omissions within the reviewed shop drawings submitted by the Contractor, their sub-trades, suppliers or the costs associated with these errors and or omissions therein.
- .8 Indicate arrangement of metal roof panels, including joints, types and locations of support members, panel anchor clips, size & type of fasteners, seals, flashings, gutters and all system components related to the new roof installation.
- .9 Drawings shall be signed and sealed by a Professional Engineer, attesting to the ability of the metal panel's assembly to withstand the specified snow loads and wind loads.
- .10 After final review, distribute copies.

**1.9 WARRANTY**

- .1 Contractor's guarantee: Provide a written warranty, signed and issued in the name of the Owner, stating that the Contractor will guarantee to repair at his own expense any leaks in the new roofing system, end lap seals and related work resulting from faulty workmanship or installation, for a period of five (5) years after the date of the Certificate of Substantial Performance and acceptance of the completed work by the Client / Owner.
- .2 Manufacturer's guarantee: Provide a written warranty, signed and issued in the name of the Owner, stating that the metal roof system manufacturer will guarantee to repair at his own expense material and labour any leaks in the metal roof deck resulting from defects in the manufacture of the metal roof panels for a period of ten (10) years from the date of the Certificate of Substantial Performance.

**1.10 FIELD QUALITY CONTROL**

- .1 The Consultant will be appointed by the Owner to supervise the work of this Section and to verify the satisfactory completion of the work in accordance with the Contract documents.
- .2 The Contractor shall provide fourteen (14) working days' written notice to the Owner and Consultant prior to the commencement of work on site. Work on site shall be coordinated with the owner's use and occupation of the site and building.
- .3 The Contract includes for an initial 5 days of fulltime inspection by the Consultant at which time the Contractor shall be responsible to undertake the following work on site:
  - .1 Initial site meeting.
  - .2 Removal and replacement of the designate area of metal roof deck.
  - .3 Mock-up of typical end lap repairs.
  - .4 Mock-up of typical roof perimeter repairs (end and side elevations).
  - .5 Mock-up of typical exhaust stack / vent repairs.
- .4 The initial site meeting will be held on the day the project starts, with the following present:
  - .1 Prime / General Contractor.
  - .2 Metal roof deck sub-trade (if applicable).
  - .3 Design Consultant.
  - .4 Owner's project representative(s).
- .5 The Consultant will present the agenda and will take minutes of the meeting.
- .6 Ensure all sub-trades and effected parties receive copies of minutes as required no later than three (3) days after distribution by Consultant or Project Manager
- .7 Cooperate with Owner and Consultant and afford all facilities necessary to permit full inspection of the work and testing of materials prior to and during their installation. Act immediately on the instructions given by the Owner or Consultant.



**1.11 DELIVERY AND STORAGE**

- .1 All materials shall be delivered and stored in their original packaging, bearing the manufacturer's name, related standards and any other specification or reference accepted as standard.
- .2 Carefully store materials delivered to the site, store metal panels and flashings in such a way as to prevent wrinkling, twisting, scratches and other damage.
- .3 Do not stockpiling materials on the roof decks in a way which could cause overloading or damage to the existing roof system, building & structure. Damage to the roof system or building structure caused by the Contractor, their work force, sub-trades or suppliers shall be repaired by the Contractor, at their expense, as required and directed by the Owner and Consultant.
- .4 The Contractor shall be responsible for the security of their equipment and materials on site.
- .5 The Owner shall not be responsible for costs associated with transport, theft, loss or damage to equipment and materials stored on site or at the Contractors facilities.

**1.12 USE OF SITE FACILITIES**

- .1 The Contractor shall provide access to and about the site to ensure continuous and efficient delivery and movement of materials and equipment by the Owners forces. Arrange routes so that they do not conflict with Owner's operations and access to the building.
- .2 The Contractor may use the existing washroom services, where provided and approved by the Owner, but if not available, the Contractor shall provide such service at no cost to the owner.
- .3 The Contractor shall assume all liability for, and be responsible for loss of or damage to, all equipment and materials stored on site, and for any equipment or materials delivered from whatever source to the site of the work.
- .4 The use of the power services will be provided at no cost to the Contractor. The Owner reserves the right to revoke these privileges if they are abused. If required, the Contractor shall arrange, pay for connection and disconnection fees and maintain temporary electrical power supply in accordance with governing regulations and ordinances.
- .5 At the completion of the work, all temporary connections and equipment shall be removed and the services and finishes shall be made good by the Contractor to the satisfaction of the Owner.
- .6 The Contractor shall provide and maintain interior building temperature required to prevent moisture, frost and cold related damage to the work, the building or the contents therein.



- .7 The Contractor shall provide and maintain temporary facilities and services required to carry out the work.
- .8 Restrict all personnel employed in connection with the work to the area(s) approved for access by the Contractor.

### **1.13 SCHEDULE**

- .1 Format
  - .1 Prepare a proposed work schedule in form of excel type line chart or manual sequence of events with dates.
  - .2 Provide line for each trade or operation.
  - .3 Provide horizontal time scale identifying first work day of each week.
  - .4 Format for listings: Chronological order of start of each item of work.
- .2 Submission
  - .1 Submit initial schedule within 10 days after award of Contract.
  - .2 Submit updated schedules with each progress claim or as agreed upon at start-up meeting.
- .3 Removal and installation of the metal roof deck must be undertaken by the Contractor with the Consultant present. The Contractor shall be required to co-ordinate the removal, installation and inspection of the metal roof deck replacement with the Consultant. The Contractor must provide written notice to the Consultant 14 days in advance of the metal roof deck replacement.

### **1.14 AS-BUILT DRAWINGS AND DOCUMENTATION**

- .1 Obtain from Consultant at commencement of work, two (2) sets of white prints of drawings for purpose of recording changes and deviations to work as-built.
- .2 Maintain these prints and make available to trades so that all changes and deviations may be recorded promptly as they occur. Be responsible for ensuring that such record of all changes is up to date at all times. Upon completion of work, return these drawings complete and in good condition to Consultant so that owner will have record of exact location of all services and equipment.

### **1.15 OVERTIME**

- .1 Overtime costs shall be included in the Unit and Stipulated Prices provided in the form of Tender. No extra costs will be paid by Owner for work which must be performed outside normal working hours.

### **1.16 PROTECTION**

- .1 Special measures shall be taken for dust control and debris on site. Provide dust filters to any intake and exhaust ducts affected by this contract. Shutting down of the existing ventilation system may not be permitted. Protect all doors and openings against dust penetration into areas of the building.

- .2 Prevent movement, settlement or damage of adjacent structures, paving and landscaping. Provide bracing or shoring as required. Repair damage caused by demolition or work on site as directed by the Owner or Consultant.
- .3 Support affected columns and adjacent floor structure and, if safety of the structure or services appears to be endangered, take preventative measures and then cease operations and notify the Consultant.
- .4 Prevent debris from blocking surface drainage systems, mechanical and electrical systems which must remain in operation.
- .5 Do not dispose of waste or volatile materials such as: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses. Ensure proper disposal procedures are maintained throughout project. Do not pump water containing suspended materials into watercourses or onto adjacent properties. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.
- .6 Prevent extraneous materials from contaminating air beyond work area, by providing temporary enclosures during demolition work.
- .7 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all affected levels.
- .8 At end of each day's work, leave work in safe, secure and stable condition.

#### **1.17 FIRE & SAFETY REQUIREMENTS**

- .1 Comply with the requirements the Safety Act, DND regulations and Federal / Territorial regulations for Constructions Projects in effect.
- .2 Have at a minimum of three serviceable 'A-B-C' fire extinguisher in the area of work.
- .3 Fire extinguishers are to be inspected prior to the start of work each day by the Contractors' site supervisor, damaged or discharged fire extinguishers are to be removed from site and replaced immediately and prior to the start of work.
- .4 Comply with all site safety regulations as stipulated by the Owner, including the proper use and wearing of foot, eye, fall and head protection at all times. All required safety regulations will be stringently enforced by the Owner and the Consultant. Failure to comply with on-site safety requirements will result in expulsion of the non-compliant worker(s). No claim for delay or extension shall be permitted due to non-conformance with safety regulations.
- .5 The building is an operational facility and the Contractor must co-ordinate all access and work on site with the Owner and the operational requirements of the Department of National Defense (DND) and Public Works and Government Services Canada (PWGSC).

**1.18 WASTE MANAGEMENT AND DISPOSAL**

- .1 Remove from site, transport and dispose of packaging materials at appropriate recycling facilities.
- .2 Place materials defined as hazardous or toxic waste in designated containers, transport and dispose at an authorized site approved to receive hazardous or toxic waste.
- .3 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Federal, Territorial and Municipal regulations.
- .4 Ensure emptied containers are sealed and stored safely.
- .5 Divert unused metal materials from landfill to metal recycling facility.
- .6 Unused paint, caulking, and sealing compound materials must not be disposed of into water courses, onto ground or in other location where it will pose health or environmental hazard.
- .7 Fold up metal banding, flatten and place in designated area for recycling.

**Part 2 PART 2 – PRODUCTS**

**2.1 MATERIALS:**

- .1 This section establishes the standard of quality required for the complete metal roof system. Proposed substitutions must meet this standard, and will be considered as follows:
  - .1 A written request for approval of a substitution is received at least ten (10) days prior to tender closing.
  - .2 The request includes a complete item-by-item description comparing the proposed substitution to the specified system, together with manufacturer's literature, samples, test data, engineering standards and performance evaluation indicating comparable standards to those specified.
- .2 Prefinished Roof Sheet, exposed to exterior.
  - .1 Metal Roof Panel 22 Ga, grade 33 galvanized metal panel, sheet steel conforming to ASTM A653M structural quality, TSR 1000 by Vicwest.
  - .2 Profile: TSR, Seamed joint at 610 mm (24") wide, with seams a minimum of 50 mm (2 inches) above the bottom of the ribbed profile.
  - .3 Coating: Prepainted with WeatherX™ on interior (underside) face.
  - .4 Clip and Fastening System: TSR Clip, made from galvanized material, 12 Ga thickness, 317 mm (12 ½") long, 133 mm (5 ¼") high, purpose-made, with two sliding clips designed to accommodate expansion and contraction of the metal roof panel / sheet.
- .3 Metal Roof Panel Fasteners:
  - .1 Panel Clip securement:

- .1 14A x 31 mm (1¼") Self Tapping Screws.
- .2 Stainless steel
- .3 Quantity as specified by the manufacturer, minimum 2 screws per TSR clip
- .4 As specified by manufacturer and design engineer, to resist wind uplift and snow loads.
- .2 Exposed Prefinished Metal Fastener:
  - .1 8mm x 25 mm, self tapping screws.
  - .2 Prefinished with gasket
  - .3 As specified by manufacturer and design engineer, to resist wind uplift and snow loads.
- .3 Thermal Block Fastener: Self drilling, 3 ½" long with a flat pan head.
- .4 Butyl Tape: 3 mm x 13 mm wide
- .5 End Lap Micro-Tape: MicroSealant tape, manufactured by ETERNABOND.
  - .1 RoofSeal™ Tape, colour grey, 150 mm (6") width, thickness: 35 mils, tensile strength: 4500PSI (+/- 500 PSI), permanence: 0.001 perms.
  - .2 DoubleStick™ Tape: Tape, 50 mm (2") width, thickness: 30 mils, permanence: 0.001 perms.
  - .3 Cleaner: Eterna Clean, manufactured by ETERNABOND or a non-residue cleaner such as acetone or lacquer thinner.
  - .4 Primer: Eterna Prime, manufactured by ETERNABOND.
- .6 Insulation: Thickness to match the existing batt insulation, with an uncompressed areas to provide R40.

## **2.2 ACCESSORIES**

- .1 Flashing: Formed from same materials and colour as the existing roof flashings. Custom fabricated to suit architectural details and existing site conditions or as required.
- .2 Gable End Foam Closures: Foam and metal closures to suit profiles selected, to manufacturer's recommendations.
- .3 Sealants: In accordance with manufacturer's recommendation and Section 07 90 00.
- .4 Rain gutter support brackets: Aluminum or galvanized metal rain gutter support and securement brackets compatible with existing rain gutters.

## **2.3 BITUMENOUS FLASHINGS**

- .1 This specification is based on roofing systems and products manufactured by the following companies:
  - .1 Bakor Inc. (Henry)
  - .2 Soprema Waterproofing Inc.
  - .3 IKO

- .2 Primer
  - .1 Alternative products shall meet or exceed the properties and performance of the specified products, in all respects. The Contractor must provide written confirmation of compatibility of all roof system components and CCMC product evaluation certification.
  - .2 Asphalt primer: black bituminous primer. Acceptable product: Elastocol 350 or Elastocol Stick or approved equivalent for torch applied or self-adhering membranes.
- .3 Membrane Flashings
  - .1 SBS- modified bitumen sheet, for torch application, with granule surfacing, minimum 3.8 mm thick, minimum 250 g/m2 non-woven polyester reinforcement, meeting CGSB 37-GP-56-M classification type 2, Class G, Grade 2.

**Part 3            PART 3 — EXECUTION**

**3.1                SURFACE INSPECTION AND PREPARATION**

- .1 Before commencing works, ensure that all surfaces are smooth, dry, clean, and free of ice and debris. The deck must be free of contamination by materials which could affect the adhesion and securement of the new roofing seals or the physical integrity of the membrane itself. No salt or calcium shall be used to remove ice or snow.
- .2 Removal of the existing bituminous sealant and mastic materials must be completed prior to installation of new materials. This work may include the use of solvents cleaners and non-ferrous wire brushes.
- .3 Areas with surface corrosion shall be wire brushed cleaned and repainted with the application of two coats of a compatible galvanized paintable sealer.
- .4 Ensure that the work of other trades has been properly completed prior to the installation of new metal panels and micro-sealant tape.
- .5 Commencement of roofing installation shall be construed as acceptance of the substrate, and thereafter the Contractor shall be fully responsible for satisfactory completion of the work as required herein.
- .6 After removal of the existing metal roof system assembly within the designated area and before commencing the work of this Section, conduct an inspection of the existing substrate and steel support members with the Consultant to review and accept the condition of the existing substrate. Ensure that the deck and all parts of the structure that are to be covered with the new metal roof panels are secure and free of excessive moisture or other deficiencies that will impact the installation and performance of the metal roof system

**3.2 PROTECTION**

- .1 Cover walls and adjacent work where materials are hoisted or used. Protect adjoining surfaces against any damage that could result from roofing repairs.
- .2 At end of each day's work or when stoppage of work occurs due to inclement weather, provide protection for completed and incomplete work. Contractor shall be responsible for inspection and securement of all materials, equipment and building systems on the roof level. Contractor shall inspect the site on a daily basis during periods of severe weather or prolonged work stoppage due to weather or other factors.
- .3 Use and maintain warning signs and barriers at roof and ground level.
- .4 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed and incomplete work.
- .5 Ensure that all materials or equipment left on the job site or atop the roof system are tarped, secured in place and protected from the elements and extreme weather conditions.

**3.3 FABRICATION**

- .1 Fabricate roof components to comply with dimensions, profiles, gauges and details as shown on the shop drawings, including fascia and soffit panels and all companion flashing.
- .2 Fabricate all components of the system in the factory, ready for field installation.
- .3 Provide roof sheet and all accessories in longest practicable length to minimize field lapping of joints.

**3.4 INSTALLATION OF NEW METAL ROOF DECK**

- .1 Do not install materials under conditions of rain, snow or fog. Install roofing elements on clean and dry surfaces, in accordance with the manufacturer's requirements and recommendations. Perform work on a continuous basis as surface and weather conditions allow.
- .2 Insulation: Install new insulation where existing insulation has been compromised by previous moisture leakage. Install new insulation to match existing, insulation shall conformance with the manufacturer's recommendations. Ensure proper compression at purlins. Lap all side and end joints to form a continuous, sealed air/vapour barrier. The Contractor shall include for the removal and replacement of 50% of the existing insulation within the area designated for roof deck replacement.
- .3 Panel clips shall be installed at every purlin location where metal roof panel replacement is designated for replacement. Do not re-use the existing screw holes when installing new panel clips to the existing purlins.
- .4 It may be necessary to remove and re-install the existing thermal blocks installed atop the steel purlins to allow installation of the new metal panel clips.

- .5 Installation of the TSR panels is a progressive system. The panels interlock one into the other, beginning at the existing roof system designated to remain. Before installing each panel, check that the panel's alignment and that the seam sealant is in place at the standing seam and is not damaged or contaminated.
- .6 Stagger end lap seams between each panel.
- .7 Install metal roof panels on panel support clips, using manufacturer's recommended construction procedures. Ensure metal roof panel is positively locked along the full length of roof. Close interlocking side joints by using a purpose-made seaming machine, as recommended by the manufacturer.
- .8 Install new panel clips at all purlins within the designated area of repair.
- .9 Clips are secured to the existing supports purlins with (minimum 2) self-drill fasteners. Ensure that all tabs of the clips are positioned in the center of the clip slots prior to seaming of the roof panel and allow for optimum sheet movement.
- .10 Check and verify the coverage and alignment of each panel during and after installation, correct if required. It is recommended that the TSR Roof Panel side laps be seamed immediately as the installation of the TSR progresses. Un-seamed panels can disengage in high winds.
- .11 Where indicated, secure the end-lap of metal roofing sheets in accordance with the manufacturer's specifications, reviewed shop drawings and details to provide a weather-tight seal. Use exposed fasteners to match colour of the existing roof system. Secure all end joints and provide a weather tight seal.
- .12 Install all companion flashing gutters, as shown on the shop drawings. Use concealed fasteners when possible. Exposed fasteners to match colour of existing flashings.
- .13 At the eave, a double row of Butyl Tape is applied on top of the Eave / Gutter flashing in such a fashion that it is concealed when the TSR Roof Panel is installed. TSR sheets are anchored at the eave with exposed fastener which are installed between the two rows of the Butyl Tape sealant.
- .14 Installation of the TSR Roof Panels shall include the installation of 7 exposed fasteners at the eave and panel ends using #3pt, 7mm x 25mm long self-drilling fastener, c/w Neobonded Washers, U.N.O. Ensure that the two outer fasteners catch the leg on either side of the Eave Metal Closures at the fascia.
- .15 Install a panel stiffener plate under the leading edge of each metal TSR roof panel. The stiffener plate leg is facing down into the insulation and should bear directly over the support. Ensure that the stiffener plate does not get fastened into the support member below.
- .16 The upper TSR Roof Panel shall be centered on the TSR clip below the lower panel.
- .17 Apply two rows of the Butyl Tape at the end laps of the metal TSR roof panel.



- .18 The upper TSR Roof Panel should lap onto the lower TSR Roof Panel by a minimum of 64mm. The upper and lower TSR Roof Panels are fastened through to the stiffener plate using #3pt, 8 mm x 25 mm long self-drilling fastener, c/w Neobonded Washers, across the width of the panel.
- .19 Staggered end laps across the width of the roof system
- .20 Replace all damaged existing metal securement straps at gable end of the roof system, along gridline A and H. Contractor to include for replacement of 40% of the existing securement straps.

### **3.5 INSTALLATION OF MICRO SEALANT TAPE**

- .1 This section includes installation of tape seals at:
  - .1 All end laps within the entire roof deck.
  - .2 All standing seams within the entire roof deck.
  - .3 All perimeter joints along the north, south, east and west elevations.
  - .4 All lighting arrest system cable securement straps and rods.
- .2 Install micro sealant tape at all end lap joints within the new and existing standing seam, metal roof deck. New micro sealant end lap seals shall include the installation of 50 mm DoubleStick tape and 150mm (6") width, RoofSeal tape. Install end lap seals prior to installation of standing seam micro sealant tape.
- .3 Install micro sealant tape atop all standing seams in the roof deck. Install micro sealant tape seal in a shingle fashion, down the slope of the roof deck.
- .4 Install micro sealant tape seals atop all joints between the metal roof deck and sheet metal flashings along the perimeter of the roof deck, on all four elevations.
- .5 All surfaces must be clean and dry prior to installation of the new tape seals. Remove asphalt mastic, bitumen, oil, grease, moisture, dust, dirt, sealants, oxidation, foreign matter or contaminants prior to installation of the new tape seals.
- .6 If surface rust is present, remove rust from the surface of the metal roof deck prior to installation of micro sealant tape. Use non-ferrous metal brush if necessary.
- .7 Clean prepared surface with EternaClean or a non-residue cleaner such as acetone or lacquer thinner.
- .8 Pre-treat cleaned surfaces with EternaPrime, surface primer. Allow primer to dry completely prior to installation of tape seals.
- .9 Use a hot air gun to remove frost and moisture from the surface of the metal roof deck prior to installation of the micro sealant tape. A hot air gun shall be used to warm the surface of the metal roof deck and micro sealant tape when the temperature drops below 2 degrees Celsius.
- .10 Do not leave gaps or fish mouths at the end of a tape seal.

- .11 Installation of micro sealant roof tape:
  - .1 Remove release liner on the underside of the tape, only remove enough liner for the area you are working on. Keep adhesive side clean and dry. Apply tape to prepared surface.
  - .2 Apply pressure to activate bonding process, use a steel roofer's roller and apply a uniform / firm pressure and ensure full and complete bonding of the tape seals to the underlying surfaces.
  - .3 For cold weather application, keep tape at room temperature before applying.
  - .4 Install end lap seals prior to installation of standing seam seal.
- .12 Fish mouths and air pockets within the completed micro-sealant tape will not be acceptable. Remove and re-install defective micro-sealant tape.

### **3.6 MODIFIED BITUMENOUS FLASHINGS**

- .1 Install new modified bituminous membrane flashings at all mechanical equipment openings within the entire roof system.
- .2 Clean metal surfaces and remove all existing flashing repair materials.
- .3 Asphalt Primer Application
  - .1 Treat all surfaces to be roofed with Primer to improve adhesion. Apply by brush or roller at a rate recommended by the primer and or roof membrane manufacturer.
  - .2 Note that the drying time of the primer is related to the ambient temperature and may vary from a few hours to a whole day. Do not proceed until the primer is dry.
- .4 Weld cap sheet flashings onto top of metal roof deck and side mechanical unit opening with torch recommended by membrane manufacturer. Membrane flashings shall be laid in strips maximum 1 m wide and torch applied. Overlap 75 mm (minimum) on side laps and extend 450 mm onto flat roof deck area. Embed granules as required where other membrane work is to overlay granulated membrane surfaces.
- .5 Avoid overheating membrane during installation. Replace or repair areas and sections of membrane damaged by overheating.

### **3.7 GARBAGE AND DISPOSAL OF DEBRIS**

- .1 Remove stockpiled garbage material and debris as directed by the Owner and or Consultant, when it interferes with operations of project construction or safety on site. Supply clearly marked disposal bins for waste material. All material and debris from the building become the property and responsibility of the Contractor once they have been removed from the building.
- .2 Transport garbage material and debris using approved haulers and receiving organizations in accordance with applicable regulations. Ensure that these materials will be disposed of in authorized landfill or waste disposal sites. Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

- .3 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.

**3.8 CLEAN-UP**

- .1 Remove protective film from panels.
- .2 Repair and touch up with colour matching high grade enamel minor surface damage, only where permitted by the Consultant and only where appearance after touch-up is acceptable to Consultant and Owner.

**END OF SECTION**

**Part 1 General**

**1.1 Scope of Work**

- .1 This Section includes the provision for the installation of new prefinished sheet metal flashings, trim and 6m length of rain gutter along perimeter of repair area. This section of work includes all labour, materials, equipment and services necessary or required to complete the removal of existing and installation of a new prefinished sheet metal flashings and trim.
- .2 In general the scope of work includes, but is not limited to:
  - .1 All labour, materials, equipment and services required and necessary to remove the existing sheet metal flashings and trim and installation of a new sheet metal flashings and trim.
  - .2 Removal from site and disposal of the existing roof system and related sheet metal debris. The Contractor's bid amount shall include all costs and fees related to and associated with the transportation and disposal of all construction waste and debris.
  - .3 Installation of a new 24ga prefinished sheet metal flashings, continuous 22ga starter strips and prefinished non-corroding fasteners.
  - .4 Install new sheet metal flashings as specified and detailed herein.

**1.2 Samples**

- .1 Provide three, 4" x 4" samples of sheet metal material, colour and finish.

**Part 2 Products**

**2.1 Prefinished Sheet Metal**

- .1 Prefinished steel with factory applied silicone modified polyester, Class F1S.
- .2 Colour selected by Owner from manufacturer's standard range.
- .3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.
- .4 Coating thickness: not less than 25 micrometers.
- .5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate than 20% to ASTM D822 as follows:
  - .1 Outdoor exposure period 1000 hours.
  - .2 Humidity resistance exposure period 1000 hours.
- .6 Base metal thickness 0.0403" (24 gauge) unless indicated otherwise. Base metal to be hot-dipped galvanized steel with coating designation Z275 (G90).
- .7 Contractor to allow for a choice of three different colours for use on this project.

**2.2 Accessories**

- .1 Continuous Starters: sheet metal, minimum 2" wide or as required on site and detailed. Thickness of continuous starter to be 22 gauge.
- .2 Fasteners: of same material as sheet metal, to CSA B111, non-corroding, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.
- .3 Exposed fasteners: Nylon head screws, hexagonal head with colour to match metal flashing colour and complete with neoprene washers.
- .4 Touch-up paint: as recommended by metal flashing and trim manufacture.

**2.3 Fabrication**

- .1 Fabricate metal flashings and other sheet metal work as detailed and in accordance with applicable CRCA 'FL' series details.
- .2 Form pieces in 2400 mm maximum lengths. Installation and securement shall include allowance for expansion and contraction within the completed assembly and at the joints.
- .3 Hem exposed edges on underside 12 mm. Miter and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Installation of the new exterior sheet metal flashing shall be completed and installed to match the existing detail, dimensions and profiles used on the existing roof systems.

**Part 3 Execution**

**3.1 Installation of Sheet Metal Flashing**

- .1 Install sheet metal work in accordance with CRCA FL series details, and as detailed.
- .2 Use concealed and exposed fasteners where noted within the design drawings.
- .3 Starter strips shall be continuous and comprised of 22 ga. material, secure starter stripes to substrate with compatible, non-corroding fasteners at 12" (300 mm) on center. .
- .4 Lock end joints and seal the joint with sealant.
- .5 Seal all flashing joints and termination points with sealant, see Section 07 90 00, Sealants.
- .6 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

- .7 Remove and re-install existing sheet metal flashings and siding designated to remain on the building as necessary to allow installation and integration of new roof system with the existing building. Re-install existing sheet metal flashings designated to remain or fabricate new sheet metal flashings and seal with the application of sealant material.
- .8 Install new continuous starter strips, inside and outside corners, edgings, soffit, drip, and caps where existing material has been damaged by removal.
- .9 Install outside corners, fillers and closure strips with carefully formed and profiled work.
- .10 Maintain joints in exterior sheet metal, true to line, tight fitting, hairline joints. Trim the existing sheet metal if necessary to complete the installation of the new roof system.
- .11 Attach components in manner not restricting thermal movement.
- .12 Seal junctions with adjoining work and dissimilar materials with sealant.

**END OF SECTION**

**Part 1 General**

**1.1 Scope of Work**

- .1 This Section includes the provision for the installation of new sealant material. This section of work includes all labour, materials, equipment and services necessary or required to complete the removal of existing sealant material and installation of a new sealant material.
- .2 Scope of work shall include:
  - .1 Removal and replacement of existing sealant materials within and between the dissimilar materials and sheet metal joints.
  - .2 Removal and replacement of existing sealant material as specified herein.
  - .3 Installation of new sealant material as noted within the design drawings and specified herein.

**1.2 References**

- .1 CAN/CGSB-19.13-M87 Sealing Compound, One-component, Elastomeric, Chemical Curing.

**1.3 SUBMITTALS**

- .1 Submit product data for all materials and products to be used on site.
- .2 Manufacturer's product to describe.
  - .1 Caulking compound.
  - .2 Primers.
  - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3 Submit duplicate samples of each type of material and colour.
- .4 Submit duplicate copies of each Material data sheet.
- .5 Submit duplicate copies of each MSDS data sheet.

**1.4 Delivery, Storage, and Handling**

- .1 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture and water.

**1.5 PROJECT CONDITIONS**

- .1 Do not proceed with installation of joint sealants under following conditions:
  - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.



- .2 When joint substrates are wet or damp.
- .3 Do not proceed with installation of joint sealants until 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 Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .3 If necessary or requested by the Owner, co-ordinate with Consultant and Owner to arrange for ventilation system to be operated on maximum outdoor air and exhaust during installation of caulking and sealants.

## **1.7 GUARANTEE**

- .1 Submit a guarantee of the work of this section covering a period of two years from date of substantial Performance of the Contract.
- .2 Defective work shall include, but not be restricted to, joint leakage, cracking, crumbling, melting, running, loss of adhesion, loss of cohesion, or staining of adjoining or adjacent work or surfaces.

## **1.8 Environmental and Safety Requirements**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

## **Part 2 Products**

### **2.1 GENERAL**

- .1 Do not use caulking that emits strong odors, contains toxic chemicals or is not certified for use in Canada. Provide Canadian Construction Materials Centre (CCMC) evaluated report for products used on site if requested by the Owner or Consultant.
- .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

- .1 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.
- .2 Sheet Metal Joints sealant:
  - .1 Urethane, single component sealant, colours selected by owner.
  - .2 To CAN/CGSB-19.13-M87, single component, elastomeric, chemical curing, compatible with roof membrane material
  - .3 Acceptable material: Single-component, polyurethane sealant.
    - .1 Dymonic® FC, manufactured by Tremco
    - .2 SikaFlex 1A, manufactured by Sika
    - .3 Approved alternate. Alternate materials to be of same or better performance and meet the following requirements:
      - .1 Adhesion-in-Peel ASTM C 794 >18-25 pli.
      - .2 Accelerated Weathering ASTM C 793 – pass.
      - .3 Movement Capability ASTM C 719 modified  $\pm 35\%$ .
      - .4 Primer and cleaner as recommended by manufacturer.
- .3 At bituminous surfaces: As recommended by membrane manufacturer.

## 2.3 Preformed Compressible and Non-Compressible back-up materials.

- .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
  - .1 Extruded closed cell, reticulated polyethylene foam backer rod.
  - .2 Size: oversize 30 to 50 %.
- .2 Bond Breaker Tape.
  - .1 Polyethylene bond breaker tape which will not bond to sealant.

## 2.4 Joint Cleaner

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

## 2.5 Primer

- .1 Use primer and apply primer as recommended by manufacturer.

**Part 3 Execution**

**3.1 SURFACE PREPARATION**

- .1 Verify at the site that joints and surfaces have been provided and that joint conditions will not adversely affect execution, performance or quality of completed work; and that they can put into acceptable condition by means of preparation specified in this section.
- .2 Ascertain that sealers and coatings applied to sealant substrates are compatible with sealant used and that full bond of the sealant and substrate is attained. Clean bonding joint surfaces of harmful matter substances including dust, silt, scale and coatings from ferrous metals by wire brush, grinding or sandblasting. Remove oil, grease and other coatings from non-ferrous metals with approved cleaning solvent.
- .3 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair work. Ensure joint surfaces are dry and frost free.
- .4 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .5 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.
- .6 Examine joint sizes and correct as required to allow for anticipated movement and to achieve proper width/depth ratio per manufacturer's recommendations for specified sealant.
- .7 Prepare surfaces in accordance with manufacturer's directions. Preparation of existing joint surfaces shall include:
  - .1 Removal of existing sealant material.
  - .2 Removal of all surface dirt and debris.
- .8 Remove all existing sealant from existing joint surfaces to be re-used.
- .9 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .10 Prepare surfaces in accordance with manufacturer's directions.

**3.2 PRIMING**

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Surfaces shall be primed prior to installation of new sealant materials. Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to installation of new sealant material and in accordance with manufacturer's instructions.

### 3.3 BACKUP MATERIAL

- .1 Install joint filler to achieve correct joint depth and shape, with approximately 30% - 50% compression.
- .2 Where depth of joint will prevent the use of backer rod, an adhesive backed polyethylene tape (bond breaker tape) should be used to prevent three-sided adhesion. All backing should be dry at time of sealant application.

### 3.4 INSTALLATION

- .1 Apply sealant in accordance with manufacturer's written instructions. Ensure the backer rod is friction fitted properly and any primers have been applied.
- .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
- .3 Apply sealant in continuous beads. Apply sealant using gun with proper size nozzle filling the joint from the backer rod up.
- .4 Use sufficient pressure to fill voids and joints solid and ensure full contact and bonding of the sealant material to joint surfaces. Application of sealant at irregular surfaces such as masonry will require special attention to ensure full contact of sealant material within the irregular surfaces.
- .5 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
- .6 Tool exposed surfaces before skinning begins to give slightly concave shape. Remove excess compound promptly as work progresses and upon completion.
- .7 Immediately tool the sealant with a spatula to ensure intimate contact with the joint walls. Dry tooling is always preferred, although xylene can be used in limited amounts to slick the spatula if needed.
- .8 Average sealant application joint width will vary from 1/4" – 1" in width. For joints ranging from 1/2" to 1" (13mm to 25mm) wide.
- .9 Minimum recommended surface temperature should be 40°F (5°C) or above at the time the sealant is applied. If sealant must be applied in temperatures below 40°F, refer to the manufactures Guide for Applying Sealants in Cold Weather .

### 3.5 Curing.

- .1 Cure sealants in accordance with sealant manufacturer's instructions.
- .2 Do not cover up sealants until proper curing has taken place.

### 3.6 Cleanup

- .1 Clean adjacent surfaces immediately and leave work neat and clean.
- .2 Remove excess and droppings, using recommended cleaners as work progresses.

**END OF SECTION**