PART 1 – GENERAL

1.1 SCOPE OF WORK

.1 Supply and install new gypsum board with fibreglass mat deck covering board mechanically fastened to existing steel deck.

.2 Supply and install new vapour barrier fully adhered to deck covering board.

.3 Supply and install new base layer polyisocyanurate adhered with Type III asphalt.

.4 Supply and install new tapered insulation adhered with Type III asphalt. Slope towards drain. Stagger all joints.

.5 Supply and install new overlay board adhered with Type III asphalt to provide torch safe surface.

.6 Crickets and saddles to be installed where necessary. Tapered insulation to be used.

.7 Supply and install new three-ply modified bitumen roofing membrane system as per manufacturer's instructions.

.8 Supply and install new spun aluminum sleeve flashing over all plumbing vents. Fill cavity between sleeve and vent with loose fill fibreglass insulation.

.9 Supply and install new pre-finished metal flashings at parapet and all roof top equipment and vents.

1.2 RELATED SECTIONS

.1 Section 06 10 00.01 – Rough Carpentry - Short Form.

.2 Section 07 21 13 – Board Insulation.

.3 Section 07 62 00 – Sheet Metal Flashing and Trim.

.4 Section 07 92 00 – Joint Sealants.

1.3 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM D6162-00a (2008), Type-III S Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

.1 Canadian General Standards Board (CGSB)
.1 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
.2 CAN/CGSB-51.33-M89. Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

.2 Canadian Roofing Contractors Association (CRCA)
.1 CRCA Roofing Specifications Manual-1997.

.3 Canadian Standards Association (CSA International)
.1 CSA-A123.3-05 (R2010), Asphalt Saturated Organic Roofing Felt.
.2 CSA A123.4-04 (R2013), Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.
.3 CSA O121-08 (R2013), Douglas Fir Plywood, Includes Update No. 1 (2013).
.4 CSA O151-09, Canadian Softwood Plywood.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

.5 Underwriters Laboratories of Canada (ULC)
.1 CAN/ULC-S704-11, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
.2 CAN/ULC-S706-09, Standard for Wood Fibre Insulating Boards for Buildings.

1.4 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.

.2 Provide layout of tapered insulation and perimeter edge details.

1.5 STORAGE AND HANDLING

.1 Provide and maintain dry, off-ground, weatherproof storage.

.2 Store rolled goods in upright position.

.3 Remove only in quantities required for same day use.

.4 Store temperature sensitive materials such as sealants, primers and adhesives at 40°F minimum.

.5 Protect insulation from mechanical damage, daylight, weather and deleterious material.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Do not install roofing when temperature remains below 0°F or in accordance with manufacturer's recommendations.

.2 Do not apply solvent based adhesive when temperature remains below - 21°F.

.3 Install roofing on dry deck, free of snow and ice. Use only dry materials and apply only during weather that will not introduce moisture into the roofing system.

.4 Do not carry out roofing when air temperature or wind-chill effect would tend to cause premature cooling of hot applied asphalt before full interply adhesion is reached.

1.7 FIRE SAFETY PRECAUTIONS

.1 Provide stored pressure, rechargeable type fire extinguishers with hose and shut-off nozzle, ULC labelled for A, B, and C class protection. Size 20 lbs. Provide minimum of two on roof and at least one for every torch applicator. Maintain fire extinguishers within 30 feet of torch applicator.

.2 Maintain fire watch for 1 hour after each days roofing operations cease.

.3 Maintain fire watch for minimum of 10 hours after completion of each day's work when installing torch applied systems.

1.8 WARRANTY

.1 For Work of this Section 07 52 00 – Modified Bituminous Roofing, 12 month warranty period is extended to 10 years labour and materials.

.2 Twenty (20) year warranty that is provided by the roofing membrane manufacturer and covers both material and labour for the duration of the warranty period (twenty years).

.3 Contractor is to provide proof to Consultant that the warranty has been initialized prior to beginning the installation of the new roofing materials.

1.9 MANUFACTURER'S REPRESENTATIVE

.1 The work shall be carried out under the general supervision of a representative of the roofing material manufacturer. The roofing materials manufacturer shall carry out site visits at least 3 days per week.

.2 At all times, the Roofing Contractor shall permit and facilitate access to the work site by the said manufacturer's representative.

1.10 FIELD QUALITY CONTROL

.1 Roofing Inspector:

.1 The Owner will engage and an independent inspection and testing firm to conduct site inspections and tests to verify compliance with the Contract Documents. Tests shall include flood tests.

.2 Cooperate with the Roofing Inspector. Provide at least 48 hours notice of commencement of each phase of the work. Provide the Inspector with unlimited access to the Work.

.3 The cost of initial inspection and testing will be paid by the Owner.
.4 The cost of re-inspection and re-testing necessitated by failure to meet specification requirements on the initial inspection/test shall be paid by the Roofing Contractor.

PART 2 - PRODUCTS

2.1 DECK COVERING

.1 ASTM C 1177 DensDeck Prime Roof Board FM Approval ASTM E 108, or approved alternative.

.2 Screws: No. 12 self-tapping, hot-dip galvanized or cadmium plated, flat head, capable of penetrating steel deck 1/2 inch.
.1 Acceptable Material: Rawl "Perma-Seal" deck screw, stress plates 3880 lbs.

.3 Adhesive: Urethane foam based adhesive. Approved for use in FM and UL Classified assemblies.
.1 Acceptable material: Garland InsulLock Roofing Adhesive.

2.2 ASPHALT PRIMER

.1 Water based asphalt primer for all roof surfaces. Standard of acceptance: GarlaPrime WB as recommended by the roofing material manufacturer for each specific substrate.

.2 Apply primer to all surfaces to be covered with membrane.

2.3 VAPOUR RETARDER

.1 Two plies of No. 15 organic, asphalt saturated perforated roofing felts to CSA A123.3

2.4 MEMBRANE

.1 Modified Bituminous Membrane cap sheet: to CGSB 37-GP-56M, ASTM D6162, Type III, SBS-SIS membrane, fibreglass/polyester reinforced, prefabricated sheet, minimum thickness: 80 mils. Recycled Pre consumer 11% Post consumer 28%.

.2 Acceptable material: Garland Stressply EUV mopped).

.3 Base membrane: two ply built-up membrane of asphalt saturated glass felts Type IV to ASTM D2178.

2.5 BITUMEN

.1 Asphalt: to CSA A123.4, Type 3.

2.6 INSULATION

.1 Board Insulation:
.1 Closed-cell polyisocyanurate foam insulation board, integrally laminated to inorganic/organic felt facers, to CAN/ULC-S704, Type 1 with facing 4, CFC-free and conforming to Environment Canada Ozone-Depleting Substances regulations, minimum RSI 1.04

$M^{2.o}C/W$ per 25 mm thickness, maximum board size 1219 mm x 1219 mm; generally two layers, each 63 mm thick.

.2 Provide minimum RSI 5.22 thermal resistance over the entire area of the roof.

.2 Tapered Insulation**:** Impregnated fibreboard conforming to CAN/ULC-S706, Type 1 (asphalt impregnated), tapered to provide a minimum finished roof slope 2%.

.3 Protection Board: Multi-ply, semi-rigid asphaltic roofing substrate board composed of a mineral-fortified asphaltic core formed between two asphaltic saturated fibreglass liners, 3.2 mm thick. Standard of acceptance: Soprema Sopraboard.

2.7 MEMBRANE FLASHINGS

.1 Membrane to be self adhering peel and stick type.

2.8 ADHESIVE

.1 Hot asphalt mopped on for securing overlay board and insulation and membranes.

2.9 CANT STRIPS

.1 Cut from prefabricated fibreboard material, to measure 6 inches on slope.

2.10 FASTENERS

.1 Covering to steel deck: No. 10 flat head, self-tapping, Type A or AB, cadmium plated screws.

2.11 SPUN ALUMINUM PLUMBING VENTS

.1 To CSA B79 of 2 mm extruded tubes of size to suit stack.

.2 Spun aluminum cap: size to suit.

2.12 ACCESSORIES

.1 Mechanical fasteners:

.1 Round top cap nails, 25 or 38 mm or equivalent stainless steel or galvanized fastenings as recommended by material manufacturers or as required for the purpose.

.2 In compliance with CSA B111, Table 12, nails shall be long enough to penetrate the substrate by at least 20 mm on flashings and parapet walls.

.3 Use FM approved screws to fasten insulation screws to penetrate deck, minimum 20 mm (maximum 20 mm where deck is exposed in building interior). Frequency and pattern to meet FM I90 windstorm requirements, including additional quantities at corners and at perimeter.

.2 Isolation pads under sleepers: Extruded expanded polystyrene board to CAN/ULC-S701, Type IV, thickness 25 mm except where otherwise indicated, compressive strength 210 kPa. Standard of Acceptance: Styrofoam SM.

.3 Metal flashings, vents and pipe sleeves: Refer to Section 07 62 00 "Metal Flashing and Trim".

2.13 ROOF DRAINS

.1 To ANSI/SPRI RD-1, 2003, Standard for Retrofit Roof Drains.

.2 Roof drain constructed of 1.3 mm thickness, copper body and neoprene gasket, dura-coated cast iron collar and dome with copper hardware.

2.14 SEALERS

.1 Plastic cement: asphalt, to CAN/CGSB-37.5.
.1 Acceptable material: Garland Flashing Bond (asbestos-free).

.2 Sealing compound: to CAN/CGSB-37.29, rubber asphalt type.
.1 Acceptable material: Garland Garlaflex Mastic (asbestos-free).

2.15 CARPENTRY

.1 Cants, curbs, fascias, blocking, or duct boards: as specified in Section 06 10 00.01 - Rough Carpentry – Short Form.

PART 3 – EXECUTION

3.1 WORKMANSHIP

.1 Do examination, preparation and roofing work in accordance with roofing manufacturer’s specification manual and CRCA Roofing Specification Manual.

.2 Do priming, asphalt roofing in accordance with CGSB 37-GP-9Ma.

.3 The interface of the walls and roof assemblies will be fitted with durable rigid material providing connection point for continuity of air barrier.

.4 Assembly component and material connections will be made in consideration of appropriate design loads.

3.2 PROTECTION

.1 Conform with requirements of Section 02 41 99 – Demolition for Minor Works for protection of existing building. Cover walls and adjacent parts of building where materials are being hoisted.

.2 Use warning signs and barriers to keep pedestrian traffic away from immediate vicinity. Maintain in good order until completion of work.

.3 Immediately clean drips and smears of bituminous material off of finished surfaces.

.4 Dispose of rain water off roof and away from face of building until roof drains or hoppers are installed and connected.

.5 Protect portions of roof not included in the work from construction related traffic and damage. Install layer of plywood protection board where traffic must continue over non-affected or completed areas. Comply with precautions deemed necessary by Consultant.

.6 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed work and materials out of storage.

.7 Install water cut-offs at end of day, and remove before resuming work.

.8 Arrange for shut down of active air-handling equipment to prevent intake of dust and debris and to prevent distribution of hazardous or objectionable odours into occupied spaces.

3.3 REMOVAL OF EXISTING MEMBRANES

.1 Remove existing equipment, flashings and membranes as specified in Section 02 41 99 – Demolition for Minor Works.

.2 Leave existing deck free and clear of all existing gypsum board coverings, membranes and insulation, and ready to receive new layer of gypsum board, vapour retarder, membrane and flashings.

3.4 EXAMINATION OF ROOF DECKS

.1 Examine roof decks and immediately inform Consultant .in writing of defects.

.2 Prior to commencement of work, ensure:
.1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris.
.2 Curbs have been built.
.3 Roof drains have been installed at proper elevations relative to finished roof surface.
.4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as required.

3.5 HEATING OF ASPHALT

.1 Asphalt to be heated in kettle sufficient to provide correct EVT range at point of application.

.2 In cold weather insulate hauling equipment and re-circulation lines to minimize heat loss.

.3 Do not heat asphalt above its Final Blowing Temperature (FBT) in tanker.

.4 Heating asphalt above its FBT may be permissible in kettle as long as asphalt is used up within 4 hours.

.5 Equip kettle and tanker with working thermometers.

3.6 PLANT AND ASPHALT

.1 Do not use direct fired equipment.

.2 Use only kettles equipped with thermometers or gauges in good working order.

.3 Locate kettle in safe place adjacent to building at location to approval of Consultant. When locating kettles, give consideration to direction of prevailing winds, building fans and air handling units to minimize possibility of smoke and fumes entering building. If wind direction causes smoke and fume problems, relocate kettles on daily basis when directed by Consultant.

.4 Maintain supervision while kettles are in operation and provide metal covers for kettles to smother flames in case of fire. Provide suitable fire extinguishers.

.5 Maintain efficiency of kettles and equipment by frequent cleaning. Remove all carbonized bitumen.

.6 Use only fibreglass roofing mops.

3.7 DECK COVERING

.1 Install layer of gypsum sheathing to steel deck and mechanically fasten with screws spaced 16 inches oc each way.

.2 Place with long axis of each sheet transverse to steel deck ribs, with end joints staggered and fully supported on ribs.

3.8 ASPHALT PRIMER APPLICATION

.1 Treat all surfaces to be roofed, with primer to improve adhesion. Apply by brush or roller at a rate of 350 g/m^2.

.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.

3.9 CONVENTIONAL SYSTEM INSTALLATION

.1 Install vapour retarder as follows:

.1 Apply hot mopping of asphalt and embed two plies of organic roofing felts. Apply asphalt at rate of 25 lbs per square. Lap sheets minimum 1/2 sheet width plus 2 inches for side and 6 inches for end laps.

.2 Insulation: install insulation to vapour retarder, fully adhered in full application of bitumen as follows:
.1 Apply hot mopping of asphalt to vapour retarder, and embed insulation. Apply asphalt at rate of 25 to 30 lbs per square.
.2 Place boards in parallel rows with ends staggered, and in firm contact with one another.
.3 Cut end pieces to suit.

.3 Tapered insulation: install tapered insulation fully adhered as follows:
.1 Install tapered insulation in accordance with shop drawings. Stagger joints between layers 6 inches minimum.
.2 Apply asphalt at temperature as recommended by manufacturer of insulation so as not to damage insulation. Apply at rate of 25 lbs per square.

.4 Fibreboard: install fibreboard to top of insulation as follows:
.1 Offset joint in fibreboard from joints in previous layers minimum 6 inches.
.2 Lay out row of fibreboard and apply hot mopping of asphalt to back of fibreboard at rate of 25 lbs per square.
.3 Flip over fibreboard and ensure firm contact to insulation.

.5 Cants and curbs: install fibreboard cant strips at all projections, edges, and intersections with vertical surfaces as follows:
.1 Apply hot bitumen to receiving surface and embed cant firmly by hand.
.2 Angle cut cants to fit tightly on back and bottom where roof to wall angle varies from 90 degrees.

.6 Membrane: install membrane in accordance with manufacturer's recommendations and as follows:
.1 Install membrane starting at low point of roof, perpendicular to slope.
.2 Embed two plies of glass felts in hot asphalt over fibreboard. Overlap sheets 1/2 width plus 2 inches. End lap 6 inches. Apply asphalt at rate of 25-30 lbs per square. Extend felts up over top of cant strip minimum 8 inches.
.3 Unroll and embed cap sheet in uniform coating of asphalt applied at rate of 35 lbs per square.
.4 Lap sheets 4 inches minimum for side and 8 inches minimum for end laps. Stagger side seams and end laps from joints in membranes below.
.5 Application to be free of blisters, wrinkles and fishmouths.
.6 Extend membrane up over top of cant strip minimum 8 inches.

.7 Membrane flashings: install membrane flashings after installing cap sheet in accordance with manufacturer's recommendations and as follows:
.1 Mop flashings to membrane in 18 inch wide strips.
.2 Lap flashings minimum 8 inches and seal by mopping.

.3 Provide 6 inch minimum side lap and seal.

.4 Mechanically fasten outside edge of flashings to fascia, curbs, nailers and other supports, without sags, blisters, fishmouths or wrinkles.

.8 Penetrations: install roof drains, vent stack covers and other roof penetration flashings and seal to membrane in accordance with the manufacturer's recommendations and details.

.9 Ballast: apply Type III Asphalt at a rate of 60 pounds per 100 square feet and promptly cover with ½" washed rolled river gravel at a rate of 550 pounds per 100 square feet.

3.10 ROOF DRAINS

.1 Coordinate with Division 22 to ensure proper seals to roof drains.

.2 Prime all flanges with roof mastic prior to roofing installation. Install membrane and felts continuously over drain then cut out and trim neatly to interior facing. Coat membrane with bitumen and set and secure clamping ring in a bed of mastic as required by the drain design. Ensure that roof screens are secured in place with a mechanical device acceptable to the Consultant before leaving the site.

3.11 PLUMBING VENTS, STACKS AND SLEEVES

.1 Make all roof penetrations watertight.

.2 Trim membrane as required. Set and coat flanges with mastic on top of roof membrane.

.3 Insulate sleeves and soil pipes with glass fibre insulation.

.4 Set caps or collars, seal with caulking to provide watertight seal.

3.12 METAL FLASHINGS

.1 Install metal flashings as indicated on the drawings, as specified in Section 07 62 00 – Sheet Metal Flashing and Trim.

3.13 CLEANING

.1 Upon completion of the work of this Section remove from the premises all surplus material, dirt and debris caused by the work of this Section and leave the installation clean.

.2 Clean any drippage and spills of surplus material from adjacent surfaces and make good any damage caused by the work of this Section.

.3 Make good any damage caused by the work of this Section.

END