

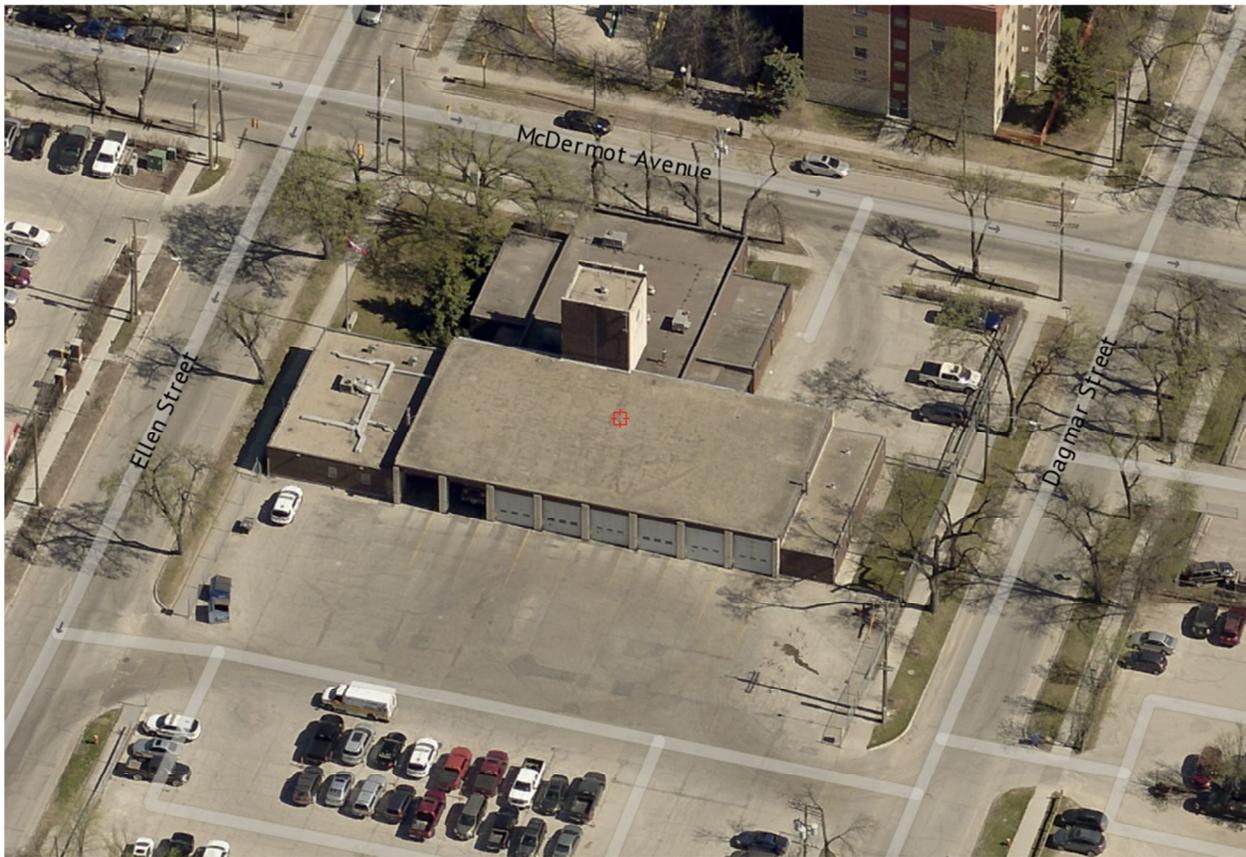


Building Envelope Ltd.

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## Bid Opportunity No. 373-2018

Provision of Roof Replacement at City of Winnipeg of Winnipeg Fire Station No. 01  
65 Ellen St., Winnipeg, MB



**BID OPPORTUNITY FOR:** 373-2018: Provision of Roof Replacement at COW Fire Hall No. 01  
65 Ellen St., Winnipeg, MB

**DATE:** October 23, 2018

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## **1. METAL FABRICATIONS- Section 05 50 00 PART G -**

### **G1. GENERAL**

#### **G1.1 REQUIREMENTS STEEL ACCESS LADDERS**

- (a) Construct access ladders as detailed and to comply with all applicable codes and regulations and shop weld connections where possible.
- (b) Unless detailed otherwise, access ladders shall typically be constructed of 40 I.D. standard steel pipe each side @ 450 o.c. Extend posts to within 75 (3") of underside of hatch or access point and return posts toward wall at top. Steel rungs to be of 64 wide x 40 high U-shaped, spaced at 300 (12") o.c. maximum vertically, with the first rung no more than this dimension as well. Leave a minimum gap of 200 (8") between the face of finished wall and the pipe posts at the top and angle further way at the bottom; weld posts to 40 x 6 bent steel bar brackets at 900 o.c. maximum vertically, with purpose made lag bolts for secure anchoring into wall structure.
- (c) Unless detailed otherwise, where access ladders occur in areas accessible to the public, provide a 6 (1/4") thick steel plate cover to fit over the ladder, starting from 300mm AFF to 2100mm AFF, with hinges on one side and a slot through the cover and a hasp welded to the vertical bar post on the other side (future padlock by The City of Winnipeg).
- (d) Unless detailed otherwise, at areas above an access ladder and roof hatch, provide an exterior vertical guard in a reversed "U-shape", constructed of 38mm (1.5") O.D. standard steel pipe. This guard shall be aligned with the vertical bar post of the ladder and extend 1000 (39") minimum above the finished roof surface (plus the roof assembly thickness down to the structural roof deck). At the bottom end of each post of the "U", weld a 6 (1/4") thick x 100 x 100 (4"x4") steel plate, for lag bolting to the structural deck.
- (e) Where any access ladder height exceeds 5000 (16'-5"), also provide a steel protection cage on the upper portion of the ladder, starting at 2440 (8') above the finished floor, to meet all applicable codes and regulations, including ANSI A14.3-2000. Construct this safety cage of steel banding with a minimum 762 (30") inside clear diameter (measured from the centre of the rung). The banding shall be spaced at 1220 (48") o.c. maximum horizontally and 230 (9") o.c. maximum vertically.
- (f) All exposed exterior components shall be hot dipped galvanized typically.

#### **G1.2 SUBMITTALS: NA**

#### **G1.3 REFERENCE STANDARD(S)**

- (a) American Society for Testing and Materials (ASTM)
  - (i) ASTM A53/A53M-99b, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless or latest.
  - (ii) ASTM A269-98, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service or latest.
  - (iii) ASTM A307-97, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength or latest.
- (b) Canadian General Standards Board (CGSB)
  - (i) CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer or latest.
  - (ii) CAN/CGSB-1.108-M89, Bituminous Solvent Type Paint. or latest
  - (iii) CAN/CGSB-1.181-92, Ready-Mixed, Organic Zinc-Rich Coating or latest.

- (c) .3 Canadian Standards Association (CSA)
  - (i) CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel or latest.
  - (ii) CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles or latest.
  - (iii) CAN/CSA-S16.1-94, Limit States Design of Steel Structures or latest.
  - (iv) CSA W48.1-M1991(R1998), Carbon Steel Covered Electrodes for Shielded Metal Arc Welding or latest.
  - (v) CSA W48.2-M1992(R1998), Chromium-Nickel Steel Covered Electrodes for Shielded or latest.
  - (vi) CSA W48.3-M1993(R1998), Low Alloy Steel Covered Electrodes for Shielded Metal Arc Welding or latest.
  - (vii) CSA W48.4-95, Solid Carbon Steel Filler Metals for Gas Shielded Arc Welding.
  - (viii) CSA W48.5-M1990(R1996), Carbon Steel Electrodes for Flux- and Metal-Cored Arc Welding or latest.
  - (ix) CSA W48.6-96, Fluxes and Carbon Steel Electrodes for Submerged Arc Welding or latest.
  - (x) CSA W59-M1998, Welded Steel Construction (Metal Arc Welding) or latest.

#### G1.4 SHOP DRAWINGS

- (a) Submit shop drawings in accordance with Submittal Procedures. Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
- (b) Miscellaneous steel shop drawings for Work of this Section shall meet all applicable codes and regulations and shall bear the signature and seal of a Professional Engineer registered in the same province as the Work.

#### G1.5 PROTECTION

- (a) Deliver, store, handle and protect materials in accordance with Section 01 60 00.
- (b) Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or strippable plastic coating, before shipping to job site. Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

### G2. PRODUCTS

#### G2.1 MATERIALS

- (a) Steel sections, bars, rods, and plates: to CAN/CSA-G40.20/G40.21, Grade 350 W.
- (b) Steel pipe: to ASTM A53/A53M standard weight, black finish.
- (c) Welding materials: to CSA W59.
- (d) Welding electrodes: to CSA W48 Series.
- (e) Bolts and anchor bolts: to ASTM A307.
- (f) Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.
- (g) Sealants: SBS compatible see Section- 07 52 00

#### G2.2 MISCELLANEOUS STEEL SECTIONS

- (a) Supply all miscellaneous steel angles, plates, brackets, lintels, bars, rods, etc., as indicated and noted on the drawings or as specified. Size to suit required loads. Continuously weld and grind smooth exposed connections. Also refer to drawings for connections and details.

**G2.3 FABRICATION**

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

**G2.4 FINISHING**

- (a) Clean all surfaces of rust, scale, grease, and foreign matter, prior to finishing.
- (b) When possible, apply coatings in the shop and before assembly. Where size permits, galvanize components after assembly, in accordance with requirements of CSA Standard G164-M1981.
- (c) All exposed exterior components shall be hot dipped galvanized typically

**G2.5 ISOLATION COATING**

- (a) Isolate aluminum from following components, by means of bituminous paint:
  - (i) Dissimilar metals except stainless steel, zinc, or white bronze of small area.
  - (ii) Concrete, mortar and masonry.
  - (iii) Wood.

**G3. EXECUTION****G3.1 ERECTION**

- (a) Do welding work in accordance with CSA W59 unless specified otherwise.
- (b) Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- (c) Provide suitable means of anchorage acceptable to Contract Administrator such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- (d) Exposed fastening devices to match finish and be compatible with material through which they pass.
- (e) Supply components for building into Work by other sections in accordance with shop drawings and schedule.
- (f) Make field connections with bolts to CAN/CSA-S16.1, or weld.
- (g) Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- (h) Cut off all sharp edges, corners, burrs, etc. and grind smooth before shop priming.
- (i) Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- (j) Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

END OF SECTION

## 2. ROOFING SCOPE OF WORK - Section 07 52 00

### G4. GENERAL

#### G4.1 REQUIREMENTS

- (a) Furnish all labor, materials, tools and equipment necessary for the removal and disposal of existing low-slope BUR roof system, including removal of non-operational roof curbing, flashings, etc, and the design and installation of a complete low-slope roof system capped with SBS modified bitumen two-ply system effective min. R30. (Soprema Colvent Base 830 & Colvent Traffic Cap 860) including the accessory items such as new drains, (ensure slope to positive drainage) connections, scuppers, drain inserts, flashings, re-paint gas-lines, C-Ports c/w roof membrane protection traffic cap, Sopramastic Blocks (pitch boxes), at a minimum.
- (b) Base bid system to be: Soprema Colvent Base 830 Traffic Cap 860. (Adhesive Fastened System) All installed roofing systems must meet Code and Regulatory Requirements along with Recommendations of the most current edition as per the followings.
  - (i) The roof assembly shall be in accordance with CSA A123.21-14 as it pertains to the wind uplift resistance. ULC Standards, ULC approved membranes Class C min. ASTM D 6162-4, system membrane. (Soprema Colvent Base 830 & Traffic Cap 860).
  - (ii) All recommendations of the Canadian Roofing Contractors Association (CRCA) "Shall have a design slope minimum of 3%-4% back-slope for drainage between drains and denoted perimeter areas as to create effective positive drainage.
  - (iii) Slope flashings to the roof and design roof drains to promote the rapid removal of water from all roof surfaces. Slopes for roofing assembly replacement at existing flat roofs are dependent on practicable heights at perimeters and location of existing roof drains.
  - (iv) Sheet Metal and Air Conditioning Contractor's National Association, (SMACNA)
  - (v) CMHC Best Practice Flashing Guide
  - (vi) All requirements of the Roofing System Manufacturer's Warranty, (RSMW)
  - (vii) All applicable Province of Manitoba Building Codes
  - (viii) The manufacturer's application instructions for each product used are considered part of this specification and should be followed at all times.
  - (ix) Raising, re-setting, and protection of air conditioning equipment, ventilators, and exhaust fans may be required. Removal and re-installing of perimeter lighting and electrical if required. Provision for temporary access and protection onto the roof, such as scaffolding, portable railings, plywood and rigid insulation roof protection, etc.

#### G4.2 SUBMITTALS

- (a) Submit product data sheets for primers, insulation, SBS membranes, adhesives, and MSDS for all products, other safety and handling instructions and installation instructions.
- (b) Submit a letter issued by Roofing Manufacturer stating approved licensed applicator status and approval to issue warranty for specified system on this project.
- (c) Submit roof system(s) adhesive patterns in accordance with CSA123.21-14 including minimum resistance for the field area, edge areas and corner areas. (*Including wind uplift calculation Wind-RCI.*)
- (d) Submit shop drawings showing the slope (saddle, cricket & back-slope) package of all roofs and flow path of rainwater. Confirm structural slope adequacy.

- (e) Submit shop drawings of change of elevation up-stand details & perimeter parapet design with flashings & claddings as required.
- (f) Submit roof ladder shop drawings.
- (g) Prior to work submit copy of MB Hydro Commercial Building Envelope Program approval letter and incentive calculation.

#### G4.3 REFERENCE STANDARD(S)

- (a) Submit a report[s] within three (3) days of a request of the Contract Administrator, issued by a certified materials testing laboratory, attesting that the roofing system offered, was tested in accordance with CSA A 123.21-10, Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane Roofing Systems. Test results shall demonstrate the roofing system provides a Dynamic Uplift Resistance (DUR) of;
  - (i) Roof-A: -1.2kPa [-25psf] for the field of the roof, -1.6 kPa [-33 psf] for the edge of the roof, and -3.1kPa [-64psf] for the corners of the roof. End zone width 5.7 ft (1.7m).
  - (ii) Roof-B: -1.2kPa [-25psf] for the field of the roof, -1.6 kPa [-33 psf] for the edge of the roof, and -3.1kPa [-64psf] for the corners of the roof. End zone width 4.0 ft (1.2m).
  - (iii) Roof-F: -1.6kPa [-33psf] for the field of the roof, -2.2 kPa [-46 psf] for the edge of the roof, and -3.1kPa [-64psf] for the corners of the roof. End zone width 3.3 ft (1.0m).
- (b) Membranes must meet or exceed requirements of CGSB 37.56–M (9<sup>th</sup> Draft), Modified bituminous membranes, prefabricated and reinforced for roofing system.
- (c) Membranes must meet or exceed requirements of ASTM D 6162, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements. Membranes must meet or exceed requirements of ASTM D 6163, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
- (d) Membranes must meet or exceed requirements of ASTM D 6164, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- (e) Mineral Wool Roof Insulation boards must meet or exceed requirements of ASTM C 726, Standard Specification for Mineral Wool Roof Insulation Board.
- (f) Polyisocyanurate thermal insulation boards must meet or exceed requirements of CAN/ULC S704-011, Thermal Insulation, Polyurethane and Polyisocyanurate, Boards Faced.
- (g) Extruded Polystyrene Insulation Boards must meet or exceed requirements of CAN/ULC-S701-11, Polystyrene Insulation Board and Pipe Covering.
- (h) Roofing system must meet or exceeds requirements of CAN/ULC-S107-10, Methods of Fire Tests of Roof Coverings, class [C].
- (i) ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- (j) ASTM E108 Standard Test Methods for Fire Tests of Roof Coverings
- (k) ASTM F1667-13 Driven Fasteners; Nails, Spikes & Staples
- (l) Canadian Roofing Contractors Association (CRCA) CRCA Roofing Specifications Manual, (current edition)

- (m) CAN/CSA-A123.4-04 (R2013) Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems
- (n) CSA-A123.23-15 Product Specification for Polymer-Modified Bitumen Sheet, Prefabricated and Reinforced

#### G4.4 DEFINITIONS

- (a) Roofing terminology: Refer to ASTM D 1079 Standard Terminology Relating to Roofing and Waterproofing and CRCA Roofing Reference Manual for definition of terms related to roofing work in this Section.
- (b) "Roofing System" means: all materials contained within the roof assemblies installed by the Contractor, including all materials above the deck including membrane flashing up to and including 1067mm (42") above the surface of the primary membrane, and related sheet metal work.

#### G4.5 COMPATIBILITY

- (a) Same manufacturer shall provide all waterproofing materials.

#### G4.6 TECHNICAL DOCUMENTS

- (a) Submit two (2) copies of the most current technical data sheets within five (5) days of contract award. These documents must describe the materials' physical properties, and explanations about product installation, including, restrictions, limitations and other manufacturer recommendations such as long-term maintenance.

### G5. PERIODIC MONITORING

- (a) The City of Winnipeg will engage third party roofing monitoring (QCA). The Monitoring will provide periodic site visits and reports to The City of Winnipeg during the progress of the roofing work, in accordance with the CRCA Roofing Applications Standards, to help ensure the roofing work is provided as set out in this Contract. Upon notice from The City of Winnipeg, the Contractor shall expediently perform all steps and make changes as identified by the roofing monitor, at no cost to the City of Winnipeg. The involvement of the roofing monitor does not relieve the Contractor of the responsibility to supervise, inspect and provide the roofing work as set out in this Contract.
- (b) Allow The City of Winnipeg and its agent access to work area and materials for inspection and monitoring purposes.
- (c) 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 test satisfactory completed and make good such work. Cost of any re-work to be borne by the Contractor.
- (d) The City of Winnipeg 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 to be in accordance with contract documents, correct such work and pay cost of examination and correction.
- (e) If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised at no cost to The City of Winnipeg and shall be corrected within a time-frame determined by The City of Winnipeg. Contractor shall pay costs for retesting and re-inspection. Every effort will be made to expedite the testing process to minimize unnecessary delays, while not compromising the integrity of the procedures; however, the Roof Monitor will not be pressured into overlooking deficient Work or loosening acceptance criteria to satisfy scheduling or cost issues.

- (f) Engagement of inspection/testing agencies does not relax the Contractor from the responsibility to perform Work in accordance with Contract Documents. Independent Inspection/Testing Agencies will be engaged for purpose of testing portions and inspecting of Work. Cost of such services will be paid by The City of Winnipeg, except for the following: Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
- (g) If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:
  - (i) The deficiency shall be documented in the report.
  - (ii) Resolutions are made at the lowest management level possible. Other parties are brought into the discussion as needed. Interpretive authority is with QCA.
  - (iii) QCA documents the resolution process.
  - (iv) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, and provides confirmation of completion of correction to QCA. QCA reschedules the test (and any additional population to be tested) with the affected Contractors, and the test(s) repeated until satisfactory performance is achieved.
  - (v) Any required retesting that is resulted of a deficient installation shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.
- (h) Provide copies of the manufacturer's site reports to the The City of Winnipeg, Consultant, and roofing monitor, prior to Interim Acceptance of the Work.

#### G5.2 PROCEDURES

- (a) Notify appropriate agency in advance of requirement for tests, in order that attendance arrangements can be made.
- (b) 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.

#### G5.3 REJECTED WORK

- (a) 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 the Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- (b) Make good other Contractor's work damaged by such removals or replacements promptly.
- (c) If in opinion of the Contract Administrator it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, The City of Winnipeg will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by the Contract Administrator.

#### G5.4 REPORTS

- (a) Provide copies to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

#### G5.5 TESTS

- (a) Contractor shall perform periodic tests as per applicable standards utilizing third party testing company if required. Results of tests shall be provided to the Contract Administrator.

- (b) Cost of tests shall be the responsibility of the Contractor. Additional test(s) and or site visits may be required due to faulty material and or workmanship. Cost of such tests/visits shall be borne by the Contractor.

#### G5.6 FIELD QUALITY CONTROL

- (a) Coordinate site work and inspections with the Contract Administrator Provide minimum 72 hours notice.
- (b) Inspection and testing of roofing membranes will be carried out by QCA Building Envelope Consultant including but not limited to membrane-substrate tensile adhesion testing conducted in general accordance with ASTM D 4541, using a Com-Ten Fastener Tester and membrane air-tightness in general accordance with ASTM E 1186.
- (c) Following project completion, The City of Winnipeg and QCA shall conduct a detailed examination in conjunction with the Roofing Contractor.
- (d) Inspection or testing by Consultant will not augment or replace Contractor quality control nor relieve contractual responsibility.

### G6. QUALITY ASSURANCE/CONTROL

#### G6.1 MEMBRANE ADHESION TESTING

- (a) The Consultant has the option to conduct pull tests to measure bond strength of roof air/vapour barrier membrane and roof insulation/membrane assembly. Results will be compared to manufacturer's recommendations to determine if corrective action is required and if roofing insulation and membrane(s) can continue. Including but not limited to membrane bond and field uplift resistance of assembly.
- (b) In the absence of manufacturer data, the standard of acceptance will be the average minus one standard deviation for the minimum bond strength.
- (c) Chain drag soundings may be completed on both the air/vapour barrier membrane installation and the cap sheet. A full and intimate bond is required. The Contractor shall rectify any de-bonded areas in accordance with manufacturer's specifications.

G6.2 Airtightness testing would be conducted on the air/vapour barrier; base sheet and cap sheet membrane(s). Testing may also include fasteners and penetrations. Testing would be done using an Air-Leak Detection Unit. Testing would be performed in general accordance with ASTM E 1186 "Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Retarder Systems" (method 4.2.7 *Chamber Depressurization in Conjunction With Leak Detection Liquid*). *Level of acceptance shall be zero-leaks*. The Contractor shall rectify any unsealed areas in accordance with manufacturer's specifications.

### G7. STORAGE AND DELIVERY

- (a) All materials shall be delivered and stored in their original packaging, in conformance with the requirements described in the Manufacturer's Manual. The manufacturer's name, brand, mass, specification number and lot number shall be shown on the labels
- (b) At all times, materials will be adequately protected and stored in a dry and properly ventilated area, away from any welding flame or spark and sheltered from the elements or any harmful substance.
- (c) Store adhesives and emulsion-based waterproofing mastics at a minimum 5 °C (41 °F). Store adhesives and solvent-based mastics at sufficient temperatures to ensure ease of application.
- (d) Materials delivered in rolls will be carefully stored upright; flashing will be stored to avoid creasing, buckling, scratches or any other possible damage.

- (e) Avoid material overloads, which may affect the structural integrity of specific roof areas.
- (f) Fuel must be stored in approved containers and placed in spill containments. Propane tanks must be properly stored and protected from any harms.

## **G8. FIRE PROTECTION**

- (a) Prior to the start of work, conduct a site inspection to make sure that all procedures and proposed changes are approved to minimize the risk of fires
- (b) All nails, bolts, screws and other fasteners, etc. shall all be as recommended by the manufacturer of the materials for which they are to be used.
- (c) Respect safety measures described by the local association recommendations.
- (d) At the end of each workday, use a heat detector gun and/or Infrared Thermographic camera to spot any smouldering or concealed fire. Provide firewatcher for a minimum of two hours after final torch application.
- (e) Never apply the torch directly to old and wood (combustible) surfaces.

G8.2 Throughout roofing installation, maintain a clean site and have one approved ABC fire extinguisher within 6 m (20 ft) of each roofing torch. Respect all safety measures described in technical data sheets. Torches must never be placed near combustible or flammable products. Torches should never be used where the flame is not visible or cannot be easily controlled.

## **G9. MATERIALS**

### **G9.1 DIMENSIONAL LUMBER**

- (a) (a) This shall be pine or spruce to CAN/CSA-O141, construction grade, maximum 15% moisture content at time of installation of the dimensions as outlined under the Description of Work.

### **G9.2 PLYWOOD SHEATHING**

- (a) (a) This shall be 1/2" construction D Grade spruce plywood.

### **G9.3 VAPOUR BARRIER SUPPORT PANEL**

- (a) Fiberglass Mat Faced Gypsum Roof Board:
  - (i) Thickness: 5/8 inch.
  - (ii) Width: 4 feet.
  - (iii) Length: 8 feet.
  - (iv) Surfacing: Fiberglass mat with non-asphaltic coating.
  - (v) In conformance with: ASTM E84 and ASTM C1177
- (b) (b) Specified Product: GP DensDeck Prime Roof Board or approved equal in accordance with B7 SUBSTITUTES.

### **G9.4 VAPOUR BARRIER MEMBRANE**

- (a) (a) Description: Self-adhesive membrane composed of SBS modified bitumen, with a surface screen made of high-density polyethylene laminated between two layers of polyethylene films. The width of the membrane is 1.14 m (45 in) to allow the membrane to fit on the top of most structural steel deck profiles. The self-adhesive underface is protected with a silicone plastic release film. And compatible with substrates and adjoining membranes.
- (b) (b) Specified Product: Soprapap'r by Soprema or approved equal in accordance with B7 SUBSTITUTES.

**G9.5 ROOFING INSULATION**

- (a) Polyisocyanurate insulation
  - (i) Description: Closed-cell polyisocyanurate foam insulation board laminated on both sides to a glass fiber reinforced felt facer. (Minimum system R-30 effective value.)
  - (ii) Specified product: SOPRA-ISO (base layer) & SOPRA-ISO PLUS (Top-layer) by SOPREMA or approved equal in accordance with B7 SUBSTITUTES.
- (b) Tapered Insulation Panel
  - (i) Description: Tapered insulation panel made of polystyrene designed as required to create a minimum 1.5% field slope to positive drainage and a three-to-four percent (3%-4%) back-slope to the roof system at drains and specified perimeters. Molded Expanded Polystyrene (MEPS) Board: certified for conformance with CAN/ULC S701, Thermal Insulation, Polystyrene, Boards and Pipe Covering, Type 2, and as follows;
    - (i) Thermal Conductivity (kSI): 0.036 W/m °C maximum.
    - (ii) Dimensional Stability: 0.3% max. Linear change.
    - (iii) Certification: third party, in accordance with CGSB, ULC, or other certification programs accredited by the Standards Council of Canada.
  - (ii) Specified product: Plastifab or approved equal in accordance with B7 SUBSTITUTES.
- (c) Sump insulation panel for drain location (See above)
  - (i) Description: Sump insulation panel made of EPS Type II designed to facilitate proper drainage around drain.
  - (ii) Product specified: Tapered Plastifab EPS or approved equal in accordance with B7 SUBSTITUTES.

**G9.6 INSULATION ADHESIVE**

- (a) (a) Description: A highly elastomeric, two components, one step, all purpose, foamable adhesive that contains no solvents and sets in minutes. Adhesive shall be applied to obtain a minimum 90 mile-per-hour wind up with rating or as otherwise indicated within the description of work.
- (b) (b) Specified product: Soprema Duotack (Cold-weather Duotack 365) or approved equal in accordance with B7 SUBSTITUTES.

**G9.7 POURABLE SEALER**

- (a) This shall be Lexcan 2 part Pourable Sealer or approved equal in accordance with B7 SUBSTITUTES. This shall be used to fill all pitch boxes or approved equal in accordance with B7 SUBSTITUTES.

**G9.8 OVERLAY BOARD**

- (a) NA

**G9.9 MODIFIED BITUMEN MEMBRANE**

- (a) This shall be the following:
  - (i) Membrane: Two-ply Modified Styrene-Butadiene-Styrene (SBS)

**G9.9.1 Base Sheet Field: Soprema Colvent Base 830.**

- (a) Description: Roofing membrane composed of SBS modified bitumen and a glass mat reinforcement. The surface is covered with a thermofusible plastic film, the underside is covered with a release protection film. The surface must be marked with three (3) chalk lines to ensure proper roll alignment.

- (b) Thickness: 2.5 mm (98.4mm)
- (c) In conformance with: CGSB 37.56-M (9<sup>th</sup> Draft).
- (d) Specified product: Colvent Base 830 by SOPREMA or approved equal in accordance with B7 SUBSTITUTES.

G9.9.2 Base Sheet Membrane for Flashings and Parapets

- (a) In conformance with: CGSB 37.56-M (9<sup>th</sup> Draft).

G9.10 Specified product: Sopralene Flam Stick by SOPREMA or approved equal in accordance with B7 SUBSTITUTES.

G9.11 Cap Sheet: The cap sheet under face is covered with a thermo-fusible plastic film and the top surface is protected by grey; coloured granules.

- (a) Colour Choices for Roofing Cap Sheet Membrane Granules
  - (i) For field surfaces: **Grey**.
  - (ii) For walkway surfaces: **Red**
  - (iii) In conformance with: ASTM D6162.
  - (iv) Specified Product: Colvent TRAFFIC CAP 860 by Soprema or approved equal in accordance with B7 SUBSTITUTES.

## G9.12 ACCESSORY MEMBRANES

(a) Cover Strip VB and BASE

- (i) Description: Membrane strip 240 mm (9.45 in) made of SBS modified bitumen and composite reinforcement. Both faces are covered with a plastic thermofusible film. The strip ensures water-tightness in the end laps.
- (ii) In conformance with: ASTM D6162.
- (iii) Specified product: SOPRALAP by SOPREMA or approved equal in accordance with B7 SUBSTITUTES.

## G9.13 COMPLEMENTARY WATERPROOFING PRODUCTS

(a) Waterproofing mastic

- (i) Description: Multi-purpose solvent-based mastic, containing SBS modified bitumen fibres with aluminum pigments and mineral fillers
- (ii) Specified product: SOPRAMASTIC ALU by SOPREMA or approved equal in accordance with B7 SUBSTITUTES.

(b) Pitch pocket filler

- (i) Description: Polyurethane pre-fabricated pitch pocket system, in various size, with compounds that bond together, with solvent less mastic and with one component elastomeric sealant.
- (ii) Specified product: Sopramastic Block SYSTEM by SOPREMA or approved equal in accordance with B7 SUBSTITUTES.

(c) Sealing product

- (i) Description: Bitumen/polyurethane waterproofing mono-component resin and polyester reinforcements. Employed at membrane leading edges, penetrations & granule repair.
- (ii) Specified products: ALSAN FLASHING and FLASHING REINFORCEMENT by SOPREMA or approved equal in accordance with B7 SUBSTITUTES.

(d) Miscellaneous Sealant

- (i) Polyether-based, single-component, water-reactive elastomeric sealing mastic and adhesive. Membrane leading edges and miscellaneous sealing details.
- (ii) Specified products: Sopramastic SP2 by SOPREMA or approved equal in accordance with B7 SUBSTITUTES.

#### G9.14 PERIMETER SECUREMENT

- (a) Perimeter Fastening Restraint SOP36/35

#### G9.15 RUBBERIZED MASTIC

- (a) This shall be Polyroof as manufactured by Tremco Ltd. or approved equal in accordance with B7 SUBSTITUTES. All exposed rubberized asphalt shall be coated with Gray Soprema.

#### G9.16 ROOF PROTECTION MAT

- (a) Description: rubber mat manufactured from recycled materials. It is intended to protect membranes from foot traffic, falling ice and other objects.
- (b) Product: Soprema Sopramat or approved equal in accordance with B7 SUBSTITUTES.

#### G9.17 ROOF DRAINS

- (a) Description: One-piece spun aluminum body, heavy-duty cast aluminum strainer dome, and clamping ring. (Control flow as required)
- (b) Specified product: OMG Hercules RetroDrain HDAL or approved equal in accordance with B7 SUBSTITUTES.

#### G9.18 SPLASH PADS

- (a) Description: Precast concrete splash block
- (b) Specified product: Barkman Concrete 105604 30 " Natural or approved equal in accordance with B7 SUBSTITUTES.

#### G9.19 MODIFIED PRIMER

- (a) This is to be the compatible primer recommended by the membrane manufacturer employed. (When applicable environmentally friendly low VOC products shall be applied.)

#### G9.20 CAULKING

- (a) This shall be Tremco Vulkem 931 or approved equal in accordance with B7 SUBSTITUTES.

#### G9.21 ALUMINUM PAINT

- (a) Waterproofing coating applied with a brush or a roller composed of elastomeric bitumen, mineral fillers and solvents.
- (b) Specified products: Sopralastic 124 Alu by SOPREMA or approved equal in accordance with B7 SUBSTITUTES.

#### G9.22 VENT STACKS

- (a) These shall be Insulated Stack Jack Flashings (with metal cap, not neoprene seal) SJ-26A as manufactured by Thaler or approved equal in accordance with B7 SUBSTITUTES.

#### G9.23 STEEL CLADDING

- (a) Specified product: Vicwest AD300

- (b) Fabricated from Z275 galvanized sheet steel conforming to ASTM A653M Grade 230 or AZ150 Galvalume, sheet steel conforming to ASTM A792M Grade 230.
- (c) Fasteners: Galvanized, with exposed fasteners colour matched to cladding.
- (d) Prefinished cladding colour to be selected from the manufacturer's standard colour range by The City of Winnipeg.

#### **G9.24 WATER-RESISTIVE BARRIER (WRB)**

- (a) Specified product: DuPont Tyvek Commercial Wrap or approved equal in accordance with B7 SUBSTITUTES.
- (b) DuPont Self-Adhered Flashing products as per DuPont Installation Guidelines

#### **G9.25 METAL FLASHING**

- (a) The bays and cap flashing shall be a minimum of 24 gauge in thickness. Finishes shall closely match the painted colour of the existing flashing. This shall be chosen from the range of Stelco 8000 series of colours.

#### **G9.26 ACCESSORIES**

- (a) All nails, bolts, screws and other fasteners, etc. shall all be as recommended by the manufacturer of the materials for which they are to be used.

#### **G9.27 TRANSITION SEALANT SBS-to-BUR**

- (a) This shall be Soprema Colply Adhesive Trowel Grade or approved equal in accordance with B7 SUBSTITUTES. (NA)

#### **G9.28 MECHANICAL SUPPORT**

- (a) UV resistant, 100% recycled rubber blocking with protective adhered SBS cap scrim sheet under blocking. TG or SA
- (b) Specified Product: C-Port by Clearline Technologies Inc. or approved equal in accordance with B7 SUBSTITUTES.

### **G10. EXECUTION**

- G10.1 Before roofing work begins, the Consultant and Roofing Foreman will examine and approve deck conditions. If necessary, a non-conformity notice will be issued to the contractor so that required corrections can be made. The start of roofing work will mean roofing conditions are acceptable for work completion.
- G10.2 Examine substrate for compliance of conditions that affect installation and performance of roof system.
- G10.3 The Contractor shall be responsible for the removal and reinstallation of any obstructions such as, but not limited to, drains, ducts, conduits, vents, air conditioning units and components at his own expense.
- G10.4 Work must be performed during weather conditions that will not adversely affect the performance of the new Work. Surfaces must be clean and dry prior to installation.
- G10.5 Cover walls and adjacent Work where materials hoisted or used.
- G10.6 Clean off drips and smears of bituminous material, primer, etc.
- G10.7 Dispose of rainwater off roof and away from face of building until roof drains or hoppers installed and connected.

- G10.8 Prevent traffic over completed roofing except where required by Work above roof level. Comply with precautions deemed necessary by Bid Opportunity. Repair damage caused by non-compliance with Bid Opportunity requirements.
- G10.9 At the end of each day's Work or when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.
- G10.10 Examine roof decks and immediately inform Contract Administrator in writing of defects.
- G10.11 Prior to commencement of Work ensure:
- (a) Decks are firm, straight, smooth, dry, and swept clean of dust and debris.
  - (b) Curbs have been built.
  - (c) Roof drains have been installed at proper elevations relative to finished roof surface.
  - (d) Plywood and lumber nailer plates have been installed to walls and parapets as indicated.
- G10.12 Removal of Existing Roofing
- (a) Remove existing roofing system, curbs and cant strips as required to properly install new roofing system. Avoid damage to decks, drains, and other components on roofs.
  - (b) Provide temporary hoarding, other protection as may be required.
  - (c) Fully protect interior of building from water penetration and or construction debris from any cause.
- G10.13 Prepare remaining surfaces to accept new roofing system. To selected roofing manufacturer's specifications, recommendations and proven standards.

## **G11. APPLICATION**

- G11.1 Ensure a roofing foreman is on Site and supervising the roofing work at all times when roofing work is undertaken. Ensure that at least one other Qualified Roofing Trades-person shall be on Site when roofing work is undertaken
- G11.2 Ensure that all Qualified Roofing Trades-persons necessary to receive the manufacturer warranties, as set out within, are appropriately trained by the manufacturer and are on Site, at all relevant times.

## **G12. PREPARATION**

- G12.1 If required, rooftop equipment, electrical and gas service lines, telephone lines, etc. must be disconnected, relocated and reconnected as required in accordance with all applicable codes and regulations to accommodate the Work without disrupting operations within the facility. Prior arrangement must be made with the Contract Administrator in the event a disruption of building operations is required.
- G12.2 Remove and dispose of all metal flashings as required.
- G12.3 Remove existing roofing system to the roof deck in the area shown on the attached drawing.
- G12.4 Remove and dispose of any equipment as designated by the City of Winnipeg and seal any resulting openings with pre-painted 20 gauge, 1 1/2" steel decking or like-kind wood decking to match.

- G12.5 Inspect and repair any deck deficiencies that would affect the installation and performance of the new roof system.
- G12.6 Fill and pack all open joints, cracks, seams, and openings in the deck.
- G12.7 Construct edge, expansion joint, projection, and all equipment curb blocking and nailers to accommodate insulation thickness. Extend all curbs to a minimum height of 203 mm (8") above the finished roof surface.
- G12.8 All blocking to be construction grade spruce wood.

### **G13. VAPOUR BARRIER SUPPORT PANEL INSTALLATION ON DECK**

- G13.1 Adhered or Mechanically Attached: As recommended by roof system and/or adhesive manufacturer or as required by FM or UL guidelines for wind uplift resistance.
- G13.2 Joints staggered and fit tight.

### **G14. VAPOUR BARRIER INSTALLATION**

- G14.1 Primer must be dry prior to the installation of the vapour barrier membrane Cut boards so edges rest on center of upper ribs/load bearing surfaces. Cut straight lines with adequate tools.
- G14.2 Beginning at the bottom of the slope, without adhering the membrane, unroll onto the substrate for alignment. Do not immediately remove the silicone release sheet.
- G14.3 Align the roll parallel to the corrugations of the steel deck. Make sure the membrane overlaps are supported along their entire length.
- G14.4 Peel back one end of the silicone release sheet and adhere this part of the membrane to the substrate. Peel back the remaining release sheet at a 45° angle to avoid wrinkles in the membrane.
- G14.5 Overlap adjacent membranes by 75 mm (3 in). Overlap end laps by 150 mm (6 in). Stagger end laps by at least 300 mm (12 in).
- G14.6 When the vapour barrier is installed directly on the steel deck, place a thin sheet of metal under the end lap of the vapour barrier.
- G14.7 At all junctions with existing roof assemblies, install water/vapour retarder cut-offs consisting of self-adhesive vapour retarder. Seal to new vapour retarder and carry it vertically between existing and new insulations, sealing it to the prepared surface of the existing roof membrane. Apply compatible sealants as required at laps and joints to ensure water ingress protection of the new assembly.

### **G15. INSULATION**

- G15.1 ADHESIVE FASTENED SYSTEM: Adhere insulation by using specified adhesive in continuous strips (minimum ¾" wide) spaced as per wind-uplift calculations on the field surface, on the perimeter, and on corners. [CSA A123.21-14.] Corners and perimeters must be installed as per FM requirements listed in the PLPDS 1-29].
- G15.2 Replace any area of damaged or deteriorated existing insulation. Fill all voids and cracks with specified insulation material.
- G15.3 The insulation must be installed to ensure that water cannot pool in the newly replaced area.

- G15.4 Tightly butt all insulation panels in half lap fashion. Offset the pattern between layers so that no insulation joints are coincidental.
- G15.5 Adhered the layers of insulation using the specified adhesives. The application of the adhesive must be done in strict accordance to manufactures guidelines so as to obtain a minimum uplift equal to 90 mile-per-hour. Stagger the layers of insulation from one another to prevent jointing. All adhesive secured assembly components must be properly stepped-in and rolled with a weighted roller to ensure contact of mateable surfaces.
- G15.6 Leave no openings or gaps at projections or perimeters.
- G15.7 Complete vapour retarder envelope wrap by sealing ends of vapour retarder to the top on the insulation.
- G15.8 At drains and scuppers, taper insulation for 24" in all directions to ensure positive drainage.
- G15.9 Install protection layer of 1/2" Sopraboard as required including fire protection tape c/w primer as required.

**G16. SUMP INSULATION PANEL INSTALLATION**

- (a) Install sump insulation panel in conformance with manufacturer's instructions and recommendations.

**G17. INSTALLATION OF FLAME STOP MEMBRANES**

- (a) Adhere the membrane directly onto an approved substrate by peeling back the silicone release film. SOPRAGUARD TAPE is designed to prevent flames from penetrating into empty spaces and openings while installing heat-welded membranes.
- (b) Unroll the flame-stop membrane onto the insulation without adhering, being careful to overlap adjacent strips to ensure that the flame will not come in contact with the insulation.

**G18. INSTALLATION OF SELF-ADHESIVE BASE SHEET ON FIELD SURFACE**

- (a) Dry unroll base sheet onto substrate, taking care to align the edge of the first selvedge with drain centre (parallel to roof edge).
- (b) Remove the silicone release film to adhere the membrane to the substrate. Remove the protective film from the side lap strip.
- (c) Each selvedge will overlap the previous one along lines provided for this purpose, and will overlap by 25 mm (1 in) at the ends. Because of the nature of this system, for this type of base sheet, joints can be aligned (no offset) to facilitate the installation of the reinforcing strip.
- (d) Seal end laps with a 240-mm (9.45-in) wide protection strip centered on the joint .
- (e) Seal all side laps using a torch and a round-nosed trowel.
- (f) Avoid the formation of wrinkles, swellings or fish-mouths.
- (g) Weighted rollers shall be employed to ensure proper adhesive to assembly component contact/adhesion.
- (h) Perimeter restraint as per manufacturers recommendations. (*Perimeter Fastening-SOP35 or 36*)

**G19. BASE SHEET FLASHING INSTALLATION (SELF-ADHERED)**

- (a) Apply base sheet flashing only after primer coat is dry.

- (b) Before applying membranes, always remove the plastic film on the section to be covered if there is an overlap (inside and outside corners and field surface). For sanded base sheet membranes, apply primer for self-adhered membrane to the area to be covered at the foot of the parapets.
- (c) Cut off corners at end laps to be covered by the next roll.
- (d) Overlap side laps by along lines provided for this purpose, and overlap end laps by 150 mm (6 in) Stagger end joints by a minimum of 300 mm (12 in).
- (e) Position the pre-cut membrane piece. Peel back 150 mm (6 in) of the silicone release paper to hold the membrane in place at the top of the parapet.
- (f) Then, gradually peel back the remaining silicone release film, pressing down on the membrane with an aluminum applicator to ensure good adhesion. Use the aluminum applicator to ensure a perfect transition between the up-stand and the field surface. Smooth the entire membrane surface with a roller for full adhesion.
- (g) Install a reinforcing gusset in all inside and outside corners.
- (h) Always seal overlaps at the end of the workday.
- (i) Avoid the formation of wrinkles, voids or fish-mouths.

#### G19.1 INSTALLATION OF REINFORCED GUSSETS

- (a) Install a reinforcing gusset in all inside and outside corners.
- (b) Heat-weld the gussets in place after installing base sheet membrane.

#### G19.2 INSTALLATION OF HEAT-WELDED REINFORCEMENTS

- (a) Install reinforcements specified for various roof surfaces according to the following instructions and illustrations of membrane manufacturer.

### **G20. ROOFING CAP SHEET INSTALLATION (TORCH-APPLIED MEMBRANE)**

- (a) Begin with double-selvage starter roll. If starter roll is not used, side laps covered in granules must be degranulated by embedding side laps in torch-heated bitumen over a 75 mm (3 in) width.
- (b) [Starting at drain] Unroll the cap sheet membrane on the base sheet without adhering, taking care to align the first strip parallel to the edge of the roof.
- (c) Cut off corners at end laps to be covered by the next roll.
- (d) Overlap side laps by along lines provided for this purpose, and overlap end laps by 150 mm (6 in) Stagger end joints by a minimum of 300 mm (12 in).
- (e) During installation, be careful not to overheat the membrane.
- (f) Avoid the formation of wrinkles, voids or fishmouths.
- (g) Conserve membrane's appearance. Avoid walking over finished surfaces; use protective walkways as needed.
- (h) Use straight edge to cut materials.

#### G20.2 INSTALLATION OF HEAT-WELDED CAP SHEETS ON UPSTANDS AND PARAPETS

- (a) This cap sheet must be installed in one-metre-wide strips.
- (b) Overlap side laps by 76mm (3 in) along lines provided for this purpose, and overlap end laps by 150 mm (6 in). The side joints must overlap and must be staggered by at least 100 mm (4 in) with respect to the joints of the cap sheet on the field surface, to avoid areas of excessive membrane thickness.
- (c) Cut off corners at end laps to be covered by the next roll.

- (d) Use a chalk line to draw a straight line on the field surface 150 mm (6 in) from the up-stands and parapets.
- (e) Use a propane torch and round-nose trowel to embed the surface granules in the layer of hot bitumen starting from the chalk line on the field surface to the bottom edge of the up-stand or parapet as well as on the granulated vertical surfaces that are to be overlapped.
- (f) This cap sheet will be heat-welded directly to the base sheet membrane, proceeding from bottom to top.
- (g) Avoid the formation of wrinkles, voids or fish-mouths.
- (h) During installation, be careful not to overheat the membrane.

**G21. MEMBRANE WALKWAY INSTALLATION**

- (a) Install membrane walkways at roof access points respecting requirements previously stipulated for cap sheet installation. Apply primer to cap sheet before installing walkways.

**G22. WATERPROOFING FOR VARIOUS DETAILS**

- (a) Install waterproofing membranes in conformance with various roofing details illustrated in the manufacturer's manual instructions and recommendations.

**G23. TIE-INS**

G23.1 NA

**G24. PLUMBING VENTS**

G24.1 Install Thaler SJ-27 roof flashings embedded into a generous bed of adhesive ensuring that coverage extends beyond the edge of stack extension flashing.

G24.2 Place stack extension over vent and over-trowel with adhesive extending a minimum of 4" beyond the edge of the flange.

G24.3 Strip in entire flange edge with 6" reinforcing membrane embedded in and top-dressed with adhesive.

G24.4 SBS membrane edges shall be terminated with secondary seal of Alsan LAM or SP2.

G24.5 Fit and seal PVC pipe section to the plumbing vent hub and insulate in accordance with the manufacturer's instructions.

**G25. FLASHING ROOF DRAINS**

G25.1 Carry roofing membranes down into sump to edge of drain fitting.

G25.2 Embed flashing flange into 3 mm thickness of sealing compound on top of roofing membrane.

**G26. METAL FLASHINGS**

G26.1 Cap flashings are to be 24 ga. galvanized sheet metal. The flashings are to conform to C.S.A.

G26.2 The inside and outside faces are to extend down a minimum of 76 mm (3"). Fasten the cap flashing using weatherproof screws spaced not more than 610 mm (24") on centre.

G26.3 Hem all free edges and seal all butts, joints and reglets with sealant.

**G27. ROOF DECKING**

- G27.1 The Contractor shall assess the condition of the deck while doing the roof repairs. Based on the assessment, the Contractor will estimate the requirement and square footage of the deck replacement if any is required.
- G27.2 The Contractor will inform the Contract Administrator and submit the requirement with the plan and drawings designed by a registered Structural Engineer.
- G27.3 The Contract Administrator will inspect and approve, reject, reduce or increase the area of the steel deck to be replaced.
- G27.4 This work will not start until the Contract Administrator approves it.
- G27.5 Design Requirements
- (a) The roof decking replacement plan must be designed and the drawings stamped by a Structural Engineer registered with the APEGM.
  - (b) Deflection under specified live load not to exceed 1/300 of span for roof, 1/360 of span for floor and 1/180 of span for wall.
  - (c) Design replacement sections to same as existing deck sections.
- G27.6 Fastening
- (a) Ensure nail head standoffs measurements meet fastener manufacturer's recommendations.
- G27.7 Products
- (a) Materials  
Materials to match existing deck
  - (b) Deck Types  
Deck to match existing deck

**1. Field Quality Control**

1. Field inspection will be performed under provisions of Section 01 45 16.
2. Quality Control of the work will be provided by QCA Building Envelope Limited. If conditions are unacceptable, QCA will notify the Installer & the City of Winnipeg.
3. Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
4. If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to The City of Winnipeg. Pay costs for retesting and re-inspection.

**END OF SECTION**

### APPENDIX: MAJOR COMPONENTS

1. The major components of the Work are as follows:

1. **Roof Replacement in Section 1: ROOF-A**

<b>EXISTING ROOF ASSEMBLY</b>
STEEL DECKING
FELT VAPOUR RETARDER
1.0" SEMI-RIGID FIBREGLASS INSULATION BOARD
CONVENTIONAL 4-PLY BUILT-UP ROOF (BUR) WITH GRAVEL AGGREGATE

<b>NEW ROOF ASSEMBLY</b>
{STEEL DECKING}*
5/8" GP DENS DECK PRIME SHEATHING
SOPREMA SOPRAVAP'R
TAPERED EPS TYPE II (Min. 1.5%-2% to achieve pos. drainage)
SOPRA-ISO PLUS (Top-layer) (Minimum system R-30 effective value.)
COLVENT BASE 830
COLVENT TRAFFIC CAP 860

\*{REPLACE EXISTING DAMAGED COMPONENTS AS REQUIRED}

**2. Roof Replacement in Section 2: ROOF-B**

<b>EXISTING ROOF ASSEMBLY</b>
STEEL DECKING
FELT VAPOUR RETARDER
4.0" POLYISOCYANURATE (ISO) INSULATION BOARD
1/2" FIBREBOARD (FB)
CONVENTIONAL 4-PLY BUILT-UP ROOF (BUR) WITH GRAVEL AGGREGATE

<b>NEW ROOF ASSEMBLY (Base Bid)</b>
{STEEL DECKING}*
5/8" GP DENS DECK PRIME SHEATHING
SOPREMA SOPRAVAP'R
TAPERED EPS TYPE II (Min. 1.5%-2% to achieve pos. drainage)
SOPRA-ISO PLUS (Top-layer) (Minimum system R-30 effective value.)
COLVENT BASE 830
COLVENT TRAFFIC CAP 860

<b>NEW ROOF ASSEMBLY (Alternate Asphalt Type II adhered)</b>
{STEEL DECKING}*
FELT VAPOUR RETARDER
4.0" POLYISOCYANURATE (ISO) INSULATION BOARD
{Replace like-kind ISO & infill Fibreboard on cost-plus.}
TAPERED EPS TYPE II (Min. 1.5% to achieve pos. drainage) (Asphalt adhered)
SOPRA-ISO PLUS (Top-layer) (Minimum system R-30 effective value.) (Asphalt adhered)
COLVENT BASE 830
COLVENT TRAFFIC CAP 860

\*{REPLACE EXISTING DAMAGED COMPONENTS AS REQUIRED}

**3. Roof Replacement in Section 3: ROOF-F**

<b>EXISTING ROOF ASSEMBLY</b>
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STEEL DECKING
FELT VAPOUR RETARDER
1.0" SEMI-RIGID FIBREGLASS INSULATION BOARD
CONVENTIONAL 4-PLY BUILT-UP ROOF (BUR) WITH GRAVEL AGGREGATE

<b>NEW ROOF ASSEMBLY (Base Bid)</b>
{STEEL DECKING}*
5/8" GP DENS DECK PRIME SHEATHING
SOPREMA SOPRAVAP'R
TAPERED EPS TYPE II (Min. 1.5%-2% to achieve pos. drainage)
SOPRA-ISO PLUS (Top-layer) (Minimum system R-30 effective value.)
COLVENT BASE 830
COLVENT TRAFFIC CAP 860

\*{REPLACE EXISTING DAMAGED COMPONENTS AS REQUIRED}

THE END