

DRAWINGS:

A200 ROOF PLAN
A201 ROOF SETAELS

SPECIFICATIONS:

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END OF SECTION

1.1 Cost Breakdown

- .1 Submit Cost Breakdown within five (5) business days of contract award. Revise to acceptance by Departmental Representative.
- .2 Prepare the Cost Breakdown as follows:
 - .1 Use an acceptable format (spreadsheet), which is legible, clearly laid out and suitable for standard photocopying.
 - .2 Break the Contract Amount into acceptable amounts corresponding to principal divisions of the Work.
 - .3 Meet the Contract Amount.
- .3 Base progress claims on accepted Cost Breakdown.

1.2 Taxes, Fees & Permits

- .1 Pay all fees and obtain all permits, including any permits for road or sidewalk closures associated with the work. Provide authorities with plans and information for determination of permit requirements and as required for acceptance.
- .2 Provide inspection certificates showing that work meets requirements of authorities.

1.3 Minimum Standards

- .1 Ensure that work uses new materials and conforms to the minimum applicable standards, including CGSB, CSA, NBC, OBC and federal, provincial and municipal codes.
- .2 For each type of product used, ensure the following:
 - .1 Materials are by a single manufacturer.
 - .2 Accessories are recommended by that manufacturer.
- .3 For each product and material used:
 - .1 Carry out work in accordance with manufacturer's applicable, printed instructions.
 - .2 Consult manufacturer's representative as required to ensure no unacceptable conditions exist and to confirm quality control procedures.
- .4 Ensure that products and materials are compatible to each other. As required by Departmental Representative, submit successful compatibility test results or signed manufacturers' certificates, to acceptance by Departmental Representative.
- .5 In case of conflict or discrepancy between standards or instructions applicable, apply most stringent requirement.

1.4 Product Data

- .1 Submit product data for standard manufactured products, including manufacturers' catalogue sheets, brochures, literature, performance charts and diagrams.

- .2 Delete information not applicable to project. Cross-reference product data information to applicable portions of Contract Documents.
- .3 Resubmit as directed and to acceptance by Departmental Representative. Allow at least three (3) business days for Departmental Representative to review any submission or re-submission.

1.5 Signage

- .1 Provide acceptable common-use signs as required, including those related to traffic control, information, instruction and use of equipment or safety devices. Signage is to use both official languages or commonly understood graphic symbols.
- .2 No advertising is permitted on site. Cover or remove anything deemed by Departmental Representative to be advertising.

1.6 Use of Premises

- .1 The Contractor is responsible to ensure that disturbances to the occupants are kept to a minimum. Provide minimum notice of 48 hours for work outside of regular business hours.
- .2 Maintain existing services to the premises and provide for unobstructed personnel and vehicle access.
- .3 Access and movement of site personnel and materials into and through the premises are forbidden, unless as arranged in advance with the Departmental Representative. Provide for temporary removable or securable access to the work area from the staging area designated by the Departmental Representative.
- .4 Ensure that at all times site personnel comply with requirements and restrictions as to use of premises.
- .5 All Contractor personnel are to comply with the building smoking policy.
- .6 Sanitary facilities are not available on site. Provide for temporary sanitary facilities for workers.

1.7 Security

- .1 Coordinate the work at the site with Security through the building security coordinator. Comply with all aspects of the security environment of the premises.

1.8 Services, Utilities and

- .1 For use of existing water and electrical services:
 - .1 Services may be used without charge only as required

**Mechanical
Equipment**

- for the work, excluding space heating.
- .2 Do not impose loads exceeding existing capacity.
- .3 Prior to using services or imposing additional loads, coordinate with Departmental Representative.
- .4 Verify, connect and disconnect at own expense and responsibility.

- .2 Maintain and protect existing building services.
- .3 For each necessary interruption of any building service throughout the course of the work:
 - .1 Notify related utility companies of intended interruption.
 - .2 Obtain requisite permissions.
 - .3 Coordinate with Departmental Representative, giving three (3) business days' notice.
 - .4 Schedule interruption after building hours.
 - .5 Keep duration to a minimum.
- .4 For rooftop mechanical equipment to be lifted for access to the work:
 - .1 Engage a qualified mechanical contractor to temporarily disconnect, separate, lift, shift, replace, reassemble and reconnect rooftop mechanical equipment as required to complete the work.
 - .2 Include related equipment, including conduit, piping, cabling and supports.
- .5 At surface mounted conduit, cabling and electrical fixtures:
 - .1 Coordinate disconnection with Departmental Representative, giving three (3) business days' notice.
 - .2 Temporarily remove components as required for access to the work.
 - .3 Keep duration of disconnection to a minimum.
 - .4 Reinstate components, providing new fasteners.

**1.9 Protection of
Public Way**

- .1 Coordinate all aspects of work to protect the public, operatives, building occupants and other users of site from all hazards in accordance with COSH and OHSA.
- .2 Design, erect and maintain acceptable protection, including hoarding, overhead protection, walkways, barricades, signage and lighting, as and where required by authorities and as required to support all loads including wind loads.
- .3 When mobile crane is in use, provide protection consisting at least of continuous solid barricades around crane, equipment and areas under hoisting operations.

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- Provide ground person during all hoisting operations to direct pedestrians.
- .4 For use of an elevating work platform, provide protection at least of continuous solid barricades around base of platform.
- 1.10 Protection of Site**
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- .1 Protect against spread of dust, dirt, debris or overspray beyond work areas.
- .2 Protect existing premises from damage, safety hazards and overloading of structure, fixtures or equipment.
- .3 Protect existing interior and exterior finishes from damage:
- .1 Do not lean or store any materials against interior or exterior walls of building.
 - .2 Provide protection from leaks from equipment.
 - .3 Provide acceptable protection for landscaped areas.
 - .4 Assume responsibility for costs associated with repair of any damage.
 - .5 Coordinate with Departmental Representative provisions for immediate clean-up of falling debris within interior spaces.
- .4 Protect premises from water damage at all times.
- .5 Report to Departmental Representative any defect in existing construction or damage to the existing premises, however caused.
- 1.11 Protection of Work**
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- .1 Protect finished work, work in progress and existing adjacent or underlying work, against all hazards.
- .2 Provide protection until take-over, including while work is closed down, however caused.
- .3 Protect work subject to damage to prevent deterioration of products in place or in storage.
- 1.12 Access and Conveyors**
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- .1 Allow for any clearing or shifting operations necessary to gain access to work areas, including lifting of mechanical equipment.
- .2 Provide access and conveying equipment including scaffolding, platforms, stairs, ladders, lifts, booms, conveyors, hoists and cranes as required to conduct the work.
- .3 Design, install and inspect access and conveying

equipment required for the work in accordance with all applicable municipal, provincial and other regulations.

- .4 For temporary scaffolding or work platform installations, provide engineered shop drawing and installation certificate, signed and sealed by a Professional Engineer, licensed in the Province of Ontario. Additions or modifications are to be approved by the Professional Engineer in writing.
- .5 Do not attach access or conveying equipment to building. Support is to be independent of finished surfaces.

1.13 Fall Protection

- .1 Comply with OHSa regulations for fall protection at all times. This building is not equipped with a permanent fall protection anchorage system.
- .2 Provide engineered shop drawing and installation certificate for temporary fall protection system, signed and sealed by a Professional Engineer. Additions or modifications are to be approved by the Professional Engineer in writing.

1.14 Handling and Storage

- .1 Conduct handling and storage operations so as to protect materials from delivery to installation. Remove and replace materials exposed to unacceptable conditions. Assume associated costs.
- .2 Handle materials, including materials salvaged for reuse, as required, as recommended by manufacturers and as follows:
 - .1 Prevent damage to materials, including puncturing.
 - .2 Prevent damage to substrate.
 - .3 Place acceptable protective runways over new work and existing finishes.
- .3 Store materials, including materials salvaged for reuse, as required, as recommended by manufacturers and as follows:
 - .1 Prevent damage to materials, including crushing.
 - .2 Provide covers to protect from moisture, weather, sunshine, deleterious materials and construction activities.
 - .3 Provide enclosures and heat as required to maintain manufacturers' recommended storage conditions.
 - .4 Store in unopened original packages, unless otherwise required.
 - .5 Stand rolled goods on end with selvaqe edge up.
 - .6 Remove and replace damaged or broken materials.

- .4 Take appropriate protective measures for materials subject to deterioration or damage in storage, including:
 - .1 For materials subject to absorbing moisture condensing within original packages, remove packaging and provide suitable ventilated protection.
 - .2 For materials subject to degradation in sunlight, provide complete coverage with opaque coverings.
- .5 For on-site storage of materials and equipment:
 - .1 Do not unreasonably encumber site.
 - .2 Promptly move items which interfere with operations of Departmental Representative or other contractors.
- .6 When site personnel are not at work on site, except as permitted for access or protection, all tools, products, materials and debris are to be stored securely on the roof, in the allotted storage space, or removed from the site.

**1.15 WHMIS and
Hazardous
Materials**

- .1 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and the provision of Material Safety Data Sheets (MSDS).
- .2 Give Departmental Representative three (3) business days' notice for work involving any of the following:
 - .1 Designated substances per Province of Ontario regulation 490/09;
 - .2 Hazardous substances per Canada Labour Code, Part II, Section 10;
 - .3 Application of paint, sealant or adhesives.
- .3 For contaminated or hazardous materials as defined by authorities, remove from site and dispose of in safe manner. Minimize danger at site and during disposal.

**1.16 Environmental
Conditions**

- .1 Work is to be carried out only in environmental conditions acceptable to Departmental Representative.
- .2 Evaluation of minimum temperatures is to be based on the factor for wind chill as recommended by CRCA.
- .3 Unless otherwise specified, all product and substrate materials are to be minimum 5°C, frost free and dry.
- .4 Remove and replace work exposed to unacceptable conditions. Assume responsibility for all costs associated with replacement of unacceptable work.

1.17 Removals

- .1 Take measures to protect substrate from damage during

removal operations, as required and as follows:

- .1 Use pry-bars, chisels or hammers only if no damage is caused to substrate.
- .2 For fasteners which cannot be pried out, break off or extract by drilling out.
- .3 For fasteners which are broken off or cannot be extracted, cut off and grind flush, cutting away surrounding materials as required to provide access.

1.18 Reinstatements

- .1 At temporary removals for salvage and at later reinstatement:
 - .1 For removals and reinstatements, employ tools which do not damage or mar finished surfaces.
 - .2 Mark each item as required for proper reinstatement, without damage to finished surfaces.
 - .3 Clean and rehabilitate items prior to storage.
 - .4 Provide protected storage until reinstatement.
 - .5 Ensure reinstatement of each item in its original location and orientation.

1.19 Waste and Recycling

- .1 Coordinate work to:
 - .1 Minimize packaging.
 - .2 Minimize cutting, waste and removals.
 - .3 Maximize reuse and recycling.
- .2 Unless otherwise specified, waste and materials for removal become Contractor's property when removed and are to be taken promptly from the site for disposal or recycling. Do not sell or burn materials on site.
- .3 For materials to be recycled, submit the following:
 - .1 Prior to beginning removals, submit acceptable plan for recycling, including destinations of materials.
 - .2 As work progresses, submit acceptable confirmation that recycling has been carried out.
- .4 The following materials are not for disposal but are to be recycled:
 - .1 Paper and cardboard packaging.
 - .2 Unused metal materials.
- .5 Disposal and recycling bins:
 - .1 Place bins only in locations acceptable to Departmental Representative.
 - .2 Provide separate bins for disposal and for the different materials for recycling.
- .6 Dispose of materials removed from the site safely, to acceptable standards of environmental protection and as required by authorities.

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- 1.20 Powder Actuated Tools**
- .1 Do not use powder actuated tools or tools using fastening explosives, unless permitted expressly by Departmental Representative.
- 1.21 Cut, Patch and Make Good**
- .1 Unless indicated in Contract Documents or instructed in writing by Departmental Representative, do not allow any part of construction to be cut, drilled or modified.
- .2 Cut existing surfaces as required to accommodate new work. Remove all items so shown or specified. Do not remove excess material or reduce structural integrity.
- .3 Patch and make good surfaces cut, damaged or disturbed, to acceptance by Departmental Representative.
- .4 Other than pre-existing damage for which accepted photographic record was provided prior to the work, make good damage, however caused, within areas affected by and adjacent to the work and related operations.
- 1.22 Adjustments and Accessories**
- .1 Allow for the nature of work which includes rehabilitation, alteration and repair of existing construction.
- .2 Cut, alter and repair adjacent existing construction as required to prepare for new work and as follows:
- .1 Replace deteriorated, unconsolidated or unsuitable material.
 - .2 Refasten loose or unstable components.
 - .3 Alter or replace components including framing, shims, blocking, backing and facing as required to achieve necessary profiles and support.
- .3 Adjust new work to accommodate existing conditions. Include for adjustments to material quantities, provision of accessories and other measures as required to alleviate deviations in layout and nature of existing construction.
- 1.23 Complete Work**
- .1 Completed work is to be:
- .1 Level, plumb, straight and square.
 - .2 Free of defects and unevenness.
 - .3 Of quality workmanship, meeting acceptable, published, manufacturer's and trade standards.
- 1.24 Review by Departmental Representative**
- .1 Coordinate operations and provide equipment and operating personnel as required to facilitate access by Departmental Representative during review of the work.
- .2 Mock-up requirements:
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- .1 The first instance of each type of operation involving cutting of existing materials or application of new materials is designated as initial work and constitutes a "mock-up" for review by Departmental Representative.
- .2 Such initial work includes all such work already in place at the time of review.
- .3 Rework the initial work, including its complete removal and replacement, as deemed necessary and as directed by Departmental Representative.
- .4 Proceed with remainder of the related type of work only after Departmental Representative's acceptance of the initial work.

- .3 Periodic review:
 - .1 Departmental Representative will review the work through its stages, on a periodic and random basis.
 - .2 Such review may take place at any time and at any work location.

- .4 Departmental Representative is to review conditions which are doubtful, differ materially from those anticipated, or prevent proper completion of work.

- .5 Give three (3) business days' notice for work to be reviewed by Departmental Representative.

1.25 Guarantees and Warranties

- .1 Guarantees and warranties are to show:
 1. Name and address of project;
 2. Guarantee commencement, which is the date of Certificate of Substantial Completion;
 3. Duration of guarantee;
 4. Clear indication of what is being guaranteed and what remedial action will be taken under guarantee;
 5. Name, official capacity, signature and seal of officer signing for guarantor.

1.26 Project Records

- .1 As work progresses, maintain accurate and up-to-date records of deviations from contract, including record drawings ("as-builts") with deviations neatly inked in.
- .2 As a pre-requisite for review for Substantial Performance, submit one (1) set of up-to-date record drawings.
- .3 Paper copies of Project Records are to be bound, with the following format for each binder:
 - .1 Three-ring, "D" ring type, with vinyl hard covers, for 215 X 280 mm (8 1/2" X 11") paper.
 - .2 With cover and spine showing project title, number, location and date.

- .4 Electronic copies of Project Records are to be provided in the following file formats:
 - .1 Text files: "MS Word".
 - .2 All other files: "Adobe PDF".

- .5 Project Records are to contain the following:
 - .1 Contact information for Contractor, subcontractors and materials suppliers.
 - .2 Guarantees and warranties.
 - .3 Specifications, in paper and electronic copies.
 - .4 Record drawings ("as-builts") in paper.
 - .5 Addenda, Change Orders and Contract modifications.
 - .6 Site Reports, Site Instructions and Field Test Reports.
 - .7 Accepted Product Data Sheets and Shop Drawings.
 - .8 Manufacturers' maintenance and cleaning instructions.

- .6 Submit one (1) complete set of Project Records, for review, two (2) weeks prior to date of Completion.

- .7 Provide accepted Project Records in four (4) copies.

END OF SECTION

1.1 Related Sections

- .1 01 32 16.19 - Construction Meeting Schedule
- .2 01 33 00 - Submittal Procedures

1.2 Administrative

- .1 Schedule and administer project meetings throughout the progress of the work at the call of the Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four (4) days in advance of meeting date to Departmental Representative.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within three (3) days after meetings and transmit to meeting participants and, affected parties not in attendance.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3 Preconstruction Meeting

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart.
 - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences, etc.
 - .5 Delivery schedule of specified equipment.

- .6 Site security.
- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .8 Departmental Representative provided products.
- .9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .10 Take-over procedures, acceptance, warranties, etc..
- .11 Monthly progress claims, administrative procedures, photographs, hold backs.
- .12 Appointment of inspection and testing agencies or firms.
- .13 Insurances, transcript of policies.

1.4 Progress Meeting

- .1 During course of Work and two (2) weeks prior to substantial performance schedule progress meetings bi-weekly.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 Notify parties minimum five (5) days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within three (3) days after meeting.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for effect on construction schedule and on completion date.
 - .12 Other business.

PART 2 – PRODUCTS

2.1 Not used .1 Not used.

PART 3 - EXECUTION

3.1 Not used 1. Not used.

END OF SECTION

1.1 Related Sections

- .1 01 31 19 Project Meetings
- .2 01 33 00 Submittal Procedures

1.2 Definitions

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.3 Requirements

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.

- .3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

**1.4 Action and
Informational
Submittals**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within five (5) working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within (5) working days of receipt of acceptance of Master Plan.

1.5 Master Plan

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return revised schedules within five (5) working days.
- .3 Revise impractical schedule and resubmit within five (5) working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6 Project Schedule

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Permits.
 - .4 Mobilization.
 - .5 Installation of new roofing
 - .6 Demobilization

- 1.7 Project Schedule Reporting**
- .1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.
 - .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

- 1.8 Project Meetings**
- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
 - .2 Weather related delays with their remedial measures will be discussed and negotiated.

PART 2 – PRODUCTS

- 2.1 Not used**
- .1 Not used.

PART 3 - EXECUTION

- 3.1 Not used**
- 1. Not used.

END OF SECTION

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|---|---|
| 1.1 Related Sections | .1 01 31 19 Project Meetings
.2 01 32 16.19 Construction Project Schedule |
| 1.2 Reference Standards | .1 Not applicable |
| 1.3 Administrative | .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
.2 Do not proceed with Work affected by submittal until review is complete.
.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
.4 Where items or information is not produced in SI Metric units converted values are acceptable.
.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
.6 Notify Departmental Representative in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
.7 Verify field measurements and affected adjacent Work are co-ordinated.
.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
.10 Keep one reviewed copy of each submission on site. |
| 1.4 Shop Drawings and Product Data | .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and |
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other data which are to be provided by Contractor to illustrate details of a portion of Work.

- .2 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Ontario.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow seven (7) calendar days for Departmental Representative's review of each submission.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, in [duplicate], containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions,

verification of field measurements and compliance with Contract Documents.

- .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
- .13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

- .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit electronic copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.
- .20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, 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 corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .21 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that the Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction

and installation and for co-ordination of Work of sub-trades.

1.5 Samples

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's business address.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.6 Mock-Ups

- .1 Erect mock-ups as directed by the Departmental Representative.

1.7 Photographic Documentation

- .1 Submit electronic copy of colour digital photography in jpg format, fine resolution monthly with progress statement and as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.

1.8 Certificates and Transcripts

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.

PART 2 – PRODUITS

2.1 Not used

- .1 Not used.

PART 3 - EXECUTION

3.1 Not used _____ 1. Not used.

END OF SECTION

**1.1 General
Protection**

- .1 Do not disrupt airport business except as permitted by Departmental Representative.
- .2 Provide temporary protection for safe handling of public, personnel, pedestrians and vehicular traffic./
- .3 Provide barricades and lights where directed by Departmental Representative.

**1.2 Movement of
equipment and
Personnel**

- .1 In areas of airport not closed to aircraft traffic:
 - .1 Obtain Departmental Representative's approval on scheduling of Work.
 - .2 Control movements of equipment and personnel as directed by Departmental Representative.
 - .3 Provide qualified field personnel at locations designated by Departmental Representative to relay signals from airport traffic control tower to equipment and personnel wishing to cross live traffic areas.
 - .4 Immediately obey signals from airport traffic control tower.

**1.3 Unserviceable
Areas**

- .1 Mark off areas made unserviceable for aircraft by Work of this Contract by providing highly visible danger markings by day and red lights by night.

PART 2 – PRODUCTS

2.1 Not used

- .1 Not used.

PART 3 - EXECUTION

3.1 Not used

- 1. Not used.

END OF SECTION

1. References

- .1 Canada Labour Code, Canada Occupational Safety and Health Regulations, latest edition.
- .2 Canadian Standards Association (CSA) CSA S350, Code of Practice for Safety in Demolition of Structures, latest edition.
- .3 Province of Ontario, Occupational Health and Safety Act and Regulations for Construction Projects, latest edition

2. Submittals

- .1 Prior to commencement of work on site, and within seven (7) days after date of notification of contract award, submit site-specific Health and Safety Plan, with necessary information including the following:
 - .1 Site-specific safety hazard assessment.
 - .2 Hazard analysis for all site tasks and operations including all safety and health risks.
 - .3 Checklist for Health and Safety Site Inspection.
 - .4 On-site Contingency and Emergency Response Plan: including standard operating procedures to be implemented during emergencies;
 - .5 Emergency Exit Plan, including site and building plan showing exit paths and emergency assembly area;
 - .6 Emergency Route to nearest hospital emergency room, including street plan and driving directions.
- .2 Prior to commencement of work on site: submit names of competent personnel and alternates who are to be responsible for the following:
 - .1 site safety and health.
 - .2 hazards present on site.
 - .3 use of personal protective equipment.
 - .4 verification of safety training for site personnel.
- .3 As the work progresses, submit required Health and Safety documents including:
 - .1 Copies of incident and accident reports.
 - .2 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
 - .3 Material Safety Data Sheets (MSDS) for all materials.
 - .4 Completed Health and Safety Inspection Checklists.

3. Filing of Notice

- .1 File Notice of Project with Provincial authorities prior to commencement of work on site.

-
- 4. Safety Assessment**
- .1 Perform site-specific safety hazard assessment in accordance with the site-specific Health and Safety Plan.
 - .2 Designated Site Superintendent is to carry out weekly Health and Safety Site Inspection and is to complete related Checklist.
- 5. Meetings**
- .1 Attend health and safety pre-construction meeting.
- 6. Regulatory Requirements**
- .1 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations and Province of Ontario, Occupational Health and Safety Act and Regulations for Construction Projects, R. S. O. 1990.
 - .2 Comply with specific standards and regulations to ensure safe operations at site containing hazardous or toxic materials.
- 7. Implementation**
- .1 Continue to implement, maintain and enforce the accepted Health and Safety Plan until final demobilization from site.
 - .2 Any request for relief from, or substitution for any portion or provision of minimum Health and Safety Guidelines specified herein or of accepted site-specific Health and Safety Plan, is to be submitted to Departmental Representative in writing. Departmental Representative will respond in writing, either accepting or requesting improvements.
 - .3 Be responsible for safety of persons and property on site and for protection of persons off site and environment to the extent that they might be affected by performance of the Work.
 - .4 Comply, and enforce compliance by site personnel, with safety requirements including:
 - .1 Contract Documents, including site-specific Health and Safety Plan.
 - .2 Canada Labour Code, Canada Occupational Safety and Health Regulations.
 - .3 Province of Ontario, Occupational Health and Safety Act and Regulations for Construction Projects.
 - .4 CSA 350 for demolition and removals.
 - .5 Applicable statutes, regulations and ordinances issued by authorities.
 - .6 Safety training as required by authorities and as recommended by manufacturers of products and equipment.
-

- 8. Unforeseen Hazards**
- .1 For unforeseen or peculiar safety-related hazards or conditions arising in the course of Work: Immediately stop work. Advise Departmental Representative verbally and in writing.
- 9. Posted Documents**
- .1 Provide and post on site documents as follows:
- .1 Health and Safety Representative and alternate – names and emergency contact information;
 - .2 General Requirements – Contractor’s name and emergency contact information;
 - .3 Notice of Project;
 - .4 Health and Safety Plan;
 - .5 Emergency Exit Plan;
 - .6 Emergency Route;
 - .7 Workplace Safety and Insurance Board of Province of Ontario (WSIB) Form 82;
 - .8 WSIB Form 1101;
 - .9 Province of Ontario, Ministry of Labour Orders;
 - .10 Province of Ontario, Occupational Health and Safety Act and Regulations for Construction Projects;
 - .11 WHMIS Material Safety Data Sheets;
 - .12 Regulations corresponding to Designated Substances which may be present.
- .2 Comply with Provincial general posting requirements.
- 10. Correction of Non-Compliance**
- .1 Immediately address all health and safety non-compliance issues, including those identified by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct health and safety non-compliance issues identified.

END OF SECTION

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- | | |
|---|--|
| <u>1.1 Installation and Removal</u> | .1 Provide temporary utilities controls in order to execute work expeditiously. |
| | .2 Remove from site all such work after use. |
| <u>1.2 Water Supply</u> | .1 Departmental Representative will provide supply of potable water for construction use. |
| <u>1.3 Temporary Power and Light</u> | .1 Departmental Representative will pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 120 volts 20 amps. |
| <u>1.4 Fire Protection</u> | .1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws. |
| | .2 Burning rubbish and construction waste materials is not permitted on Site. |

PART 2 – PRODUCTS

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|----------------------------|--------------|
| <u>2.1 Not used</u> | .1 Not used. |
|----------------------------|--------------|

PART 3 - EXECUTION

- | | |
|----------------------------|--------------|
| <u>3.1 Not used</u> | 1. Not used. |
|----------------------------|--------------|

END OF SECTION

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- | | |
|---|---|
| 1.1 Related Sections | .1 01 73 00 - Execution |
| 1.2 Reference Standards | .1 Not applicable. |
| 1.3 Existing Services | .1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings. |
| 1.4 Location of Equipment and Fixtures | .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
.3 Inform Departmental Representative of impending installation and obtain approval for actual location.
.4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative. |
| 1.5 Records | .1 Record locations of maintained, re-routed and abandoned service lines. |

PART 2 – PRODUCTS

- | | |
|---------------------|--------------|
| 2.1 Not used | .1 Not used. |
|---------------------|--------------|

PART 3 - EXECUTION

- | | |
|---------------------|--------------|
| 3.1 Not used | 1. Not used. |
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END OF SECTION

1.1 Related Sections

- .1 01 33 00 - Submittal Procedures.
- .2 01 71 00 - Examination and Preparation.
- .3 .07 52 11 – Modified Bituminous Roofing

2. Action and Informational Submittals

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Departmental Representative or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Departmental Representative or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.3 Materials

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

1.4 Preparation

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.

- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work.

1.5 Execution

- .1 Execute cutting, fitting, and patching to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .9 Restore work with new products in accordance with requirements of Contract Documents.
- .10 Fit Work watertight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .11 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

1.6 Waste Management and Disposal

- .1 Separate waste materials for recycling in accordance with Section 01 10 00.

PART 2 – PRODUCTS

2.1 Not used

- .1 Not used.

PART 3 - EXECUTION

3.1 Not used 1. Not used.

END OF SECTION

1.1 Related Sections

- .1 01 71 00 - Examination and Preparation
- .2 01 73 00 - Execution
- .3 07 52 00 – Modified Bituminous Roofing

1.2 Project Cleanliness

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Departmental Representative or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide containers on-site for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling. Refer to Section 01 10 00.
- .7 Dispose of waste materials and debris off site.
- .8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.3 Final Cleaning

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris other than that caused by Departmental Representative or other Contractors.

- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .9 Remove dirt and other disfiguration from exterior surfaces.
- .10 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .11 Sweep and wash clean paved areas.
- .12 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .13 Clean roofs, downspouts, and drainage systems.
- .14 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .15 Remove snow and ice from access to building.

1.4 Waste Management and Disposal

- .1 Separate waste materials for recycling in accordance with Section 01 10 00.

PART 2 – PRODUCTS

2.1 Not used

- .1 Not used.

PART 3 - EXECUTION

3.1 Not used

- 1. Not used.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

- | | |
|-------------------|----------------|
| 1. Roof Membranes | Section 075211 |
| 2. Sheet Metal | Section 076200 |
| 3. Joint Sealing | Section 079200 |

1.2 References

1. Canadian Standards Association (CSA)
 - .1 CSA B111–1974 (R2003), Wire Nails, Spikes and Staples
 - .2 CAN/CSA-G164–M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles
 - .3 CSA O80 Series–15 Wood Preservation
 - .4 CSA O121–17 Douglas Fir Plywood
 - .5 CAN/CSA–O141–05 (R2014), Softwood Lumber
 - .6 CSA O151–17 Canadian Softwood Plywood
2. Canadian Lumber Standards Administration Board (CLSAB)
3. National Lumber Grading Authority (NLGA)
4. Standard Grading Rules for Canadian Lumber (2014)

1.3 Roofing Design

- .1 Provide verification from a Professional Engineer licensed in the Province of Ontario that all work of this Section meets wind uplift resistance of 2.1 kPa at parapets, calculated using Wind-RCI (Roof Calculator on Internet) provided by the National Research Council of Canada.

1.4 Handling and Storage

- .1 Protect materials from moisture and weather. Do not allow plywood and lumber surfaces for application of membrane to become wet prior to membrane application.

1.5 Tolerances

- .1 Align and plumb faces of components.

1.6 Source Quality

- .1 Lumber identification: by grade stamp of an agency certified by CLSAB.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.
- .3 Plywood, OSB and wood based composite panel construction sheathing identification: by grade mark in accordance with applicable CSA standards.

1.7 Protection

- .1 During removals and installations, protect adjacent existing materials and finishes to remain.
- .2 Protect against intake of dust and fumes into building air handling systems.

- 1.8 Submittals** .1 Submit product data for products used.

PART 2—PRODUCTS

- 2.1 Lumber Material** .1 Lumber: to NLGA grading standards; Grade No. 2, Northern softwood species; S4S, moisture content 19% or less in accordance with CAN/CSA–O141, preservative pressure treated in accordance with CSA O80 Series to a net retention of 4.0 kg/m³.
- .2 Provide minimum material sizes as required and as follows:
- .1 Framing lumber: 40 x 143 mm (2" x 6" nominal).
- .2 Sleepers: 190 x 190 mm (8" x 8" nominal).

- 2.2 Panel Materials** .1 Plywood: to CSA O121 or CSA O151 exterior grade, thickness 19 mm, solid one side; graded and marked to applicable CSA standards, preservative pressure treated in accordance with CSA O80 Series to a net retention of 4.0 kg/m³.

- 2.3 Accessories** .1 Fasteners are to be of size and length as required to suit material thickness and to provide secure anchorage.
- .2 Nail fasteners for wood substrate: to CSA B111, galvanized steel spiral framing nails, exterior grade.
- .3 Screw fasteners for wood substrate: galvanized steel wood screws with countersunk heads, exterior grade.
- .4 Fasteners for steel substrate: galvanized hardened self-tapping steel screws, exterior grade, recommended for purpose by manufacturer.
- .5 Membrane seals: self-adhesive membrane patches and membrane sealing compound, supplied by the Related Section.

- 2.4 Coatings** .1 Preservative for wood: Chromated Copper Arsenate (CCA) to CSA O80 Series; green colour.
- .2 Galvanizing for fasteners: to CAN/CSA–G164.

- 2.5 Miscellaneous** .1 Provide miscellaneous work for work of other Sections, including:
- .1 Blocking, backing, nailers and shims.
- .2 Temporary supports, bracing and forms.

PART 3 - EXECUTION

3.1 Workmanship

- .1 Carry out work to required standards and as follows:
 - .1 In accordance with requirements of NBC.
 - .2 For proper support of other materials and assemblies.

3.2 Removals

- .1 Carry out removals to achieve access for installation of roofing system.
- .2 Assume costs associated with repairs to surfaces at removed fasteners.

3.3 Examination

- .1 Before installation of materials, examine conditions as required and as follows:
 - .1 Conduct final examination of substrate for application of materials.
 - .2 Immediately inform Departmental Representative of defects and arrange work to accommodate review.
 - .3 At time of installations, ensure that conditions are as required and as recommended.
 - .4 Ensure application of membrane is complete before installation of wood components. Verify acceptance of membrane by Departmental Representative.

3.4 Preparation

- .1 Remove any existing dust and other foreign matter to allow proper contact to surfaces of substrate.
- .2 Allow for the nature of alterations to an existing structure. Cut, alter and repair adjacent construction as required to accommodate existing conditions and prepare for new work, as indicated and as follows:
 - .1 Refasten existing loose or unstable components.
 - .2 Alter existing components as required to achieve necessary profiles and support.
 - .3 Do not remove excess material or reduce structural integrity.

3.5 Cutting and Fitting

- .1 Cut components neatly to achieve square and tight fit at all joints. Cut plywood and sheet materials using a guide to achieve straight edges.
- .2 Allow for the nature of alterations to an existing structure. Cut, trim and shape new material as required to fit to adjoining existing surfaces.
- .3 For sloped, canted or tapered construction, angle-rip, bevel-cut and plane wood components, including framing, as required to provide close fit and continuous support.
- .4 Treat surfaces exposed by cutting, trimming or boring with

liberal brush application of preservative before installation. Saturate and maintain wet film on surface for minimum three (3) minute soak on lumber and one (1) minute soak on plywood.

3.6 Fastening

- .1 Fasten framing members with a minimum of two (2) fasteners per joint. Frame, tie and brace members to provide necessary strength and rigidity. Fasten as required and at 400 mm (16") maximum spacing, with at least two (2) fasteners per joint.
- .2 Fasten plywood, furring, blockings and nailers to each other and to substrate at 300 mm (12") on centre maximum spacing in a staggered pattern.
- .3 Fasten to existing substrate using screw fasteners only.
- .4 Do not damage membrane on substrate. Immediately seal damage to membrane, including punctures, pilot holes and removed fasteners, with membrane seals including sealing compound and membrane patches according to the Related Section.
- .5 For plywood and similar sheets, provide continuous edge support. Fasten edges as required and at 150 mm (6") maximum spacing.
- .6 Countersink fasteners where necessary for good appearance or for clearance for other work.

3.7 Sleepers

- .1 Provide sleepers as required and as follows:
 - .1 Replace existing wood block sleepers.
 - .2 Provide blocking as required to maintain existing sleeper height.
 - .3 Secure sleepers to roof deck with threaded rod bolted through deck. Coordinate with Departmental Representative for interior access.
 - .4 Maintain existing sleeper spacing.

3.8 Miscellaneous

- .2 Provide miscellaneous work for work of other Sections, including:
 - .3 Blocking, backing, nailers and shims.
 - .4 Temporary supports, bracing and forms.

3.9 Clean-up

- .1 Clean-up as required. Remove excess fasteners as work progresses, using metal detectors or magnetic sweepers.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

- | | |
|-----------------------------------|------------------|
| 1. Rough Carpentry | Section 06 10 53 |
| 2. Sheet Metal Flashings and Trim | Section 07 62 00 |
| 3. Joint Sealant | Section 07 92 00 |

1.2 References

1. American Society for Testing and Materials (ASTM)
 - .1 ASTM C1177/C1177M-17, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - .2 ASTM D41-11 (2016), Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 - .3 ASTM D6162/D6162M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
 - .4 ASTM D6163/D6163M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
 - .5 ASTM D6164/D6164M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
2. Canadian General Standards Board (CGSB)
 - .1 CGSB-37-GP-9Ma-83 Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
 - .2 CAN/CGSB 37-GP-56M AMEND 85 Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
3. Canadian Roofing Contractors' Association (CRCA): Roofing Specifications Manual, most recent edition.

1.3 Administrative Requirements

- .1 Convene pre-installation meeting one week prior to beginning waterproofing work, with contractor's representative and Departmental Representative to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Review installation instructions and warranty requirements.

1.4 Submittals

- .1 Submit copies of the most current technical data sheets. These documents must describe the physical properties of materials and explanations about product installation, including restrictions, limitations and other manufacturer recommendations.

- .2 Provide copies of WHMIS MSDS for all products to be utilized.

1.5 Qualifications

- .1 Roofing contractors must be registered with manufacturer's quality assurance program, and provide the Departmental Representative with a written certificate to this effect before beginning any roofing work.

1.6 Storage and Delivery

- .1 All materials must be delivered and stored in their original packaging, in conformance with the requirements described in the manufacturer's technical documentation.
- .2 At all times, materials must be adequately protected and stored in a dry and properly ventilated area, away from any welding flame or spark, and sheltered from the elements and any harmful substances.
- .3 Store adhesives and solvent-based mastics at a minimum of 5°C.
- .4 Materials delivered in rolls must be carefully stored upright; flashings must be stored to avoid wrinkling, buckling, scratches or any other possible damage.
- .5 Avoid gathering construction materials on the roof, which may affect the structural integrity by imposing loads exceeding what is admissible.

1.7 Fire Protection

- .1 Prior to the start of work, conduct a site inspection to ensure its safety in order to minimize fire risks and hazards.
- .2 Respect safety measures recommended by the related local authorities.
- .3 At the end of each workday, use a heat detector gun to spot any smouldering or concealed fire. Job planning must be organized to ensure workers are still on location at least 1 hour after welding works.
- .4 Never apply the torch directly to flammable materials.
- .5 Throughout roofing installation, maintain a clean site and have at least one ULC-approved Class A, B or C fire extinguisher, charged and in perfect operating condition, within 6 m of each torch. Respect all safety measures described in technical data sheets of sealants. Welding torches must never be placed near combustible or flammable products, nor be used where the flame is not visible or cannot be easily controlled.

1.8 Dust and Fumes

- .1 Co-ordinate with building operations personnel with regard to intake louvres and any work creating dust or fumes, including use of primer, adhesive, solvents and torches.

**1.9 Extended
Warranty**

For the work of this Section, the 12 month warranty period is extended to 24 months.

PART 2--PRODUCTS

**2.1 Performance
Criteria**

- .1 Compatibility between components of the roofing system is essential. All waterproofing materials must be provided by the same manufacturer. Provide written declaration to Departmental Representative stating that materials and components, as assembled in the system, meet this requirement.
- .2 Roofing System: to CSA A123.21 for wind uplift resistance.

**2.2 Sheet
Membranes**

- .1 Modified Bitumen Vapour Barrier: Vapour barrier membrane composed of SBS modified bitumen and a glass mat reinforcement. The upper surface is sanded, the underface is covered with a thermofusible plastic film. In conformance with: CAN/CGSB 37.56-M (9th Draft).
- .2 Base Sheet Membrane for Field Surface: Roofing membrane composed of SBS modified bitumen and a non-woven polyester reinforcement. Both sides are covered with a thermofusible plastic film. The surface must be marked with three (3) chalk lines to ensure proper roll alignment.
- .3 Base Sheet Membrane for Flashings and Parapets: Membrane composed of SBS modified bitumen and composite (non-woven polyester and glass mat reinforcement). The surface is covered with a thermofusible plastic film and the underface is covered with a release protection film. The surface shall be marked with three (3) chalk lines to ensure proper roll alignment.
- .4 Roofing Cap Sheet Membrane: Roofing membrane composed of SBS modified bitumen with a non-woven polyester reinforcement and elastomeric bitumen. The surface is protected by coloured granules. The underface is covered with a thermofusible plastic film.
- .5 Waterproofing membranes composed of SBS modified bitumen, covered with granules on surface, with a 100 mm selvedge on both sides. The underface is covered with a thermofusible plastic film.

- .6 Walkway cap sheet: thickness 5.0 mm, with non-woven polyester reinforcement, bottom surface with thermofusible film for torched application, top surface with ceramic granules, colour to Departmental Representative's selection. Provide 1 m wide walkway membrane from roof access point to HVAC units. Provide 1m walkway around all HVAC units. Allow for 60 lineal metres of walkway.
- .7 SA membrane: Self-adhering, with top surface cross-laminated high-density polyethylene film reinforcement, SBS modified bituminous membrane, thickness 1.0 mm, with release film.

2.3 Primer

- .1 Primer for Thermofusible Membranes: Primer made of bitumen, volatile solvents and adhesive resins. Used as primer to improve the adhesion of thermofusible waterproofing membranes.
- .2 Primer for Self-Adhesive Membranes: Primer composed of SBS synthetic rubber, adhesive resins and volatile solvents. Used as primer to improve the adhesion of self-adhesive membranes.

2.4 Sheathing

- .1 Sheathing: faced gypsum board, water resistant core, surfaced with glass mat facers for adhesive and torch applications, thickness 13 mm.
- .2 Accessories: FM Approved No. 12 flat head, self-tapping, Type A or AB, corrosion resistant screws and galvalume plate assemblies.

2.5 Insulation

- .1 Polyisocyanurate Insulation: Closed-cell polyisocyanurate foam insulation board laminated on both sides with a fiberglass yarn-reinforced organic paper.
 - .1 North roof: Two layers 38.1 mm each for total 76.2 mm.
 - .2 South upper roof: Two layers 38.1 mm each for total 76.2 mm.
 - .3 South lower Roof: two layers 50 mm each for total 100 mm.
- 2. Semi-rigid insulation for parapets and other wood structures: Non-combustible, lightweight, semi-rigid stone wool batt insulation to CAN/ULC-S702, Type 1.
- 3. Provide crickets on the upslope side of all mechanical equipment and between in-line drains.

2.6 Accessories

- .1 Insulation Adhesive: Two-component, quick-setting, low-expansion foam urethane adhesive.
- .2 Bituminous Board: Semi-rigid roofing support panel composed of a mineral-reinforced asphaltic core between

two asphalt-saturated fibreglass liners. Thickness of 3.2 mm.

- .3 Flame stop membrane: Self-adhesive membrane composed of SBS modified bitumen and a glass mat reinforcement, designed to prevent flames from penetrating into voids, cavities and openings before installing heat-welded membranes.
- .4 Waterproofing mastic: Description: Multi-purpose mastic composed of SBS modified bitumen, fibres, mineral fillers and solvents.
- .5 Pitch pocket filler: Polyester-made precast blocks of various sizes a single-component, polyether-based mastic and a single-component, polyether based sealant and adhesive.
- .6 Liquid membrane: Bitumen/polyurethane waterproofing mono-component resin and polyester reinforcement.
- .7 Cleaning solvents: Low hazard solvents as recommended by adhesive, primer and membrane manufacturers.
- .8 Loose granules: For use with sealing compound and liquid membrane, to match membrane cap granules.

2.7 Roof Drains

- .1 Retro-fit drain inserts: heavy-duty components, stainless steel, maximum diameter downpipe to fit existing drains. Provide insert at all roof drains. Drain inserts are to be as follows:
 - .1 Flange: stainless steel, 460 mm diameter minimum.
 - .2 Downpipe: stainless steel, 0.12 mm thick.
 - .3 Collar clamping ring: cast aluminium.
 - .4 Compressible connectors: to ensure waterproof seal with existing pipe.
 - .5 Strainer: screened dome with access hatch, cast aluminium, with provision for securing to collar.
 - .6 Separation between dissimilar metals: Separators or coatings acceptable to Departmental Representative.

2.8 Spun Aluminum Flashings

- .1 Plumbing vents: Purpose made insulated spun aluminum metal flashing sleeve with integral flange, matching removable cap (screw fastened), pre-molded urethane insulation liner and EPDM base seal size to suit.

PART 3 – EXECUTION

3.1 Workmanship

- .1 Carry out work to ensure:

- .1 Continuity of AVB membrane to existing building elements and spaces, leaving no gaps.
- .2 Continuity of waterproof protection to building elements and spaces, leaving no leaks.
- .3 Continuity of AVB and waterproof protection at tie-ins to components at openings.
- .4 Full and continuous adhesion of membranes.
- .2 Carry out membrane work in accordance with applicable standards, including the following:
 - .1 For AVB membrane and associated work, to National Air Barrier Association – Professional Contractor Quality Assurance Program.
 - .2 For roofing membrane and associated work, CRCA Roofing Specifications Manual.
- .3 Coordinate work to minimize cutting and wastage.

3.2 Removals

- .1 Carry out removals to achieve access for installation of roofing system.
- .2 Remove and dispose of existing roof assembly including; waterproofing membrane, insulation, vapour barrier, metal flashings and related accessories from all horizontal and vertical surfaces in Contract area.

3.3 Surface Examination and Preparation

- .1 Surface examination and preparation must be completed in conformance with instructions in the membrane manufacturer's technical documentation.
- .2 After removals are complete and before roofing work begins, the Departmental Representative and roofing foreman must review and approve deck conditions as well as flashings at parapets, roof drains, plumbing vents, ventilation outlets and other construction joints. If unacceptable conditions are identified, a **non-conformity notice documenting the required corrective action to be taken will** be issued to the contractor. The start of roofing work must be considered as acceptance of conditions for work completion.
- .3 Do not begin any portion of work before surfaces are clean, smooth, dry, and free of ice and debris. Use of calcium or salt is forbidden for ice or snow removal.
- .4 Be sure plumbing, carpentry and all other works have been duly completed.
- .5 Materials must not be installed during rain or snowfall.

3.4 Method of Execution

- .1 Roofing work must be completed in a continuous fashion as surfaces are readied and as weather conditions allow.

- .2 Ensure waterproofing of roofs at all times, including protection during installation work by other trades and protection as work is completed (e.g. vents, drains, etc.).

3.5 Protection

- .1 Protect the exposed surfaces of finished work to avoid damage during roof installation and material transportation. Install walkways made of rigid boards over installed roofing materials to enable passage of people and transport of products. Assume full responsibility for any damage.
- .2 Cover walls, walks and adjacent work where materials are hoisted or used.
- .3 Use warning signs and barriers. Maintain in good order until completion of Work.
- .4 Clean off drips and smears of bituminous material immediately.
- .5 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected.
- .6 Protect roof from traffic and damage. Comply with precautions deemed necessary by Departmental Representative.
- .7 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.

3.6 Primer

- .1 Wooden, metallic, concrete, and masonry surfaces must receive a coat of primer at a rate of 0.15 to 0.25 L/m². All surfaces to be primed must be free of rust, dust or any residue that may hinder adherence. Primed surfaces must be covered with the roofing membrane as soon as possible (on the same day for self-adhesive membranes).

3.7 Air/Vapour Barrier Membrane

- .1 Primer must be dry prior to the installation of the vapour barrier membrane.
- .2 Starting at the lowest point of the roof slope, the vapour barrier membrane must be heat-welded onto the substrate in conformance with manufacturer's written recommendations.
- .3 Overlap adjacent rolls 75 mm. End laps must be 150 mm. Space end laps by at least 300 mm.
- .4 The roof vapour barrier must meet and overlap the air/vapour barrier on adjoining walls to ensure total continuity.

3.8 Insulation

1. Apply insulation adhesive between substrate and insulation as recommended by adhesive and insulation manufacturers and as follows:
 - .1 Apply adhesive in continuous beads minimum 19 mm wide, maximum 300 mm on centre, unless otherwise indicated.
 - .2 Apply boards once adhesive begins to rise. Do not allow adhesive to skin over before applying insulation boards. Use pressure at several points to achieve maximum contact as well as complete adhesion.
 - .3 Within initial set time of adhesive, examine installation of boards and re-apply pressure in order to remove unevenness and achieve proper surface alignment.
 - .4 Increase amount of adhesive as required to resist local wind uplift and at wind uplift zones which are defined as 10% of least roof width, but not less than 1 m as follows:
 - .1 At wind uplift zones at roof ends apply beads maximum 125 mm on centre.
 - .2 At wind uplift zones at roof ends corners, apply beads maximum 50 mm on centre.
2. All joints between rows and layers of insulation must be staggered.
3. Ensure surfaces of boards are in-plane and aligned evenly from board to board.
4. Replace boards which are out-of-plane, warped, not fully adhered or unacceptable to Departmental Representative.
5. Install crickets on upslope side of all mechanical equipment, and between in-line drains.

3.9 Protection Board

- .1 All boards must be in perfect connection, without any significant variances in level, and must be completely adhered to the surface.
2. Apply adhesive between substrate and protection board as recommended by manufacturer and as follows:
 - .1 Apply adhesive in continuous beads minimum 19 mm wide, maximum 300 mm on centre, unless otherwise indicated.
 - .2 Apply boards once adhesive begins to rise. Do not allow adhesive to skin over before applying protection boards. Use pressure at several points to achieve maximum contact as well as complete adhesion.
 - .3 Within initial set time of adhesive, examine installation of boards and re-apply pressure in order to remove unevenness and achieve proper surface alignment.

-
- .4 Increase amount of adhesive as required to resist local wind uplift and at wind uplift zones which are defined as 10% of least roof width, but not less than 1 m as follows:
 - .1 At wind uplift zones at roof ends apply beads maximum 125 mm on centre.
 - .2 At wind uplift zones at roof ends corners, apply beads maximum 50 mm on centre.
 - 3. All joints between rows of protection boards must be staggered.
 - 4. Ensure surfaces of boards are in-plane and aligned evenly from board to board.
 - .5 Replace boards which are out-of-plane, warped, not fully adhered or unacceptable to Departmental Representative.
- 3.10 Installation of Flame Stop Membrane**
-
- .1 Adhere the membrane directly onto an approved substrate by removing the silicone release film.
 - .2 Unroll the flame-stop membrane onto the joints between the protection boards, being careful to overlap adjacent selvages to ensure that the flame does not penetrate the insulation.
- 3.11 Installation of Torch Applied Base Sheet Membrane**
-
- .1 Unroll base sheet on the substrate, taking care to align the edge of the first selvedge with drain centre (parallel to roof edge).
 - .2 Cut off corners at end laps to be covered by the next roll.
 - .3 Weld the base sheet onto prepared substrate.
 - .4 Each selvedge must overlap the previous one along lines provided for this purpose, and must overlap the ends by 150 mm . Space end laps by a minimum of 300 mm.
 - .5 Avoid the formation of wrinkles, swellings or fishmouths.
- 3.12 Installation of Self-Adhesive Base Sheet on Flammable Substrates**
-
- .1 Apply base sheet flashing only after primer coat is dry.
 - .2 Before applying membranes, always burn the plastic film from 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-adhesive membrane on the area to be covered at the foot of the parapets.
 - .3 Cut off corners at end laps of areas to be covered by the next roll.
 - .4 Each selvedge must overlap the previous one along lines provided for this purpose, and by 150 mm at the ends.

- .5 Position the pre-cut membrane. Remove 150 mm of the silicone release film to hold the membrane in place at the top of the parapet.
- .6 Gradually peel off 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 flashing and the field surface. Smooth the entire membrane surface with a membrane roller for full adhesion.
- .7 Install a reinforcing gusset at all inside and outside corners.
- .8 Always seal overlaps at the end of the workday.
- .9 Avoid the formation of wrinkles, swellings or fishmouths.

**3.13 Installation of
Reinforcing
Gussets**

- .1 Install reinforcing gussets at all inside and outside corners.
- .2 Heat-weld the gussets in place after installing base sheet membrane.

**3.14 Installation of
Thermofusible
Cap sheet
Membrane**

- .1 Begin with double-selvedge starter roll. If starter roll is not used, side laps covered with granules must be de-granulated by embedding granules in torch-heated bitumen over a 75-mm width.
- .2 Starting at drain, unroll the membrane on the base sheet, taking care to align the edge of the first selvedge with the edge of the roof.
- .3 Cut off corners at end laps at areas to be covered by the next roll.
- .4 Each selvedge must overlap the previous one along lines provided for this purpose, and must overlap by 150 mm at the ends. Space end laps a minimum of 300 mm.
- .5 Heat-weld cap sheet membrane with a torch on the base sheet to create a bleed out of 3 to 6 mm.
- .6 At laps over granulated sheets, embed granules by sliding a hot trowel over the heated surface.
- .7 During installation, be careful not to overheat the membrane or its reinforcements.
- .8 Avoid the formation of wrinkles, swellings or fishmouths.
- .9 Avoid walking over finished surfaces; use rigid protective walkways as needed.
- .10 For ponding unacceptable to Departmental Representative, apply additional membrane as required to

ensure drainage. Acceptable ponding is 6 mm or less with no standing water present after 48 hours.

3.15 Liquid Membrane

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

3.16 Sealing Compound

- .1 Provide sealing compound to achieve proper sheet membrane performance, including for:
 - .1 Watertightness at edges.
 - .2 Evenness at irregularities in membrane and flashing installations.

- .2 For SA membrane and flashings, provide sealing compound where required, where recommended and as follows:
 - .1 As filler under membrane at inside corners at changes in plane.
 - .2 As setting bed under membrane at uneven surfaces.
 - .3 As top seal at edges of laps within 300 mm of changes in plane.
 - .4 At edges at membrane terminations, with or without termination securement.
 - .5 At edges of patches.
- .3 Apply as recommended by manufacturer and as follows:
 - .1 Prepare and prime substrate as for associated membrane.
 - .2 Apply sealing compound to form a continuous bead and complete seal, thickness 3 mm minimum.
 - .3 Tool surface of bead to eliminate air pockets and ensure seal.
 - .4 Where sealing compound is exposed to weather, immediately embed granules to protect entire surface.

3.17 Penetrations General

- .1 Work at penetrations is to achieve watertight connection between membrane and penetrating components, where required, where recommended and at pipe vents and similar penetrations.
- .2 At penetrations, including roof and wall penetrations such as vents, conduit, ducts, and pipes, provide flashings and seals as recommended by membrane manufacturer, as required and as follows:
 - .1 Install penetration flashings to suit conditions at penetrations.
 - .2 At each ply of membrane, fully lap and seal sheets to flashings.
 - .3 Install retention clips and collars as required to secure terminal edge of all membrane.
 - .4 Adjust height of plumbing vent piping where required.
- .3 Install flashings and seals as required, as recommended and as follows:
 - .1 Install firestop.
 - .2 Apply membrane base sheet. Extend to overlap firestop.
 - .3 Apply sealing compound to seal between base sheet, firestop and penetrating component.
 - .4 Install sleeve or similar flashing with flange.
 - .5 Apply membrane cap sheet. Extend to overlap flange.

**3.18 Penetration
Seals**

- .6 Apply sealing compound to seal between cap sheet and flange.
 - .7 Immediately embed granules to protect entire surface of sealing compound.
 - .8 Install sleeve cap and secure as required.
- .1 Provide as required at penetrations or interruptions of membranes associated with elements such as pipes, conduits, cables, anchors, chimneys and vents.
 - .2 Apply as recommended by manufacturer and as follows:
 - .1 Prepare substrate in accordance with manufacturer's instructions. Surfaces must be clean, dry and free of debris, dust, non-adhered particles, oil, corrosion, condensation or other contaminants.
 - .2 Metal surfaces and PVC pipes must be cleaned with non-greasy solvents, such as acetone or methyl ethyl ketone (MEK).
 - .3 Lay out the precast blocks around the penetration so as to ensure a minimum gap of 25 mm between the block inner wall and the penetration. Trace the outline for reference.
 - .4 Using a standard cartridge extruder, seal the base of each penetration with the sealant and adhesive. Cover the penetration with sealant at least 25 mm above the height of the precast blocks.
 - .5 Under and at the ends of the precast blocks, on the flat surface, apply a 6 mm bead around the perimeter and at the centre of the surface.
 - .6 Place and align the precast blocks on the roof outline. Apply pressure on the precast blocks until product overflows from all sides of the precast blocks.
 - .7 Apply a bead of the sealing product to the block joints and at the outer perimeter of the structure made of precast blocks. Use the tip of a trowel to bond the sealant and adhesive to the membrane.
 - .8 For horizontal surfaces, completely fill the configuration with the sealing mastic.
 - .9 For vertical surfaces, completely fill the configuration with the sealant and adhesive.

3.19 Roof Drains

- .1 Work at roof drains is to achieve:
 - .1 Watertight connection between membrane and plumbing components.
 - .2 Free-flowing drainage from the surface of the membrane, without ponding.
- .2 At existing roof drains:

- .1 Provide largest diameter drain insert compatible with existing drains, as required and as recommended by insert manufacturer.
- .2 Fill cavities between insert and existing drain surfaces with spray-applied insulation.
- .3 Create 1m x 1m sump at each drain.
- .4 Set flange in sealing compound.
- .5 Adjust insert compression seal to prevent back-flow.
- .6 Seal AVB membrane to perimeter of existing drain bowl/stem to remain in place.
- .7 Extend roofing membrane base and cap sheets to cover and seal to flange of new drain insert.

3.20 Final Inspection

- .1 Ensure that membrane is inspected and accepted by Departmental Representative prior to installation of covering materials.

3.21 Clean-up

- .1 Clean up promptly, as required and as follows:
 - .1 Immediately clean adjacent surfaces, removing drips, smears and droppings of bituminous and other material, using recommended cleaners.
 - .2 As work progresses, remove excess materials.
 - .3 Leave work and adjacent areas neat and clean.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

- | | |
|--------------------|------------------|
| 1. Rough Carpentry | Section 06 10 13 |
| 2. Roof Membranes | Section 07 52 11 |
| 3. Joint Sealing | Section 07 92 00 |

1.2 References

1. Aluminium Association Inc. (AA)
 - .1 Aluminium Sheet Metal Work in Building Construction-2002.
2. American Society for Testing and Materials (ASTM)
 - .1 ASTM A653/A653M-20, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM A792/A792M-10 (2015), Standard Specification for Steel Sheet, 55% Aluminium-Zinc Alloy-Coated by the Hot-Dip Process.
 - .3 ASTM D523-14 (2018), Standard Test Method for Specular Gloss.
3. Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-93.3- M91 Prefinished Galvanized and Aluminium-Zinc Alloy Steel Sheet for Residential Use.
4. Canadian Roofing Contractors' Association (CRCA)
 - .1 Roofing Specifications Manual (2011)
5. Canadian Standards Association (CSA)
 - .1 CSA B111- 1974 (R2003), Wire Nails, Spikes and Staples

1.3 Submittals

1. Submit product data for products used.
2. Submit two (2) copies of manufacturer's standard colour charts.
3. Submit duplicate 100 x 100 mm (4" x 4") samples of each type of sheet metal material, colour and finish to be used. Do not order the related materials before samples are accepted by Departmental Representative.

1.4 Warranty

1. Submit, for Departmental Representative's acceptance, manufacturer's standard warranty document executed by authorized company official.
2. Warranties shall include making good other building parts and finishes and other Departmental Representative's property damaged or disturbed in the course of remedying defects.
3. Warranty to be in a form acceptable to the Departmental

Representative.

PART 2—PRODUCTS

2.1 Compatibility

1. Ensure compatibility of materials, including other metals and fasteners, in contact with metal surfaces. For dissimilar metals, provide non-metallic separation as required to prevent galvanic reaction.

2.2 Sheet Metal

- .1 Prefinished sheet with factory applied polyvinylidene fluoride.
 - .1 Class F1S
 - .2 Colour as selected by Departmental Representative from manufacturer's standard range.
 - .3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.
 - .4 Coating thickness: not less than 22 micrometres.
 - .5 Resistance to accelerated weathering for caulk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:
 - .1 Outdoor exposure period 2500 hours.
 - .2 Humidity resistance exposure period 5000 hours.

2.3 Components

- .1 Exposed sheet metal flashings: pre-painted galvanized steel, 0.81 mm (24 ga.) thick, commercial quality, Type A to ASTM A653/A653M with Z275 zinc coating, shapes and profiles to suit conditions, with formed edges and stiffeners, colour to be approved by Departmental Representative.

2.4 Accessories

- .1 Starter strips, cleats, clips, hook strips and closures: of same material, as sheet metal being secured, minimum 22 ga. thick, minimum 50 mm wide, of size, shape and length as required and to suit material thickness and to provide secure anchorage.
- .2 Fasteners: to CSA B111, of type as recommended by manufacturer of material to be fastened, minimum size #8 and of size and length for secure anchorage and to suit material thickness without excessive penetration spalling or cracking, and as follows:
 - .1 At sheet metal or wood substrate: self-tapping sheet metal screws, coated exterior grade.
 - .2 At aluminium and at dissimilar metals: stainless steel.
 - .3 At concrete or masonry substrate: proprietary, hardened, self-tapping, steel screws, coated exterior grade, purpose recommended by manufacturer.

- .4 Fasteners to have washers of same material as sheet metal being fastened, 1 mm thick with non-metallic packing, unless otherwise noted.
- .5 All exposed screws or those penetrating metal and membrane must have rubber backed washers.
- .3 Membrane seals: membrane sealing compound and self-adhesive membrane patches, supplied by the related Section.
- .4 Touch-up paint: as recommended by prefinished material manufacturer.

2.5 Fabrication

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details as indicated.
- .2 Cut panels as required, as recommended and as follows:
 - .1 Cut panels from maximum commercially available lengths up to 2.4 m maximum, to minimize the number of panel joints in any installation.
 - .2 Cut square, true and accurate to size.
 - .3 Make allowance for expansion at joints.
- .3 Form panels as required, as recommended and as follows:
 - .1 Form panels free from distortion and other defects detrimental to appearance or performance.
 - .2 Form square, true and accurate to size.
 - .3 For panels of 400 mm or greater width, provide stiffening crimps or folds to prevent flexure.
- .4 Form edges with 13 mm hems where required, where recommended and as follows:
 - .1 At exposed edges, hem on underside.
 - .2 At points of runoff, provide hemmed drip edges.
 - .3 At upper edges not covered by other flashings, provide projected, hemmed edges formed for sealant bead.
- .5 Form new metal counter flashing as follows:
 - .1 Counter flashing to be of consistent height and to follow slope of roof.
 - .2 Form 40 mm horizontal return along top of flashing to be inserted into saw-cut reglet.
 - .3 Form 25 mm projecting drip edge along base of flashing.
- .6 For transitions, perimeter flashings and supports for membrane installation, co-ordinate with Related Section to ensure proper profiles to receive and support sheet membrane, liquid membrane or sealing compound.

- .7 For fasteners at both new and reinstated existing flashings, provide slotted fixing holes

2.6 Coatings

- .1 Isolation coating: Bituminous coating to separate dissimilar metals or where metal surfaces are in contact with concrete.

2.7 Miscellaneous

- .1 Provide sheet metal components for membrane installation by Related Section, including:
 - .1 Transitions and perimeter flashings.
 - .2 Supports at gaps.

PART 3 - EXECUTION

3.1 Workmanship

- .1 Carry out work to required standards and as follows:
 - .1 In accordance with CRCA details.
 - .2 In accordance with AA details.
 - .3 To achieve weathertight protection to insulation.

3.2 Preparation for Removals

- .1 Prior to removal of components for reinstatement, note locations and orientations for exact reinstatement where required.

3.3 Removals

- .1 Carry out removals to achieve access for installation of roofing system.
- .2 Remove and dispose of all cap and counter flashings at parapets, expansion joints, wall bases, roof dividers and at curbs or mechanical bases, including at mechanical vents, pipe chases and chimney vents and salvage where indicated.

3.4 Examination

- .1 Before installation of materials, examine conditions as required and as follows:
 - .1 Examine substrate and conditions likely to affect the work.
 - .2 Ensure insulation work is complete before installation of covering flashings.
 - .3 Promptly inform Departmental Representative of unsuitable, defective or doubtful conditions. Arrange work to accommodate review.

3.5 Preparation for Installation

- .1 At time of installation, ensure that conditions, including of materials and substrate, are suitable for the work.
- .2 For components temporarily removed and salvaged for re-installation, restore shape, repair, remove existing sealant and clean surfaces to Departmental Representative's acceptance.
- .3 Remove foreign matter, including dust and moisture.

- .4 Apply isolation coating to metal surfaces to be in contact with or embedded in concrete, masonry or mortar.

3.6 Fastening

- .1 Provide fasteners to achieve secure attachment of components, as required, as recommended and as follows:
 - .1 Provide at 400 mm on centre maximum.
 - .2 Provide at least three (3) fasteners in any length of material.
 - .3 Space fasteners evenly.
 - .4 Ensure that no fastener obstructs any allowance for movement or expansion.
 - .5 Use concealed fastenings except where approved before installation.
- .2 Fasten starter strips, cleats, clips, hook strips and closures to substrate as required, as recommended and as follows:
 - .1 Drill pilot holes into substrate to facilitate installation of fasteners, sized in accordance with manufacturer's instructions.
 - .2 Allow for fastening on existing substrate surfaces which are uneven or out-of-plumb.
 - .3 Provide shims or other accessories to accommodate variations in the existing surfaces.
- .3 For fastening starter strips at top edge of membrane:
 - .1 Fit and align lengths to ensure continuous and complete installation, with no gaps between adjoining lengths of starter strip.
 - .2 Fasten starter strip at 300 mm on centre, providing continuous securement and compression.
 - .3 Provide additional fasteners at 50 mm from ends of each length of starter strip and in other locations as required to provide compression at any irregularities in substrate.
- .4 For fastening to substrate with membrane:
 - .1 Use screw fasteners only.
 - .2 Do not remove stripped or failed fasteners.
 - .3 Do not damage membrane.
 - .4 Immediately repair damage to membrane, including punctures, with membrane sealing compound or membrane patches.
- .5 Fasten components to starter strips, cleats, clips, hook strips and closures as required, as recommended and as follows:
 - .1 Expose fasteners where required to permit future removal of components.

**3.7 Sheet Metal
Flashings**

- .2 Space exposed fasteners for good appearance.
- .1 Provide new sheet metal flashings for weather protection to membrane and insulation, where required, where recommended and as follows:
 - .1 At parapets, provide new cap and counter flashings.
 - .2 On exterior face of parapets.
 - .3 At curbs for mechanical equipment, provide new flashings.
 - .4 At wall bases, provide new vertical flashing.
- .2 Install as required, as recommended and as follows:
 - .1 Start installation with concealed starter strips.
 - .2 Lock end joints using S-lock joints, forming tight fit over starter strips, cleats and hook strips.
 - .3 Fold and overlap to form closed interior and exterior corners.
 - .4 Mitre returns.
 - .5 At exposed ends, provide closures. Extend and shape closures as required to protect underlying assembly.
 - .6 Avoid protruding edges.
- .3 At junctures to existing flashings or to other materials, form watertight joints as required, as recommended and as follows:
 - .1 Remove, modify, reinstall or replace existing flashings.
 - .2 Cut, trim and shape new flashings as required to fit to adjoining surfaces.
 - .3 Form closures for installation of sealant.

3.8 Clean-up

- .1 Clean-up as required. Remove excess fasteners as work progresses, using metal detectors or magnetic sweepers.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

- .1 Modified Bituminous Membrane Roofing Section 07 52 00
- .2 Sheet Metal Flashing and Trim Section 07 62 00

1.2 References

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C920-18, Standard Specification for Elastomeric Joint Sealants.
 - .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13- M87 Sealing Compound, One-component, Elastomeric, Chemical Curing

1.3 Submittals

- .1 Submit product data for products used.
- .2 Submit MSDS sheets for each product used.
- .3 Submit two (2) copies of manufacturer's standard colour charts for sealant.

1.4 Environmental Requirements

- .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.
 - .2 When joint substrates are wet.
 - .3 Prior to removal of contaminants capable of interfering with adhesion from joint substrates.

1.5 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, water and contact with ground or floor.
- .2 Handle all products with appropriate precautions and care as stated on the Material Safety Data Sheet.

PART 2 – PRODUCTS

2.1 Sealant

- .1 Polyurethane sealant: Single-Component, non-sag, moisture-cure, polyurethane hybrid joint sealant: ASTM C920, Type S, Grade NS, Class 35, Use NT; Greenguard certified.
- .2 Sealants are to:
 - .1 Be non-bleeding, non-staining, UV resistant and capable of sustaining their own weight.

- .2 Meet or exceed all applicable governmental and industrial safety and performance standards.
 - .3 Be manufactured and transported in such a manner that all steps of the process, including the disposal of waste products arising therefrom, must meet the requirements of all applicable governmental acts, by laws and regulations including the Fisheries Act and the Canadian Environmental Protection Act (CEPA).
 - .4 Be formulated and manufactured without fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, barium or their compounds except barium sulfate.
 - .5 Contain a total of volatile organic compounds (VOCs) not in excess of 5% by weight as calculated from records of the amounts of constituents used to make the product.
 - .6 Be accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.
 - .7 Be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants and used only with qualified primers.
- .3 Colours of sealant: to Departmental Representative's selection from manufacturer's standard colour range.

2.2 Accessories

- .1 Primer: Type as recommended by sealant manufacturer. Primer to be compatible with joint forming materials.
- .2 Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer and compatible with joint forming materials.
- .3 Preformed Compressible back-up materials: Extruded closed cell foam backer rod, oversize 30 to 50 %.
- .4 Bond breaker tape: Polyethylene bond breaker tape which will not bond to sealant.

PART 3 - EXECUTION

3.1 Workmanship

- 1. Carry out work to required standards and to achieve weather-tight performance of exposed assemblies.

3.2 Removals

1. Remove sealant from sheet metal components, brick masonry and related junctures down to clean substrate.

3.3 Preparation

- .1 At time of installations, ensure that conditions, including of materials and substrate as well as of ambient and surface temperatures, are as recommended by manufacturers. Promptly inform Departmental Representative of unsuitable, defective or doubtful conditions.
- .2 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .3 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair work.
- .4 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.
- .5 Ensure joint surfaces are dry and frost free.
- .6 All joint forming materials to be primed prior to sealant installation.
- .7 Prepare surfaces in accordance with manufacturer's directions.

3.4 Primer

- .1 Apply as required to prevent staining, assist bond and to stabilize porous surfaces, as indicated and to contact surfaces of joints.
- .2 Apply as recommended by manufacturer and as follows:
 - .1 Mask adjacent finishes as required for protection.
 - .2 Apply with clean, soft, absorbent lint-free cloth, using each piece only once for any application or wiping.
 - .3 Apply at specified rate, in a thin film and in one pass, avoiding excess application.
 - .4 As required, apply second coat of primer.
 - .5 Protect primed surfaces.
 - .6 Re-prime contaminated surfaces as well as surfaces where working time of primer has been exceeded.

3.5 Back-up Material

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.6 Application

- .1 Apply sealant in accordance with manufacturer's written instructions.
- .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
- .3 Apply sealant in continuous beads.
- .4 Apply sealant using gun with proper size nozzle.
- .5 Use sufficient pressure to fill voids and joints solid.
- .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets or embedded impurities.
- .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
- .8 Remove excess compound promptly as work progresses and upon completion.
- .9 Cure sealants in accordance with sealant manufacturer's instructions.
- .10 Do not cover up sealants until proper curing has taken place.

3.7 Clean-up

- .1 Clean-up as required and as follows:
 - .1 Immediately clean adjacent surfaces, removing drips, smears and droppings of sealant and other material, using recommended cleaners.
 - .2 Remove masking after tooling of joints and before sealants begin to cure.

END OF SECTION