

Project Name: CFIA ROOF REPLACEMENT

Project No. K0551

Date: 4 July 2014

ISSUED FOR TENDER

PROJECT MANUAL

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1 SUMMARY OF WORK

1.1 Work covered under this Contract

- .1 Work of this Contract includes furnishing labour, materials, equipment, services and other related expenses to execute complete construction of facility specified under Contract Documents.
- .2 In accepting award of this Contract, Contractor hereby reaffirms that it is fully informed regarding all conditions affecting Work including its company's provincial taxes are in good standing and further accepts to complete Work for purpose intended in accordance with Contract Documents. Contractor hereby reaffirms that it does not and will not have any conflict of interest in executing work of this Contract.

1.2 Work provided by Owner or performed under separate contracts

- .1 The term "NIC" means that work of this Project which is not being performed or provided by the Contract; the term means "Not In This Contract" or "Not a Part of The Work to be Performed or Provided by The Contractor".
- .2 "NIC" work is specified and/or indicated on the Drawings as an aid to the Contractor in scheduling the amount of time and materials necessary for the completion of the Contract.

2 WORK RESTRICTIONS

2.1 Occupancy

- .1 Existing premises will remain occupied during Work. Execute Work to cause minimum interference with activities in existing premises and maintain maximum safety to occupants. Take reasonable measures to minimize and control noise, dirt and dust during Work.
 - .1 Provide a methodology for phasing and staging of the Work, and indicating safety and fire escape routes for the occupants of the building during construction.
- .2 Before entering existing premises to carry out Work or to obstruct or take out of use any area of existing premises, or to cause any other interference, request meeting with Departmental Representative in order to reach agreement as to time and length of time you may interfere, possess, obstruct or remove from use any such area or services.

2.2 Access to Site

- .1 Work shall be confined to Work Site limits indicated on Drawings and/or within area defined by property lines. Work on Municipal property shall be carried out under regulations of respective Municipality and authorities having jurisdiction including without any limitations any associated fees, permits, insurance or bonding required.
 - .2 Assume responsibility for care, custody and control of Site and perform work to extent covered in Contract Documents. Make good damage to existing Site and existing buildings (if any) due to Work of this Contract.
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- 2.3 Access to Existing Building(s)
- .1 Provide roads, walks, ramps, stairs and such other means of access as required. Maintain temporary entrances to building(s) including enclosed hoardings as required. Maintain access to existing service entrance(s) at all times, including ready access for fuel oil trucks and delivery vehicles. Bridge excavations with construction to safely support any load that could be imposed or provide personnel to assist in deliveries to building(s) as required.
 - .2 Access to the existing buildings, and access to the neighbouring properties, cannot be blocked or otherwise compromised.
 - .3 No heavy equipment allowed over underground fuel storage tanks on the east side of the building.
 - .4 For the metal roofing work on the north side, care should be taken around an exterior boiler flue adjacent to the roof, (it gets hot when it blows off steam). The Contractor should co-ordinate with the building operator for the timing of that steam discharge. Location of the flue is indicated on the drawings.
- 2.4 Inclement Weather and Cold Weather Work
- .1 Take precautions during inclement weather and provide adequate protection to Work and construction materials from water damage.
 - .2 Continue Work including winter months, if applicable, until Work is completed and accepted.
 - .3 Inclement weather or extra work caused thereby shall not be considered valid reason for additional payment or delay in satisfactory conclusion of Work.
- 2.5 Parking on Site
- .1 Parking shall be available on site as directed by Departmental Representative.
- 2.6 No Smoking Policy
- .1 Cooperate, respect and comply with the no smoking policy requirements.
 - .2 Ensure that Contractor's employees, sub-contractors and suppliers, performing work on Site on Contractor's behalf, are instructed to comply with the no smoking policy requirements.
- 3 **SPECIFICATIONS**
- 3.1 Specifications are not intended as detailed description of installation methods but serve to indicate particular requirements in completed Work.
 - 3.2 Where Contract Documents do not provide sufficient information for complete installation of item, then as supplement, comply with manufacturer's written instructions for quality of work.
 - 3.3 Portions of Specifications are written in short form. Therefore, it shall be understood that where item of Work is stated in heading followed by material, equipment, component, or operation, words "shall be", "shall consist of" or similar words or phrases are implied which denote supply, fabricate and supply, install, provide or commission of such materials, equipment or operations for component of Work designated by heading.
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- 3.4 Where the Contract Documents refer to the singular, provide as many as required to complete Work. Words used in one gender only shall mean females and as well as males and conversely.
- 3.5 Whenever used in Specifications following definitions shall apply:
- .1 Supply - Procurement or fabrication of standard components not to special design of materials, equipment, or components, or performance of services to extent indicated. Where used with respect to materials, equipment, or components, term shall include delivery to Site but is not intended to include installation of item, either temporary or final.
 - .2 Fabricate and Supply - Fabrication of materials, equipment, or component, to special customized design to extent indicated including delivery to Site, assisting in form of supervision to those Section(s) installing materials, equipment or component. Term does not include installation of item either temporary or final.
 - .3 Install - Placement of materials, equipment, or components, including receiving, unloading, transporting, storage, uncrating and installing, and performance of such testing and finish work as is compatible with degree of installation specified complete ready for use.
 - .4 Provide - To Supply and Install, complete and in place, including accessories, finishes, tests and services as required to render item so specified complete ready for use.
 - .5 Commission – Start-up and initial operation of equipment as required and/or as specified in respective Sections, to demonstrate satisfactory operation of components and entire system including calibration of any control instrumentation as required to maintain operations.
- 3.6 Drawings, Lists or Schedules of Items are intended to show scope and arrangement of work. For location of item described refer to such Drawings, Lists or Schedules unless location stipulated in Specifications.
- 3.7 Wherever words "acceptable", "approved", "reviewed", "satisfactory", "selected", "directed", "designated", "permitted", "inspected", "instructed", "clarification", "required", "report", "submit", "obtain", "consult", "advise", or similar words or phrases are used in Standards or in Contract Documents, it shall be understood that, unless context provides otherwise words "by/to/with/from the Consultant" shall follow them as applicable.

4 **DIVISION OF WORK**

- 4.1 Work specified in the Specifications is divided into Sections for reference purposes only. Division of work between Contractor and Subcontractors is the Contractor's responsibility. The Departmental Representative and Consultant assume no responsibility to act as an arbitrator to establish subcontract limits between Sections or Divisions of the Work.

5 **STANDARDS AND CODES**

- 5.1 Contract forms, codes, specifications, standards, manuals and installation, application and maintenance instructions, referred to in the Specifications unless otherwise specified and unless otherwise stated in the governing building code, shall be the latest published editions at the date of the Contractor's bid submission.
- 5.2 Conform to standards, in whole or in part, as stated in the Specifications.
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5.3 If there is question as to whether any product or system is in conformance with applicable standards, the Departmental Representative reserves the right to have such products or systems tested at the Contractor's cost to prove conformance.

5.4 The cost for such testing will be borne by the Departmental Representative in the event of conformance with the Contract Documents or by the Contractor in the event of non-conformance.

6 **EXAMINATION OF SITE AND DOCUMENTS**

6.1 Make a careful examination of the Place of the Work, and investigate, at no cost or risk to the CFIA, matters relating to the nature of The Project to be undertaken, the means of access and egress thereto and there from, the obstacles to be met with and the rights and interests which may be interfered with during the performance of The Work.

6.2 Make a careful examination of the extent of the Work to be performed and any and all matters which are referred to in the Contract Documents, or which are necessary for the full and proper construction of The Project and the conditions under which it will be performed.

7 **EXAMINATION OF SURFACES AND CONDITIONS**

7.1 Examine the site for damages to existing elements to remain. Photograph extent of existing damages and submit photographs to Departmental Representative. Refer to Section 01 33 00 for specifications regarding photographic documentation and submissions.

7.2 The Contractor shall ensure each Subcontractor examines job conditions and the work to which his work is to be applied, anchored or connected.

7.3 Report unsatisfactory conditions likely to prevent the proper installation of work.

7.4 Correct unsatisfactory conditions before commencing the particular work.

7.5 Commencement of the work implies acceptance of conditions.

8 **EXISTING UTILITIES**

8.1 Work will be carried out during normal operating hours. Notify Departmental Representative and building Owner prior to any anticipated disruption in service.

8.2 When breaking into or connecting to existing services or utilities, execute work at times directed by local governing authorities, with a minimum of disturbance to work, and to building occupants and to pedestrian and vehicular traffic.

8.3 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in a manner approved by authority having jurisdiction and stake or otherwise record location of capped service.

9 **COOPERATION**

9.1 Contractor to provide competent site superintendent to be on site at all times to lay out the work and be responsible for accuracy and programming of work of subcontractors.

- 9.2 Site superintendent with a minimum of 10 years related experience. The submission of a CV is requested in order to confirm years of related experience.
- 9.3 Ensure that all Subcontractors cooperate with each other in order that work will be carried out expeditiously, and will be satisfactory in all respects at completion of The Project.
- 9.4 Ensure that all Subcontractors examine Drawings and Specifications covering The Work which may affect the performance of their own work.
- 9.5 From time to time, examine the work of all Subcontractors and have corrected, defects and deficiencies which may adversely affect The Work.
- 9.6 Ensure that The Work is in compliance with the Contract Documents and accept responsibility for delays or costs resulting from failure to inspect, and any replacement required.
- 9.7 Be responsible for damage of any kind to The Work. Replace any materials or work so damaged that cannot be repaired or restored to the Departmental Representative 's satisfaction. Such repairs or replacements shall be made by the trade that performed the original work.
- 9.8 Ensure that all Subcontractors cooperate with other Subcontractors whose work attaches to or is affected by their own work, and ensure that minor adjustments are made to make adjustable work fit to fixed work.
- 9.9 Ensure that Subcontractors requiring foundations or openings to be left for the installation of their work furnish the necessary information to the Subcontractors concerned in ample time.
- 9.10 Items to be built-in shall be supplied as and when required by the Subcontractor building in the items together with forms, templates, anchors, sleeves, inserts, measurements, shop drawings and accessories required to be fixed to or inserted in the Work and set in place or instruct the related Subcontractors as to their location.
- 9.11 Pay the cost of extra work caused by, and make up time lost as the result of, failure to provide the necessary cooperation, information or items to be fixed to or built into the Work in adequate time.
- 9.12 Cooperate with other Contractors working on and in the vicinity of the site.

10 **PROTECTION AND SECURITY**

- 10.1 Protect existing services, structures, landscaping and other items required to remain and newly installed Work during construction with secure and durable coverings, barricades or guards suitable for the various conditions. Perform the Work in a manner to avoid damage. Remove and replace at no expense to the CFIA, any work and materials damaged that cannot be repaired or restored to the Departmental Representative 's satisfaction.
- 10.2 Protect interior of existing building from the weather in accordance with Section 01 50 00.
- 10.3 Owner's personnel will be occupying the existing building(s) during construction and alterations. Provide for the safety of occupants and for the security of occupied areas. Provide protection and keep clear areas that are required for access to, and exit from, occupied areas. Maintain clear and safe fire exit routes.
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- 10.4 Where construction operations must be executed or traffic routed over finished floors, lay minimum 6 mm thick plywood coverings tightly fitted over surface in such areas. Secure plywood to prevent movement in a manner which will not damage finished surfaces.
- 10.5 Where construction operations must be executed over finished roofs and waterproofed areas lay minimum 12 mm thick plywood covering. Secure plywood to prevent damage and penetration of roof and waterproofed surfaces. Provide means to prevent wind uplift.
- 10.6 Cover openings in equipment, ducts and pipes until final connections are made.
- 10.7 Protect exposed live electrical equipment during construction for personal safety.
- 10.8 Shield and mark live electrical parts with appropriate warnings.
- 10.9 Provide temporary doors for rooms containing electrical distribution equipment. Keep doors locked except when under the direct supervision of a qualified electrician.
- 10.10 Wherever practical lock or barricade finished areas.
- 10.11 As soon as construction is sufficiently advanced, enclose accessible openings to provide security. Provide temporary doors with security hardware.
- 10.12 Ensure continuous security of the Work and construction equipment.
- 10.13 Provide protection against the elements to maintain Products and installations from damage and deterioration.
- 10.14 Remove snow and ice immediately from parts of the Work except finished roofs. Do not use salt and avoid mechanical damage.

11 **FIRE SAFETY DURING CONSTRUCTION**

- 11.1 Provide fire prevention and protection measures to existing building as required by all authorities having jurisdiction.
- 11.2 Maintain exits, including stairways and exterior doors to the outside. Provide acceptable alternative exits where an existing exit is blocked off or deleted due to construction activities.
- 11.3 Where access to an exit through construction area is absolutely necessary, clearly define, protect and separate access from the construction area by a smoke tight fire separation equivalent to minimum 3/4 hour fire resistance rating.

12 **SAFETY MEASURES**

- 12.1 Comply with the safety regulations of the Occupational Health and Safety Act and authorities having jurisdiction for the safety of the Work.
 - 12.2 Contractor is to attend an on-site, one hour Health & Safety Orientation meeting by CFIA prior to the commencement of any works.
 - 12.3 Safety Wear: Provide in the field office a minimum of four CSA approved safety helmets and four pair green label safety boots available for the exclusive use of authorized visitors.
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13 **DIMENSIONS**

- 13.1 Wall thicknesses shown on the drawings are nominal only. In all cases, determine the actual sizes at the building.
- 13.2 Dimensions of shop fabricated portions of the building shall be verified on the site before shop drawings and fabrication is commenced.
- 13.3 Where dimensions are not available before fabrication is commenced, the dimensions required shall be agreed upon between the various trades concerned.
- 13.4 Departmental Representative will not accept claims for extra expense on the part of the Contractor by reason of non-compliance with this article.
- 13.5 Location of plumbing, heating and electrical fixtures and outlets, ducts, conduits and pipes shown or specified but not dimensioned shall be considered approximate. Consult with the Departmental Representative to determine the actual location of items not dimensioned as may be required to suit the job conditions. Relocation caused by failure to determine the actual locations shall be executed without charge to the Departmental Representative.

14 **DRAWINGS ON SITE**

- 14.1 Keep on the site at all times, one copy of the drawings and specifications, including a Departmental Representative's reviewed and stamped set of all shop drawings.

15 **EXPLOSIVES**

- 15.1 Use of explosives on site is not permitted.

16 **NOISE LIMITATIONS**

- 16.1 Contractor is required to keep to a minimum noise and his full cooperation is requested.
- 16.2 No pneumatic or other noisy equipment will be permitted on the project site.

17 **OVERLOADING**

- 17.1 Take precautions to prevent the overloading of any part of the structure, false work, form work or scaffolding during the progress of the Work, and make good, at no expense to the Departmental Representative all damage resulting from such overloading.
- 17.2 No load bearing members shall be cut, drilled or sleeved without the written consent of the Departmental Representative.

18 **HOLES THROUGH FLOORS AND WALLS**

- 18.1 Where holes are made in floors for the passage of pipes, ducts and conduit or wires, the holes shall be sealed with cement grout after the pipes, ducts and conduit or wires have been placed.
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18.2 Where holes are made in walls for the passage of pipes, ducts, conduit or wires, holes shall be filled with a suitable material, cement grout in masonry or concrete walls or plaster in plaster or drywall walls, regardless of whether or not the pipes have escutcheon plates. Grout or plaster around outside of sleeves where holes are sleeved.

18.3 In mechanical rooms above grade and in other rooms where faucets occur, (for example, washrooms, kitchens) the pipes, ducts, conduits or wires or all, which pass through floors, shall be enclosed in a 100 mm high metal sleeve and then grouted around pipes and ducts.

18.4 Above requirements shall apply to both exposed and concealed walls and floors.

19 **SNOW REMOVAL FROM SIDEWALKS**

19.1 Where local by-laws require that sidewalks be cleared of snow during winter, maintain sidewalks free of snow during the period of construction.

20 **NUMBER OF ITEMS**

20.1 In cases where an item or part of materials or equipment is referred to in the singular number, it is intended that such reference shall apply to as many items or parts as are required to complete the Work.

21 **NO INTERFERENCE WITH OWNER'S PRODUCTION**

21.1 Construction of the project shall in no way jeopardize the Owner's operations by interruption of any facility or service, except authorized scheduled interruptions of services.

22 **ACCESS**

22.1 Provide and maintain free access to permanent or temporary fire extinguishing equipment.

22.2 Maintain full exit facilities at all times.

22.3 Keep existing egress free from materials, equipment and obstructions of all kinds.

23 **DEBRIS**

23.1 Daily as the Work proceeds and on completion, each Subcontractor shall clean up and remove from the premises rubbish, surplus materials and equipment resulting from his work. Follow Contractor's instructions regarding disposal of rubbish.

23.2 Debris shall be dampened, put in containers and removed by means of material hoist or put in sealed containers and removed through the designated egress routes.

24 **SPECIAL CLEANING**

24.1 Remove oil, grease, loose paint, mill scale, dirt and any foreign substance of deleterious material from the surfaces to receive sprayed fireproofing in accordance with the Fireproofing Manufacturer's requirements. Remove by sandblasting when scraping, brushing and washing are non-effective.

25 **RECONSTRUCTION, ALTERATIONS AND MAKING GOOD**

- 25.1 Work consists of additions to the existing building and certain alterations to the existing building, including cutting and making openings to give access to the additions.
- 25.2 Where new work connects with existing work and where existing work is altered, carry out all necessary cutting and fitting required to make satisfactory connections with the existing work under this contract so as to leave the project in a finished and workmanlike condition.
- 25.3 Unless otherwise specified or required by codes or By-laws to meet a certain requirement or both, make good new work to match existing work.
- 25.4 Make good concrete, masonry, steel, roofing, plaster, drywall ceilings, flooring and other materials and finishes which are damaged or disturbed during the progress of additions and re-construction under the Contract.
- 25.5 Existing services shall be disconnected and relocated, where necessary, and reconnected as required to complete the Work. This work shall include, without being limited to, plumbing, drainage, heating, ventilating, air conditioning and electrical services.
- 25.6 Where existing work is to be made good, the new work shall match exactly the old work in material, construction and finish, unless otherwise noted or specified.
- 25.7 Drilling or cutting of existing work shall be carefully executed, leaving a clean hole no larger than required.
- 25.8 Wherever it becomes necessary to cut or interfere in any manner with existing equipment or service lines for short periods of time, do such work at times agreed upon between the Departmental Representative and the Contractor.
- 25.9 Coordinate the Work of the various trades, taking into account the existing installations to assure the best arrangement of pipes, conduit, ducts and mechanical, electrical and other equipment, in the available space.
- 25.10 If required, in critical locations, interference or installation drawings or both, shall be prepared showing the Work of the various trades as well as the existing installations, and shall be submitted to the Departmental Representative for review before the commencement of the Work.

26 **EMPLOYEE CONTROL**

- 26.1 Workmen are permitted into existing buildings only where their work is affected.
- 26.2 All entrances to existing buildings from new additions, whether through the existing or through doors in temporary partitions shall be kept locked with keys.

End of Section

1 **SUBSTITUTIONS**

- 1.1 Whenever Products are specified exclusively by trade name, manufacturer's name or by catalogue reference, use only those items, unless written approval for substitution is obtained from Departmental Representative.
- 1.2 No substitutions will be permitted without prior written approval of the Departmental Representative.
- 1.3 Proposals for substitutions may only be submitted after award of Contract.
- 1.4 Substitutions submitted on shop drawings without following requirements of this Section prior to submission of the shop drawings will cause the shop drawings to be rejected at any time. Departmental Representative's review of shop drawings shall not be construed as approval of substitutions.
- 1.5 Requests for substitutions must include statements of:
- .1 Description of proposed substitution.
 - .2 Respective costs of items originally specified and the proposed substitution.
 - .3 Compliance with the Building Codes and requirements of authorities having jurisdiction.
 - .4 Affect concerning compatibility and interface with adjacent building materials and components.
 - .5 Compliance with the intent of the Contract Documents.
 - .6 Reason for the request.
- 1.6 Proposed substitutions will be considered only under the following conditions:
- .1 If the materials and products specified are not available; or
 - .2 If substitute materials and products to those specified, which are brought to the attention of and considered by the Departmental Representative as equivalent to those specified, will not change the Contract Price and Contract Time; or
 - .3 If substitute materials and products to those specified, which are brought to the attention of and considered by the Departmental Representative as superior to those specified, will not change the Contract Price and Contract Time; or
 - .4 If a material or product is specified together with a requirement for performance and, in the opinion of the Contractor, the specified material or product will not produce the required results.
- 1.7 There is no obligation on the part of the Departmental Representative to accept proposed substitutions. Acceptance of proposed substitutions does not relieve the Contractor's responsibility under the Contract.
- 1.8 Should proposed substitution be accepted either in part or in whole, bear full responsibility and costs when substitution affects other work on the project. Pay for design and contract document changes required as result of the substitution.
- 1.9 Amounts of all credits arising from acceptance of substitutions will be determined by the Departmental Representative and the Contract Price adjusted accordingly.
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1.10 Wherein the expression "other acceptable equivalents" or similar expressions in specification Sections, submissions under the expression shall be as specified in this Section.

End of Section

Substitution Request No: _____ **Date:** _____
Project: _____ **Project No:** _____
Contractor: _____

Specified Product Specification Reference

Section Number	Section Title	Paragraph Number
_____	_____	_____

Proposed Substitution

Manufacturer and Product Trade Name _____

Address _____ **Phone Number** _____

Contact Name _____ **Model Number** _____

History of Product New Product ___ 2-5 years old ___ 5-10 years old ___ More than 10 years old ___

Similar Installatio Project Name & Address _____

Departmental Representative _____ Owner _____

Proposed Substitution Affects Other Parts of Work No ___ Yes, explain: _____

Differences Between Proposed Substitution and Specified Product _____

Reason For Not Providing Specified Product _____

Changes to Contract Price Add/Deduct \$ _____

Changes to Contract Time Add/Deduct _____ days

Contractor's Declaration

The Contractor Declares that:

- Proposed substitution has been fully investigated and determined to be equivalent or superior in all respects to specified product, and complies with requirements of authorities having jurisdiction.
- Same warranty will be furnished for proposed substitution as for specified product.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Proposed substitution is compatible with adjacent materials and assemblies.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Signed By: _____ Date: _____

Supporting Data Attached: Drawings Product Data Samples Reports Other _____

Departmental Representative's Review

- Substitution Accepted – Provide submittals in accordance with Specification requirement.
- Substitution Accepted as Noted – Provide submittals in accordance with Specification requirement.
- Substitution Not Accepted – Use specified product.

Signed By: _____ Date: _____

Owner's Acceptance

Signed By: _____ Date: _____

Additional Comments:

Departmental Representative _____

Contractor _____

Owner _____

1 **CASH FLOW**

1.1 Within ten Working Days of Contract award, submit detailed breakdown of cost of Work in form acceptable to Departmental Representative, divided to coincide with organization of specifications into sections, per month and coincident with approved construction schedule.

1.2 Cost breakdowns when totalled, shall be same as Contract Price.

1.3 Purpose of the cost breakdown is to assist Departmental Representative with evaluation of progress draws and to assist with cash flow arrangements.

End of Section

1 COORDINATION

- 1.1 Contractor to provide competent site superintendent, with a minimum 10 year documented experience, to be on site at all times to lay out the work and be responsible for accuracy and programming of work of subcontractors. The designated site superintendent shall be present at all scheduled meetings.
- 1.2 Coordinate scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- 1.3 Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- 1.4 Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- 1.5 In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- 1.6 Coordinate completion and clean up of Work of separate Sections in preparation for Substantial Performance.
- 1.7 Coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of facility's activities.
- 1.8 Notify Departmental Representative and building Owner prior to any anticipated disruption in service.

2 ALTERATION PROJECT PROCEDURES

- 2.1 Materials: As specified in product Sections; match existing products and work for patching and extending work.
 - 2.2 Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
 - 2.3 Remove, cut, and patch work in a manner to minimize damage and to provide a means of restoring products and finishes to original condition.
 - 2.4 Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.
 - 2.5 Where new work abuts or aligns with existing, perform a smooth and even transition. Patched work to match existing adjacent work in texture and appearance.
 - 2.6 When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Departmental Representative.
 - 2.7 Where a change of plane of 6 mm (1/4") or more occurs, submit recommendation for providing a smooth transition for Departmental Representative's review or request instructions from Departmental Representative.
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- 2.8 Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.
- 2.9 Finish surfaces as specified in individual product Sections.
- 3 CUTTING AND PATCHING**
- 3.1 Employ skilled and experienced installer to perform cutting and patching.
- 3.2 Submit written request in advance of cutting or altering elements which affects:
- .1 Structural integrity of element.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of element.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of other contractors.
- 3.3 Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
- .1 Fit the several parts together, to integrate with other Work.
 - .2 Uncover Work to install or correct ill-timed Work.
 - .3 Remove and replace defective and non-conforming Work.
 - .4 Remove samples of installed Work for testing.
 - .5 Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- 3.4 Execute work by methods which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.
- 3.5 Cut rigid materials using masonry saw or core drill.
- 3.6 Restore Work with new products in accordance with requirements of Contract Documents.
- 3.7 Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- 3.8 Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- 3.9 Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- 3.10 Identify any hazardous substance or condition exposed during the Work to Departmental Representative for decision or remedy.
- 4 PRE-CONSTRUCTION CONFERENCE**
- 4.1 Departmental Representative will schedule a conference after Notice of Award and prior to Contractor occupancy of site.
- 4.2 Attendance Required: Departmental Representative and Contractor.
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- 4.3 Agenda:
- .1 Submission of executed bonds and insurance certificates.
 - .2 Distribution of Contract Documents.
 - .3 Submission of list of subcontractors, list of products, Schedule of Values, and progress schedule.
 - .4 Designation of personnel representing the parties in Contract, and Departmental Representative.
 - .5 Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, contract changes and contract closeout procedures.
 - .6 Scheduling.
 - .7 Use of premises by Contractor.
 - .8 Owner's requirements.
 - .9 Construction facilities and controls provided by Departmental Representative.
 - .10 Temporary utilities provided by Departmental Representative.
 - .11 Security and housekeeping procedures.
 - .12 Procedures for testing.
 - .13 Procedures for maintaining record documents.
 - .14 Requirements for start-up of equipment.
 - .15 Inspection and acceptance of equipment put into service during construction period.
 - .16 Health & Safety Orientation meeting (one hour) by Departmental Representative.

5 PROGRESS MEETINGS

- 5.1 Schedule and administer meetings throughout progress of the Work at maximum bi-weekly intervals.
- 5.2 Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies within two days to Departmental Representative, participants, and those affected by decisions made.
- 5.3 Attendance Required: Job superintendent, major subcontractors and suppliers, Departmental Representative, Building Manager, as appropriate to agenda topics for each meeting.
- 5.4 Agenda:
- .1 Review minutes of previous meetings.
 - .2 Review of Work progress.
 - .3 Field observations, problems, and decisions.
 - .4 Identification of problems which impede planned progress.
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- .5 Review of submittals schedule and status of submittals.
- .6 Review of off-site fabrication and delivery schedules.
- .7 Maintenance of progress schedule.
- .8 Corrective measures to regain projected schedules.
- .9 Planned progress during succeeding work period.
- .10 Coordination of projected progress.
- .11 Maintenance of quality and work standards.
- .12 Effect of proposed changes on progress schedule and coordination.
- .13 Other business relating to Work.

6 **PRE-INSTALLATION CONFERENCES**

- 6.1 When required in individual specification Section, convene a pre-installation conference at work site prior to commencing work of the Section.
- 6.2 Attendance Required: Parties directly affecting, or affected by, work of the specific Section.
- 6.3 Notify Departmental Representative four days in advance of meeting date.
- 6.4 Prepare agenda, preside at conference, record minutes, and distribute copies within two days after conference to participants, with two copies to Departmental Representative.
- 6.5 Review conditions of installation, preparation and installation procedures, and coordination with related work.

End of Section

1 MECHANICAL AND ELECTRICAL CO-ORDINATOR

- 1.1 Employ and pay for full time services of a person or firm technically qualified, approved by Departmental Representative and experienced in field coordination for type of mechanical and electrical work required for this Project, for duration of the Contract.
- 1.2 Submit name, address, telephone number and C.V. of proposed mechanical and electrical co-ordinator, to Departmental Representative for approval.
- 1.3 Should proposed co-ordinator not be approved, submit name, address, telephone number and C.V. of another candidate for Departmental Representative's approval.
- 1.4 Mechanical and electrical co-ordinator shall not be assigned other tasks which interfere with the functions specified in this Section.

2 DUTIES OF MECHANICAL AND ELECTRICAL CO-ORDINATOR

2.1 Coordination:

- .1 Coordinate work of mechanical and electrical trades.
- .2 Coordinate mechanical and electrical work with architectural and structural work to minimize changes to architectural and structural work due to mechanical and electrical work.
- .3 Coordinate progress schedules, including dates for submittal and for delivery of Products.
- .4 Conduct conferences among Subcontractors, Suppliers and other concerned entities as necessary to establish and maintain coordination and schedules, and to resolve matters in dispute.
- .5 Participate in progress meetings. Report on progress of work to be adjusted under coordination requirements, and any needed changes in schedules.
- .6 Transmit minutes of meetings to concerned entities.

2.2 Coordination Documents:

- .1 Prepare coordination and interference drawings of installation for efficient use of available space, for proper sequence of installation, and to resolve conflicts.
- .2 Prepare progress schedule to record responsibilities under each section of Divisions 1 through 16 of specifications for actions which directly relate to mechanical and electrical work, including submittal and temporary utilities; record electrical power characteristics and control wiring for each item of equipment and include this schedule as part of the Construction Schedule.
- .3 Maintain documents throughout construction period, recording changes due to modifications and adjustments.
- .4 After acceptance of original and revised documents, reproduce and distribute copies to each concerned entity.

2.3 Coordination of Submittal:

- .1 Review shop drawings, product data, and samples for compliance with Contract Documents and for coordination among work of sections of the Project Manual. Transmit to Contractor for review then transmit to Departmental Representative.
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- .2 Coordinate cutting and patching work.
 - .3 Check field dimensions and clearances, relation to available spaces, and anchor bolt settings.
 - .4 Coordinate Work to fit in confined spaces such as above suspended ceilings, shafts and walls.
 - .5 Check compatibility with equipment and Work of other Sections, electrical characteristics, and control requirements.
 - .6 Check motor voltages and control characteristics.
 - .7 Coordinate controls and interlocks, voltages and wiring of pneumatic switches, and relays.
 - .8 Coordinate wiring and control diagrams.
 - .9 Review effect of any changes on work of other Sections.
 - .10 Verify and coordinate maintenance of Record Documents.
- 2.4 Coordination of Substitutions and Modifications:
- .1 Review proposals and requests from Subcontractors. Check for compliance with Contract Documents and for compatibility with Work, Products and equipment of other Sections.
 - .2 Submit to Contractor with recommendation for action.
- 2.5 Observation of work:
- .1 Observe work for compliance with Contract Documents.
 - .2 Maintain a list of observed deficiencies and defects; promptly submit to Contractor.
- 2.6 Documentation:
- .1 Observe and maintain a record of test record:
 - .2 Specifications section number, product or equipment, and name of Subcontractor.
 - .3 Testing agency and name of inspector.
 - .4 Name of manufacturer's representative present.
 - .5 Date, time, and duration of tests.
 - .6 Type of test, and results.
 - .7 Re-testing required.
 - .8 Assemble documentation for handling of disputes and claims.
 - .9 Submit copies of documentation to Departmental Representative upon request.
- 2.7 Equipment Startup:
- .1 Verify utilities, connections, and controls are complete and equipment is in operable condition.
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- .2 Observe start-up and adjustments; record time and date of start-up, and results.
 - .3 Observe equipment demonstrations to Owner; record times and record additional information required in Operation and Maintenance Manuals.
- 2.8 Inspection and Acceptance of Equipment:
- .1 Prior to inspection, verify that equipment is tested and operational, clean, and in specified condition.
 - .2 Assist the Departmental Representative inspection; prepare list of items to be completed or corrected.

End of Section

1 **SCHEDULES REQUIRED**

- 1.1 Submit the following schedules:
- .1 Construction Progress Schedule.
 - .2 Submittal Schedule for Shop Drawings and Product Data.
 - .3 Submittal Schedule for Samples.
 - .4 Submittal Schedule for timeliness of Owner furnished Products.
 - .5 Product Delivery Schedule.

2 **FORMAT**

- 2.1 Prepare schedule in the form of a horizontal bar chart.
- 2.2 Provide a separate bar for each trade or operation.
- 2.3 Provide horizontal time scale identifying the first work day of each week.
- 2.4 Format for listings: the table of contents of this specification.
- 2.5 Identification of listings: by specification section numbers.

3 **SUBMISSION**

- 3.1 Submit initial schedules within 15 days after award of contract.
- 3.2 Submit one one opaque reproduction, plus 2 copies to be retained by the Departmental Representative.
- 3.3 Departmental Representative will review schedule and return review copy within 10 days after receipt.
- 3.4 Resubmit finalized schedule within 7 days after return of review copy.
- 3.5 Submit revised progress schedule with each application for payment.
- 3.6 Distribute copies of the revised schedule to:
 - .1 Job site office.
 - .2 Subcontractors.
 - .3 Other concerned parties.
- 3.7 Instruct recipients to report to the contractor within 10 days, any problems anticipated by the timetable shown in the schedule.

4 **CONSTRUCTION PROGRESS SCHEDULE**

- 4.1 Include the complete sequence of construction activities.
 - 4.2 Include the dates for the commencement and completion of each major elements of construction including the following.
 - .1 Site clearing.
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- .2 Site utilities.
- .3 Special Subcontractor work.
- .4 Equipment Installations.
- .5 Finishes.
- 4.3 Show projected percentage of completion of each item as of the first day of the month.
- 4.4 Indicate progress of each activity to date of submission schedule.
- 4.5 Show changes occurring since previous submission of schedule:
 - .1 Major changes in scope.
 - .2 Activities modified since previous submission.
 - .3 Revised projections of progress and completion.
 - .4 Other identifiable changes.
- 4.6 Provide a narrative report to define:
 - .1 Problem areas, anticipated delays, and the impact on the schedule.
 - .2 Corrective action recommended and its effect.
 - .3 The effect of changes on schedules of other prime contractors.
- 5 **SUBMITTALS SCHEDULE**
- 5.1 Include schedule for submitting shop drawings, product data, and samples.
- 5.2 Indicate dates for submitting, review time, resubmission time, float time, last date for meeting fabrication schedule.
- 5.3 Include dates when submittals and delivery will be required for owner-furnished products.
- 5.4 Include dates when reviewed submittals will be required from the Departmental Representative.

End of Section

1 **RELATED WORK**

1.1 Individual submittals: under pertinent sections of this specification.

2 **SUBMITTALS**

2.1 Submit to Departmental Representative, shop drawings, samples and other items, in strict accordance with the provisions of this Section.

2.2 All submittals to the Departmental Representative's office to include prepaid carrying and all other charges.

3 **SHOP DRAWINGS AND PRODUCT DATA**

3.1 The term shop drawings means drawings, diagrams, illustrations, schedules, performance charts, product data, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the work.

3.2 The Contractor shall arrange for the preparation of clearly identified shop drawings as the Departmental Representative may reasonably request.

3.3 Prior to submission to the Departmental Representative, the Contractor shall review all shop drawings. By this review the Contractor represents that he has determined and verified all field measurements, field construction criteria, materials, catalogue numbers and similar data or will do so and that he has checked and coordinated each shop drawing with the requirements of the work and of the Contract Documents. The Contractor's review of each shop drawing shall be indicated by stamp, date and signature of an authorized person.

3.4 The Contractor shall submit shop drawings to the Departmental Representative for review with reasonable promptness and in orderly sequence so as to cause no delay in the Work or in the work of other contractors.

3.5 Submit three hard copies and one electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

3.6 Submit three hard copies and one electronic copy 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.

3.7 Submit three hard copies and one electronic copy 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.

3.8 Submit three hard copies and one electronic copy 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.

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- .2 Certificates must be dated after award of project contract complete with project name.
- 3.9 Submit three hard copies and one electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
- .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- 3.10 Submit three hard copies and one electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- 3.11 Submit three hard copies and one electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- 3.12 Prepare a schedule fixing the dates for submission and return of shop drawings.
- 3.13 With prior approval of the Departmental Representative, catalogue cuts showing all aspects, design, sizes, components and rough-in information for equipment may be submitted as shop drawings, placed in 3-ring binders. Six copies of each catalogue cut are required.
- 3.14 The Contractor shall make changes in shop drawings which the Departmental Representative may require consistent with the Contract Documents and resubmit unless otherwise directed by the Departmental Representative. When resubmitting, the Contractor shall notify the Departmental Representative in writing of any revision other than those requested by the Departmental Representative.
- 3.15 Shop drawings shall define the division of responsibility between different trades. Shop drawings shall show materials, methods of construction and attachment or anchorage, erection diagrams, connections and other details necessary to complete the work. Shop drawings shall show cross references to drawings and specifications.
- 3.16 The review by the Departmental Representative is for the sole purpose of ascertaining conformance with the general design concept. The review shall not mean that the Departmental Representative approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor, and such review shall not relieve the Contractor of his responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the Work of all subtrades and work of other contractors.
- 3.17 Any adjustments made on the shop drawings by the Departmental Representative are not intended to change the contract price. If the Contractor deems that such adjustments effect the value of the work, he shall so state in writing before proceeding with the fabrication and installation of the work.
- 3.18 Make shop drawings accurately to a scale sufficiently large to show pertinent features of the item to be supplied and the method of connection to the work including attachments, reinforcing, anchorage and location of exposed fastenings.
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4 **REPRODUCTION OF DRAWING ELECTRONIC FILES**

- 4.1 Reproduction of the Departmental Representative's drawings to serve as background for shop drawings will be permitted. Remove all identification or reference to the Departmental Representative from the drawings that are used for this purpose.
- 4.2 The release of these electronic files by the Departmental Representative does not imply transfer of copyright to the Contractor. The Contractor shall be responsible for all liabilities and damages resulted from the use of these files.

5 **SAMPLES**

- 5.1 Samples, when requested by the Departmental Representative, shall be submitted showing material, colour and finish. Materials used in the construction shall correspond to the reviewed samples.
- 5.2 Samples shall be submitted in such quantities which are required to be returned plus one which will be retained by the Departmental Representative.
- 5.3 Refer to individual sections for more particular requirements for specified samples.
- 5.4 At each stage, assemble and submit all relevant samples in context, at one time, in the following groups:
 - .1 Exterior Materials and Finishes.
 - .2 Ceiling Systems and Light Fixtures.
 - .3 Hardware.
 - .4 Cover plates, grilles, etc., of Mechanical and Electrical Sections.
- 5.5 Identify each sample with Project Number, Job Name, Date of Submittal, Type of Material, Names of Contractor, Subcontractor and Manufacturers.

6 **COLOURS**

- 6.1 Unless the precise colour and pattern is specifically described in the contract documents, whenever a choice of colour or pattern is available in a specified product, submit accurate colour charts from the manufacturer's standard range of colours and pattern charts to the Departmental Representative for his review and selection.
- 6.2 Unless all available colours and patterns have identical costs and identical wearing capabilities and are identically suited for the installation, completely describe the relative costs and capabilities of each.

7 **PROGRESS PHOTOGRAPHS**

- 7.1 Upon commencement of the Work, and thereafter as directed by Departmental Representative, supply to the Departmental Representative colour photographs of the progress of all parts of the Work.
 - .1 Submit electronic copy of digital photography in jpg format, standard resolution.
- 7.2 Photographs shall be taken by a professional photographer, and from locations as determined by the Departmental Representative.

- 7.3 When directed by the Departmental Representative, supply a final set of hard copies of colour photographs.
- 7.4 Each photograph shall be dated and locations noted on back of same. Prints shall be 200 x 250 mm (8" x 10") in size. Insert each photograph in a heavy, clear, celluloid folder, 3 hole punched on the left hand side for binding purposes. Each photograph shall have, at the lower right hand corner, a white patch with the name of the project and the date and location of exposure.
- 7.5 Cost of progress photographs is part of the Contract sum.

8 IDENTIFICATION OF SUBMITTALS

- 8.1 Completely identify each submittal and re-submittal by showing at least the following information:
- .1 Project Number.
 - .2 Job Name.
 - .3 Date of Submittal.
 - .4 Name of Contractor.
 - .5 Name and address of submitter, plus name and telephone number of the individual who may be contacted for further information.
 - .6 Drawing Number and Specification Section number to which the submittal applies.
 - .7 Whether this is an original submittal, or re-submittal.

9 COORDINATION OF SUBMITTALS

- 9.1 Prior to submittals for Departmental Representative's review, use all means necessary to fully coordinate material, including the following procedures:
- .1 Determine and verify field dimensions and conditions, materials, catalogue numbers and similar data,
 - .2 Coordinate as required with the trades and with public authorities involved.
 - .3 Secure necessary approvals from public authorities and others and signify by stamp, or other means, that they have been secured.
 - .4 Clearly indicate deviations from the Contract Documents.
- 9.2 Unless otherwise specifically permitted by the Departmental Representative, make submittals in groups containing associated items; the Departmental Representative may reject partial submittals as not complying with the provisions of the Contract Documents.
- 9.3 Make submittals far enough in advance of scheduled dates of installation to provide required time for reviews, for securing necessary reviews, for possible revision and re-submittal, and for placing orders and securing delivery so as to cause no delay in the Work or in the work of other contractors.
- 9.4 Costs of delays occasioned by tardiness of submittals shall not be borne by the CFIA.

End of Section

1 **REFERENCES**

- 1.1 Canadian Standards Association (CSA): Canada.
- .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- 1.2 National Building Code 2010 (NBC):
- .1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.
- 1.3 National Fire Code 2010 (NFC):
- .1 NFC 2010, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3
Fire Safety Plan.
- 1.4 Province of Ontario:
- .1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as
amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
- .2 Reg. 490/09, Designated Substances.
- .3 Workplace Safety and Insurance Act, 1997.
- .4 Municipal statutes and authorities.
- 1.5 Treasury Board of Canada Secretariat (TBS):
- .1 Treasury Board, Fire Protection Standard April 1, 2010 www.tbs-sct.gc.ca/pol/doceng.aspx?id=17316§ion=text.
- 1.6 Fire Commissioner of Canada (FCC):
- .1 FC-301 Standard for Construction Operations, June 1982.
- .2 FC-302 Standard for Welding and Cutting, June 1982.
- Labour Program
Fire Protection Engineering Services
4900 Yonge Street 8th Floor
North York, Ontario M2N 6A8

and copies may be obtained from:

Human Resources and Social Development Canada
Labour Program
Fire Protection Engineering Services
Ottawa, Ontario K1A 0J2

2 **SUBMITTALS**

- 2.1 Make submittals in accordance with Section 01 33 00.
- 2.2 Submit site-specific Health and Safety Plan: Within [7] days after date of Notice to
Proceed and prior to commencement of Work. Health and Safety Plan must include:
- .1 Results of site specific safety hazard assessment.
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- .2 Results of safety and health risk or hazard analysis for site tasks and operations.
 - .3 Measures and controls to be implemented to address identified safety hazards and risks.
 - .4 Provide a Fire Safety Plan, specific to the work location, in accordance with NBC, Division B, Article 8.1.1.3 prior to commencement of work. The plan shall be coordinated with, and integrated into, the existing Building Emergency Procedures and Evacuation Plan in place at the site. Departmental Representative will provide Building Emergency Procedures and Evacuation Plan. Deliver two copies of the Fire Safety Plan to the Departmental Representative not later than 14 days before commencing work.
 - .5 Contractor's and Sub-contractors' Safety Communication Plan.
 - .6 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing Building Emergency Response requirements and procedures provided by Departmental Representative.
 - 2.3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 10 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 5 days after receipt of comments from Departmental Representative.
 - 2.4 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
 - 2.5 Submit names of personnel and alternates responsible for site safety and health.
 - 2.6 Submit records of Contractor's Health and Safety meetings when requested.
 - 2.7 Submit 4 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, weekly.
 - 2.8 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.
 - 2.9 Submit copies of incident and accident reports.
 - 2.10 Submit Material Safety Data Sheets (MSDS).
 - 2.11 Submit Workplace Safety and Insurance Board (WSIB)- Experience Rating Report.
 - 2.12 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel, in accordance with O. Reg. 490, prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
 - 3 **FILING OF NOTICE**
 - 3.1 File Notice of Project with Provincial authorities prior to commencement of Work.
 - 4 **WORK PERMIT**
 - 4.1 Obtain building permits related to project prior to commencement of Work.
 - 4.2 Obtain Hot Work Permit from Property Manager.
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5 **SAFETY ASSESSMENT**

5.1 Perform site specific safety hazard assessment related to project.

6 **MEETINGS**

6.1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

7 **REGULATORY REQUIREMENTS**

7.1 Comply with the Acts and regulations of the Province of Ontario.

7.2 Comply with specified standards and regulations to ensure safe operations at site.

8 **GENERAL REQUIREMENTS**

8.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

8.2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or requesting improvements.

8.3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing.

9 **COMPLIANCE REQUIREMENTS**

9.1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter 0.1, as amended.

10 **RESPONSIBILITY**

10.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

10.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

10.3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act for the Province of Ontario.

11 **UNFORSEEN HAZARDS**

11.1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Departmental Representative verbally and in writing.

11.2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.

12 **HEALTH AND SAFETY CO-ORDINATOR**

12.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:

- .1 Have working knowledge of occupational safety and health regulations.
- .2 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
- .3 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- .4 Be on site during execution of Work and report directly to and be under direction of site supervisor.

13 **POSTING OF DOCUMENTS**

13.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province of Ontario, and in consultation with Departmental Representative.

- .1 Contractor's Safety Policy.
 - .2 Constructor's Name.
 - .3 Notice of Project.
 - .4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
 - .5 Ministry of Labour Orders and reports.
 - .6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
 - .7 Address and phone number of nearest Ministry of Labour office.
 - .8 Material Safety Data Sheets.
 - .9 Written Emergency Response Plan.
 - .10 Site Specific Safety Plan.
 - .11 Valid certificate of first aider on duty.
 - .12 WSIB "In Case of Injury At Work" poster.
 - .13 Location of toilet and cleanup facilities.
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14 **CORRECTION OF NON-COMPLIANCE**

- 14.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- 14.2 Provide Departmental Representative with written report of action taken to correct noncompliance of health and safety issues identified.
- 14.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

15 **BLASTING**

- 15.1 Blasting or other use of explosives is not permitted.

16 **POWDER ACTUATED DEVICES**

- 16.1 Use of powder actuated devices is not permitted.

17 **WORK STOPPAGE**

- 17.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
- 17.2 Assign responsibility and obligation to Health and Safety Coordinator and Competent Supervisor to stop or start Work when, at Health and Safety Coordinator's or Competent Supervisor's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations

End of Section

1 GENERAL REQUIREMENTS

- 1.1 Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
- .1 Specific quality assurance and quality control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of products.
- .2 Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality control procedures that facilitate compliance with the Contract Document requirements.
- .3 Requirements for Contractor to provide quality assurance and quality control services required by Departmental Representative, or authorities having jurisdiction are not limited by provisions of this Section.
- 1.2 Travel Expenses: Where it is necessary for the Departmental Representative to visit places away from the site of the Works in order to supervise, inspect or witness testing activities of items of the Work, for compliance with the Contract Documents, the Contractor shall pay the travelling, lodging and food expenses of the Departmental Representative, on the Departmental Representative's authorization.

2 DEFINITIONS

- 2.1 Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- 2.2 Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Departmental Representative.
- 2.3 Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.
- 2.4 Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.
- 2.5 Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- 2.6 Product Testing: Tests and inspections that are performed by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- 2.7 Source Quality Control Testing: Tests and inspections that are performed at the plant, mill, factory, or shop.
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- 2.8 Field Quality Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- 2.9 Testing Agency: An entity engaged to perform specific tests, inspections, or both.
- 2.10 Experienced: An entity having successfully completed previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

3 **CONFLICTING REQUIREMENTS**

- 3.1 General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Departmental Representative for a decision before proceeding.
- 3.2 Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Departmental Representative for a decision before proceeding.

4 **SUBMITTALS**

- 4.1 Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- 4.2 Schedule of Tests and Inspections: Prepare in tabular form and include the following:
- .1 Specification Section number and title.
 - .2 Description of test and inspection.
 - .3 Identification of applicable standards.
 - .4 Identification of test and inspection methods.
 - .5 Number of tests and inspections required.
 - .6 Time schedule or time span for tests and inspections.
 - .7 Entity responsible for performing tests and inspections.
 - .8 Requirements for obtaining samples.
 - .9 Unique characteristics of each quality-control service.
- 4.3 Reports: Prepare and submit four copies of certified written reports that include the following:
- .1 Date of issue.
 - .2 Project title and number.
 - .3 Name, address, and telephone number of testing agency.
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- .4 Dates and locations of samples and tests or inspections.
 - .5 Names of individuals making tests and inspections.
 - .6 Description of the Work and test and inspection method.
 - .7 Identification of product and Specification Section.
 - .8 Complete test or inspection data.
 - .9 Test and inspection results and an interpretation of test results.
 - .10 Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - .11 Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - .12 Name and signature of laboratory inspector.
 - .13 Recommendations on retesting and re-inspecting.
- 4.4 Permits, Licenses, and Certificates: For Departmental Representative's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

5 **QUALITY ASSURANCE**

- 5.1 General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- 5.2 Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- 5.3 Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- 5.4 Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- 5.5 Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- 5.6 Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated. Requirement for specialists shall not supersede requirements of authorities having jurisdiction.
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- 5.7 Testing Agency Qualifications: An independent agency with the experience and capability to conduct testing and inspecting indicated, and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
- 5.8 Factory Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- 5.9 Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
- .1 Contractor responsibilities include the following:
 - .1 Provide test specimens representative of proposed products and construction.
 - .2 Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - .3 Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - .4 Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - .5 Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - .6 When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
 - .2 Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Departmental Representative with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- 5.10 Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
- .1 Build mockups in location and of size indicated or, if not indicated, as directed by Departmental Representative.
 - .2 Notify Departmental Representative seven days in advance of dates and times when mockups will be constructed.
 - .3 Demonstrate the proposed range of aesthetic effects and workmanship.
 - .4 Obtain Departmental Representative's approval of mockups before starting work, fabrication, or construction.
 - .1 Allow seven days for initial review and each re-review of each mockup.
 - .5 Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - .6 Demolish and remove mockups when directed, unless otherwise indicated.
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5.11 Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Sections in the Specifications.

6 **QUALITY CONTROL**

6.1 Departmental Representative's Testing: The Departmental Representative may require during progress of the Work, testing and inspection by an independent testing company as directed by the Departmental Representative, or as required in these Specifications, to determine if materials provided for the Works meet the specified requirements.

.1 Where independent inspection and testing are required by the Contract Documents, the cost of these services shall be paid for by the Departmental Representative, except where cash allowances have been included for the specific inspection & testing. In this case, the Contractor shall pay independent inspection and testing company charges authorized by the Departmental Representative from the cash allowances included for these services.

.2 Retesting and Re-inspection: When initial tests indicate non-compliance with the Contract Documents, costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be deducted by the Departmental Representative from the Contract Price. Retesting and re-inspection shall be performed by the same testing agency as the initial tests.

.3 Departmental Representative will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.

6.2 Code Compliance and Contractor's Convenience Testing

.1 Code Compliance Testing: Inspection and tests required by codes or ordinances, or by an authority having jurisdiction shall be the responsibility of the Contractor and shall be paid for by the Contractor.

.2 Contractor's Convenience Testing: Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor and paid for by Contractor as part of the Contractor's overhead expenses.

.3 Engage a qualified testing agency to perform these quality-control services. Contractor shall not employ same entity engaged by Departmental Representative, unless agreed to in writing by Departmental Representative.

.4 Submit a certified written report, in triplicate, of each quality-control service.

.5 Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

.6 Retesting/Re-inspecting: Provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.

6.3 Manufacturer's Field Services: Where indicated, engage a factory authorized service representative to inspect field-assembled components and equipment installation, including service connections.

6.4 Testing Agency Responsibilities

- .1 Cooperate with Departmental Representative and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
- .2 Notify Departmental Representative and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
- .3 Determine the location from which test samples will be taken and in which in-situ tests are conducted.
- .4 Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
- .5 Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
- .6 Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
- .7 Do not perform any duties of Contractor.

6.5 Contractor Responsibilities

- .1 Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - .1 Access to the Work.
 - .2 Incidental labour and facilities necessary to facilitate tests and inspections.
 - .3 Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - .4 Facilities for storage and field curing of test samples.
 - .5 Delivery of samples to testing agencies.
 - .6 Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - .7 Security and protection for samples and for testing and inspecting equipment at Project site.
 - .2 Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - .1 Schedule times for tests, inspections, obtaining samples, and similar activities.
 - .3 Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality assurance and quality control services required by the Contract Documents. Submit schedule within 30 days of date established for commencement of the Work.
 - .1 Distribution: Distribute schedule to Departmental Representative, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.
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- .2 Establishing Schedule: By advance discussion with the selected testing and inspection agencies, determine the time required for the agencies to perform their duties and the time required for the issuance of resulting reports. Allow for the times in the construction schedule.
- .3 Schedule Revisions: Co-ordinate revisions with the testing and inspection agencies when changes to the construction schedule are necessary.
- .4 Schedule Adherence: Provide advance notice to the testing laboratory and to the inspection company of when testing of the Work is required. If the testing laboratory is ready to perform its functions according to the schedule and is prevented from doing so due to incompleteness of the work, extra costs for testing attributable to the delay will be back charged to the Contractor.

7 **TEST AND INSPECTION LOG**

- 7.1 Prepare a record of tests and inspections. Include the following:
 - .1 Date test or inspection was conducted.
 - .2 Description of the Work tested or inspected.
 - .3 Date test or inspection results were transmitted to Departmental Representative.
 - .4 Identification of testing agency or special inspector conducting test or inspection.
- 7.2 Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Departmental Representative's reference during normal working hours.

8 **REPAIR AND PROTECTION**

- 8.1 On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
- 8.2 Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
- 8.3 Protect construction exposed by or for quality-control service activities.
- 8.4 Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

End of Section

1 **TERMS OF REFERENCE**

- 1.1 Work of this section includes inspection and testing of roofing for compliance with the contract documents and as specified herein.
- 1.2 Inspection agency shall visit the work each day roofing is being applied.

2 **QUALIFICATIONS OF INSPECTION AND TESTING COMPANY**

- 2.1 Execute work by an independent inspector, having no affiliations with the contractor nor the subcontractors, and having continuous experience, satisfactory to the Departmental Representative, of the type of work specified in this section.
- 2.2 The inspection company shall have detailed knowledge of specified work and materials, installation techniques, and a minimum of five years experience providing inspection services.

3 **SITE MEETING**

- 3.1 Prior to start of work, attend a site meeting with the Departmental Representative, contractor and the roofing trades. Purpose of the meeting is to ensure familiarity with the requirements of the work, common understandings reached, methodologies, relationships and protection of work criteria are understood.

4 **SITE INSTRUCTIONS**

- 4.1 Any site instructions deemed necessary by the inspection agency shall be issued by the Departmental Representative only, to the appropriate parties concerned. The inspection agency shall not issue instructions to the contractor and subcontractors.

5 **REPORTS**

- 5.1 All reports shall be prepared or reviewed by the inspector's supervisory personnel. The reports shall confirm compliance of the work with the contract documents or contain comments on variances from the contract documents, together with recommended action to rectify variances, propose any tests required to confirm compliance and coordinate all testing and inspection.
 - 5.2 Present a final report at the end of the program, summarizing previous intermediate reports and is to be signed to the effect that the inspection company has complied with these terms of reference and certifies that all the requirements of the specification and drawings concerning the work have been fulfilled.
 - 5.3 Report format shall be columnar, listing the items to be inspected and tested, where applicable, shall contain notations of the specified, standard or other document reference covering the items to be inspected or tested. The reports shall contain affirmative or negative indications of whether or not the various items comply with the corresponding document requirements, and shall contain a description on any non-compliances.
 - 5.4 Prior to start of inspections, submit a report outlining inspection methods and procedures for Departmental Representative's approval. Include sample report forms.
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6 NON-COMPLIANCE AND SITE CONDITIONS REPORTING

- 6.1 Immediately notify Departmental Representative so that the Departmental Representative can issue necessary corrective instructions to the contractor:
- .1 On discovery of applications not in compliance with the Contract Documents.
 - .2 Should unforeseen site conditions arise requiring a change to the method of application or materials to suit the conditions.
- 6.2 Report correction of or lack of attention by the subcontractor and the contractor, to non-conforming work noted in previous reports.

7 PAYMENT

- 7.1 Cost of initial testing for work of this Section shall be paid for by CFIA. Cost of re-testing and re-inspection to verify corrected work shall be paid for by the Contractor

8 UNIT PRICES

- 8.1 Submit unit prices stating the cost for work listed below. Unit prices shall include all labour, materials, products, and disbursements and related charges, and shall represent the actual cost to the CFIA, exclusive of the Goods and Services Tax.
- 8.2 The following is a list of unit prices applicable to the work:
- .1 Site inspection, per hour:
 - .1 Principals.
 - .2 Senior engineers.
 - .3 Field engineers or senior technicians.
 - .4 Field technicians.

9 EQUIPMENT

- 9.1 Provide testing equipment, measuring instruments and other necessary apparatus of sufficient accuracy to verify the acceptability of the work being inspected or tested.

10 TESTING AND INSPECTION

- 10.1 Assist the Departmental Representative in review of shop drawings for design and detail.
- 10.2 Inspect substrates for required finish, cure, dryness, slope to drains, setting of drains to correct levels and provision of water seals.
- 10.3 Check materials and installation provided by other trades for compatibility and suitability to accept roofing.
- 10.4 Check type, quality and condition of equipment and measuring devices.
- 10.5 Check that shelf life of materials are not exceeded.
- 10.6 Check treatment of cracks, treatment of horizontal to vertical junctions, reinforcements, flashings, reglets, items penetrating through substrates.
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- 10.7 Check by measuring that materials are applied to required consistent uniform thicknesses.
- 10.8 Check that work is completely bonded to the substrate, is homogeneous, has elasticity and is free of crumbling, powdering, blisters, pinholes and craters.
- 10.9 Check that protection is provided and care taken to prevent damage to membrane, flashings and other parts of the system during construction of the building.

End of Section

1 **GENERAL**

- 1.1 Provide temporary utilities, construction facilities and controls in order to execute the work expeditiously.
- 1.2 Remove from site all such work after use.

2 **UTILITY HOOK-UP**

- 2.1 Installation and hook-up of the various utility lines are described in the pertinent other sections of these specifications.

3 **PRODUCT HANDLING**

- 3.1 Protection: use all means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of the work.
- 3.2 Replacements: In the event of loss or damage, immediately make all repairs and replacements necessary to the approval of the Departmental Representative and at no additional cost to CFIA.

4 **TEMPORARY WATER SUPPLY**

- 4.1 Provide an adequate pure water supply for the use of all subcontractors.
- 4.2 Run the supply pipes from the nearest available sources. Maintain in good condition.
- 4.3 Obtain authorization from Departmental Representative for temporary water supply. Arrange for a temporary water connection, and metering if required by Departmental Representative. If required by the Departmental Representative, pay public utilities fees. Provide water meter, piping and valves as required.
- 4.4 Pay for water used until date of Substantial Performance of the Work.
- 4.5 Obtain permission from the Departmental Representative to use permanent services when available.

5 **TEMPORARY FIRE PROTECTION**

- 5.1 Provide all temporary fire protection required and maintain in good order throughout the work.
- 5.2 Fire protection shall include without being limited to, stand-pipe system and water supply as required by the local authorities.

6 **TEMPORARY ELECTRICAL SERVICE**

- 6.1 Provide temporary service for lighting and the operation of electric pumps, motors, vibrators and other power tools during the work.
 - 6.2 Extension cords shall be supplied by the trades concerned.
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7 TEMPORARY POWER AND LIGHTING

- 7.1 Arrange with the local public utility or Departmental Representative for temporary electrical power and metering. Pay for permits, connections including extension cords, and power used until date of Substantial Completion of the Work.
- 7.2 Comply with the requirements of codes, by-laws and regulations governing temporary power and lighting at the location of the Work.
- 7.3 Contractor will provide a power source on each floor in a central location. Each Subcontractor shall provide required extension cords from location where power is provided to location where it is needed.
- 7.4 Contractor will arrange for general temporary lighting throughout Work areas. Each Subcontractor shall provide special task lighting required in the execution of the Work.
- 7.5 Provide sufficient lighting to ensure sufficient visibility for the proper execution, safety and inspection of the Work.
- 7.6 Comply with Construction Safety Association's "Temporary Wiring Standards on Job Sites", the Ontario Electrical Code, and other authorities having jurisdiction.
- 7.7 Provide and maintain temporary lighting required by the Departmental Representative for safety and security at temporary walkways, service areas and entrances provided for access to existing buildings during progress of construction.

8 TEMPORARY HEATING AND VENTILATING

- 8.1 Provide temporary heating required during the work, including attendance, maintenance and fuel.
 - 8.2 Prior to enclosing the building, maintain work areas as required at not less than 10 deg. C using approved temporary heating devices. After enclosure, keep premises heated to a temperature of at least 15 deg. C using approved temporary heating devices.
 - 8.3 Solid fuel salamanders will not be permitted inside the building. Use electric space heaters, steam heat or underwriters' laboratories labelled gas heaters. Do not use the permanent heating system for temporary heating purposes.
 - 8.4 Vent temporary heaters to the exterior and keep the building free of carbon monoxide, carbon dioxide and other obnoxious or harmful gases, smoke and soot.
 - 8.5 The permanent heating equipment when it is installed and in safe operating condition may be used for temporary heating, except that fans and air handling equipment shall not be used for this purpose. At the completion of the work, thoroughly clean the equipment and system, and service all components so that warranties on the equipment and system shall remain in force for a minimum of one year from the date of Substantial Performance of the Work.
 - 8.6 Pay for all fuel and leave oil tanks filled on the date of Substantial Performance of the Work.
 - 8.7 Where frost might penetrate floor slabs, footings or any part of a building not specifically designed to withstand frost penetration, provide temporary heat or adequate protection by means of straw or other coverings during freezing weather.
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8.8 Provide temporary heating to defrost frozen ground in order to permit the placing of concrete on earth.

9 **TEMPORARY OFFICE**

9.1 Provide on the project site, an adequate office for own use, with space for the use of the Departmental Representative and the Consultant. The office space, 2400mm x 2400mm (8'-0" x 8'-0") approximately, shall have a separate 900 mm x 2400 mm (3'-0" x 8'-0") long bench or table for drawings and a drawer beneath the bench.

9.2 When directed by the Departmental Representative, the Contractor shall remove the site office and provide similar offices and facilities within the building. Move all equipment and contents of the site office into the new building office.

9.3 Mobile units provided by the Contractor containing equivalent office space and services will be acceptable.

10 **TEMPORARY TELEPHONE**

10.1 Install a temporary telephone in the contractor's office on the project site, for the use of the contractor and subcontractors.

10.2 Install a temporary telephone in the Departmental Representative's office for the use of the Departmental Representative.

10.3 All long distance charges shall be paid for by the party making the call.

11 **TEMPORARY SANITARY FACILITIES**

11.1 Comply with the requirements of codes, local by-laws and regulations and provide sanitary temporary toilets and washbasins for the use of workers on the project at the location of the Work acceptable to the authorities having jurisdiction.

12 **PROTECTION DEVICES**

12.1 Erect fencing, barricades, covered ways, tarpaulins, steps, bridges, platforms, notice and warning boards, and maintain all lights, signals and protection of all kinds for the protection of the workmen engaged on the project, for the protection of adjoining property and for protection of the public in accordance with local regulations.

13 **TEMPORARY FENCING**

13.1 Provide and erect a rigid post and plywood hoarding around entire area of construction, consisting of 1200 mm x 2400 mm x 19 mm (4'-0" x 8'-0" x 3/4") exterior grade plywood secured vertically to 3600 mm (12'-0") long 89 mm x 89 mm (4" x 4") wood posts located at 1100 mm (3'-8") o.c. and set 1150 mm (3'-10") into ground. Install plywood sheets on alternate sides of wood posts and paint each exposed panel surface, opposite area of construction, with two coats of exterior grade paint. Provide a pair of hinged plywood gates at entrance, complete with padlock and hasp.

13.2 Maintain fencing and hoarding free of advertising, re-paint if necessary.

14 **TEMPORARY SERVICE ACCESS**

- 14.1 Furnish and install gravel surfaces, with sufficient base to provide safe convenient access for materials and supplies.
- 14.2 Maintain and protect in good order existing roads, sidewalks and curbs to the satisfaction of the owner and replace any that become damaged due to any operations under the contract.
- 14.3 Report all damaged areas in writing to the Departmental Representative, prior to the work of the contract.
- 14.4 Regulate parking on the project site and restrict to authorized cars only by means of identification stickers or cards if conditions so required.
- 14.5 Upon completion, restore areas to original condition, unless otherwise specified.

15 **TEMPORARY ENCLOSURES**

- 15.1 Interior enclosures: erect interior dust-proof temporary enclosures where shown or directed. Enclosure to be complete with door, fastenings, lock and two keys for Departmental Representative, constructed as follows:
 - .1 38 mm x 89 mm (2" x 4") wood framing.
 - .2 one layer of 0.25 mm (10 mils) thick polyethylene, or
 - .3 two layers of 0.15 mm (6 mils) thick polyethylene.
 - .4 Erect enclosure to form a dust-proof installation. Install slab door, opening toward the Work, complete with lock.
 - 15.2 Exterior enclosures: erect exterior temporary enclosures where shown or directed. Partition to be complete with door, fastenings, lock and two keys for Departmental Representative, constructed as follows:
 - .1 Wood framing, 38 mm x 89 mm (2" x 4").
 - .2 Asphaltic sheathing paper.
 - .3 T&G exterior grade plywood sheathing, 22 mm (7/8") thick.
 - .4 Erect enclosures to form a weathertight, dust-proof enclosure. Install slab door, opening towards the Work, complete with lock.
 - .5 Provide all necessary temporary weathertight enclosures, doors, fastenings and keys.
 - .6 Properly close and lock the building at nights, Sundays, holidays and other occasions when the Work is not in progress.
 - .7 Vacuum the area above false ceilings, including duct work and pipes prior to construction.
 - .8 Establish traffic control patterns which prevent construction dust from being tracked into occupied areas. Adhesive strips on floors to catch dust on shoes may be useful.
 - .9 Ventilate construction areas with negative pressure with respect to adjacent patient care areas. If possible, exhaust air from construction areas directly outside the hospital.
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- .10 Carefully clean construction areas before occupancy. Additionally, when renovation is contemplated infection, include control practitioners at an early stage of planning, prior to commencement of work, to review areas of potential risk and recommend additional control measures.
- 16 **TEMPORARY PORTABLE FIRE EXTINGUISHERS**
- 16.1 Provide portable fire extinguishers throughout construction areas; conform with fire authority requirements regarding location. Provide and maintain extinguishers in each temporary office or storage room.
- 16.2 Maintain extinguishers to requirements of Canadian Fire Underwriters' Association. Use pressurized water type extinguishers of 11.365 litres (2-1/2 gallon) capacity; anti-freeze type if subject to low temperatures; pressurized dry chemical extinguishers in vicinity of gasoline, oil or grease or where electrically operated equipment is used with minimum 2.27 kg (5 lb.) capacity.
- 16.3 Extinguishers shall remain the property of the contractor. Remove at substantial performance of the work.
- 17 **SIGNS ON PROPERTY**
- 17.1 No other signs or advertisements other than warning signs shall be exhibited on the project site.
- 17.2 Maintain signs in good condition for the duration of the contract.
- 17.3 Exact location, height and orientation shall be verified on the project site by the Departmental Representative.
- 17.4 Exact paint colours for sign and lettering shall be selected by the Departmental Representative at a later date.
- 18 **TEMPORARY SITE DRAINAGE**
- 18.1 Provide adequate water collection and diversion without affecting the drainage of the adjacent properties, and maintain the surface of the project site in a workable condition for construction operations.
- 18.2 Provide temporary drainage, pumps and dry plank walkways in order to facilitate construction operations.
- 19 **PAINTING TEMPORARY STRUCTURES**
- 19.1 Paint storage sheds, offices, hoardings and other temporary structures required to colour selected by the Departmental Representative, and re-paint as required and /or directed.
- 20 **SCAFFOLDING, PLANT AND MACHINERY**
- 20.1 Provide form work, scaffolding, equipment, tools and machinery for the proper execution of the Work.
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20.2 Construct and maintain scaffolding in a rigid, secure and safe manner. Erect scaffolding without damage to the structure or the finishes independent of walls. Use scaffolding in such a manner as to interfere as little as possible with other trades. When not in use, move scaffolding as necessary to permit installation of other work.

20.3 Remove scaffolding promptly when no longer required. Scaffolding in use over finished floor surfaces shall be mounted on rubber tired wheels.

21 **CONVEYING EQUIPMENT**

21.1 Provide and maintain conveying equipment such as cranes, hoists, derricks and the like as required for the proper execution of the project.

21.2 Assume complete responsibility for construction, strength, placing, anchoring and operation of derricks, cranes, hoists, guy and operating cables and any other mechanical contrivance used for the work, to ensure that any load carried thereon can be safely supported and be free from accidents to persons.

21.3 Make the use of accessory equipment and conveying systems available to all trades as required and make necessary arrangements in connection therewith.

21.4 Remove immediately such equipment when no longer required.

21.5 Where local by-laws and regulations or any authorities having jurisdiction require drawings and specifications on accessory and conveying equipment, obtain and pay for same and assume responsibility for their adequacy.

22 **STORAGE AREA**

22.1 Allocate an area of the project site, approved by the Departmental Representative, for the storage of materials and tools.

22.2 Keep the storage area tidy at all times.

22.3 No other part of the project site shall be used as storage area.

23 **NOISE LIMITATIONS**

23.1 Keep construction noise to a minimum.

23.2 No pneumatic or other noisy equipment will be permitted on the project site.

24 **SNOW REMOVAL FROM SIDEWALKS**

24.1 Where local by-laws require that sidewalks be cleared of snow during winter, maintain sidewalks free of snow during the period of construction.

25 **ACCESS**

25.1 Provide and maintain free access to permanent or temporary fire extinguishing equipment.

25.2 Maintain full exit facilities at all times.

25.3 Keep existing egress free from materials, equipment and obstructions of all kinds.

26 **DEBRIS**

26.1 Daily as the work proceeds and on completion, clean up and remove from the premises rubbish, surplus materials and equipment resulting from work.

26.2 Dampen debris and put in containers and remove by means of material hoist or put in sealed containers and removed through the designated egress routes.

27 **ROADS**

27.1 Keep local roads clear of mud, dirt, and debris at all times to the requirements of the authorities having jurisdiction.

28 **REMOVAL**

28.1 Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the work; remove all such temporary facilities and controls as rapidly as progress of the work will permit or as directed by the Departmental Representative and repair the damaged surfaces.

End of Section

1 STANDARDS AND CODES

- 1.1 Contract forms, codes, specifications, standards, manuals and installation, application and maintenance instructions, referred to in the Specifications unless otherwise specified and unless otherwise stated in the governing building code, shall be the latest published editions at the date of the Contractor's bid submission.
- 1.2 Conform to standards, in whole or in part, as stated in the Specifications.
- 1.3 If there is question as to whether any product or system is in conformance with applicable standards, the Departmental Representative reserves the right to have such products or systems tested at the Contractor's cost to prove conformance.
- 1.4 The cost for such testing will be borne by CFIA in the event of conformance with the Contract Documents or by the Contractor in the event of non-conformance.

2 SPECIFIED OPTIONS

- 2.1 When only one manufacturer's catalogued trade name is specified, provide only that catalogued trade name, material or product.
- 2.2 When more than one manufacturer's trade name is specified for a material or product, the choice is the contractors.
- 2.3 When more than one manufacturer's catalogued trade name is specified along with a referenced standard, the choice is the contractor's on condition the material or product complies with the referenced standard.
- 2.4 When a material or product is specified by reference to a standard only, the contractor may select any material or product that meets or exceeds the specified standard.
- 2.5 When a material or product is specified by prescriptive or performance specification, the contractor may select any material or product meeting or exceeding the specification.
- 2.6 When a material or product is specified by reference to a standard or by prescriptive or performance specification, upon request of the Departmental Representative obtain from the manufacturer, an independent testing laboratory reporting, showing that the material or product meets or exceeds the specified requirements.

3 QUALITY

- 3.1 Products, materials, equipment and articles, referred to as Products throughout the specifications, incorporated into the Work shall be new, not damaged or defective, and of the best quality comparable with the specifications for the purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- 3.2 Defective products, whenever identified prior to the completion of work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is a precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- 3.3 Should any dispute arise as to the quality or fitness of products, the decision rests strictly with the Departmental Representative based upon the requirements of the contract documents.
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3.4 Unless otherwise indicated in the specifications, maintain uniformity of manufacture for any particular or like item throughout the work.

4 **AVAILABILITY**

4.1 Immediately upon award of contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify the Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of work.

4.2 In the event of failure to notify the Departmental Representative at commencement of work and should it subsequently appear that work may be delayed for such reason, the contractor shall, as determined by the Departmental Representative and at no increase in contract price, temporarily install another product until such time as specified product becomes available, at which time the temporarily installed product shall be removed and the specified product installed.

5 **PRODUCT DELIVERY, STORAGE, HANDLING AND PROTECTION**

5.1 Handle and store products in a manner to prevent damage, adulteration, deterioration and soiling to the products, other building components, assemblies, other products, the structure, the site and surrounding property and in accordance with manufacturer's instructions when applicable.

5.2 Remove and replace damaged products at own expense and to the satisfaction of the Departmental Representative.

5.3 Delivery and Handling:

- .1 Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
- .2 Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
- .3 Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- .4 Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

5.4 Storage:

- .1 Store packaged or bundled products in original and undamaged condition with manufacturer's seals and labels intact. Do not remove from packaging or bundling until required in the work, except where otherwise specified for a specific item.
 - .2 Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - .3 Store products subject to damage from weather in weatherproof enclosures.
 - .4 Store cementitious products clear of earth or concrete floors, and away from walls.
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- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in a heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

6 **TRANSPORTATION**

- 6.1 Pay costs of transportation of products required in the performance of the work.
- 6.2 Transportation cost of products supplied by the CFIA will be paid for FOB curb side at the site by the CFIA. Unload, handle and store such products.

7 **WORKMANSHIP**

- 7.1 Workmanship shall be the best quality, executed by workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Departmental Representative if required work is such as to make it impractical to produce the required results.
- 7.2 Do not employ any unfit person or anyone unskilled in their required duties.
- 7.3 Decisions as to the quality or fitness of workmanship in cases of dispute rest solely with the Departmental Representative whose decision is final.

8 **SPECIAL PROTECTION AND PRECAUTIONS**

- 8.1 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).

9 **FASTENINGS**

- 9.1 Provide metal fastenings and accessories in the same texture, sheen, colour and finish as adjacent materials, unless indicated otherwise.
 - 9.2 Use noncorrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in the affected specification section.
 - 9.3 Prevent electrolytic action between dissimilar metals and materials.
 - 9.4 Space anchors within their load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
 - 9.5 Keep exposed fastenings to a minimum, space evenly and install neatly.
 - 9.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.
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10 **STAINLESS STEEL WORK**

- 10.1 Stainless steel used in the Work shall be type as specified in each perspective Section, and shall be high quality and manufactured of non-rusting, virgin, and non-recycled materials.
- 10.2 Use tools that are free of contaminants that will cause corrosion and rusting of stainless steel in the fabrication and finishing of stainless steel work.
- 10.3 When requested by the Departmental Representative identify the names of the stainless steel manufacturers, fabricators and the finishing subcontractors. The Departmental Representative reserves the right to visit the manufacturing, fabrication and finishing facilities. The Contractor shall arrange for such visits by the Departmental Representative.
- 10.4 An inspection and testing agency may be appointed by the Departmental Representative to test the stainless steel work.

11 **MANUFACTURER'S INSTRUCTIONS**

- 11.1 Unless otherwise indicated in the specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- 11.2 Notify the Departmental Representative in writing, of conflicts between the specifications and manufacturer's instructions, so that the Departmental Representative may establish the course of action.
- 11.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Departmental Representative to require removal and re-installation at no increase in the contract price.

12 **TRADEMARKS AND LABELS**

- 12.1 Trademarks and labels, including applied trademarks and labels are not acceptable in the finished work, except those required for operating instructions, or when located in mechanical, electrical and control rooms.
- 12.2 Remove trademarks and labels by grinding, if necessary, painting out where the particular surface is being painted, or if on plated parts, replace with new plain plated or non-ferrous metal parts.

13 **CONCEALMENT**

- 13.1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- 13.2 Before installation, inform the Departmental Representative if there is a contradictory situation. Install as directed by the Departmental Representative.

End of Section

1 **DEFINITIONS**

- 1.1 Cutting: Removal of in-place construction necessary to permit installation or performance of other Work. Cutting does not include mere drilling of holes to accommodate screws, anchors, bolts or other fasteners, such drilling is part of each Section's installation function.
- 1.2 Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

2 **SUBMITTALS**

2.1 Submit written request in advance of cutting or patching which affects:

- .1 Structural integrity of any element of Work and of Project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of any operational element.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or other contractor.

2.2 Include in request:

- .1 Identification of Project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or patching.
- .4 Description of proposed work, and Products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on work by Owner or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be performed.

3 **PREPARATION**

- 3.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- 3.2 After uncovering, inspect conditions affecting performance of Work.
- 3.3 Beginning of cutting or patching means acceptance of existing conditions.
- 3.4 Provide supports to assure structural integrity of surroundings; devices and methods to protect other portions of Work from damage.
- 3.5 Provide protection from elements for areas which may be exposed by uncovering Work.
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- 4 **EXECUTION**
- 4.1 Execute cutting, fitting, and patching to complete the Work.
- 4.2 Do not cut, drill or sleeve load-bearing members without obtaining written approval for each condition.
- 4.3 Fit the several parts together, to integrate with other work.
- 4.4 Uncover Work to install ill-timed work.
- 4.5 Remove and replace defective and non-conforming work.
- 4.6 Remove samples of installed Work for testing if directed by the Departmental Representative.
- 4.7 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- 4.8 Perform work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.
- 4.9 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- 4.10 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- 4.11 Restore Work with new Products in accordance with requirements of Contract Documents.
- 4.12 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and with suitable allowance for deflections and expansions and contractions.
- 4.13 Enclose pipes, ducts, conduit and wires passing through assemblies at areas where penetrations occur on suspended floors in a 100 mm (4") high metal sleeve and make air and watertight with water resistant fire stopping.
- 4.14 Completely seal voids of penetrations of fire rated assemblies with fire stopping material, full thickness of the construction element.
- 4.15 Refinish surfaces to match adjacent finishes. Refinish continuous surfaces to nearest intersection. Refinish entire assembly.

End of Section

- 1 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**
- 1.1 Work consists of certain alterations to the existing building, including cutting and making openings.
- 1.2 Execute Work with least possible interference or disturbance to occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.
- 1.3 Where security has been reduced by work of Contract, provide temporary means to maintain security.
- 1.4 Provide temporary dust screens, barriers, warning signs in locations where renovation and alteration work is adjacent to areas used by public or Owner's personnel.
- 1.5 Where new work connects with existing work and where existing work is altered, carry out all necessary cutting and fitting required to make satisfactory connections with the existing work under this contract so as to leave the project in a finished and workmanlike condition.
- 1.6 Unless otherwise specified or required by codes or By-laws to meet a certain requirement or both, make good new work to match existing work.
- 1.7 Make good materials and finishes which are damaged or disturbed during the progress of additions and re-construction under the Contract.
- 1.8 Disconnect and relocate existing services, where necessary, and reconnect as required to complete the Work. This work shall include, without being limited to, plumbing, drainage, heating, ventilating, air conditioning and electrical services.
- 1.9 Where existing work is to be made good, match new work exactly with old work in material, construction and finish, unless otherwise noted or specified.
- 1.10 Carefully drill or cut existing work, leaving a clean hole no larger than required.
- 1.11 Wherever it becomes necessary to cut or interfere in any manner with existing equipment or service lines for short periods of time, do such work at times as agreed upon by the Departmental Representative.
- 1.12 Coordinate the Work of the various Sections, taking into account the existing installations to assure the best arrangement of pipes, conduit, ducts and mechanical, electrical and other equipment, in the available space.
- 1.13 If required, prepare interference or installation drawings or both, showing the Work of the various Sections as well as the existing installations, and shall be submitted to the Departmental Representative for review before the commencement of the Work.

End of Section

1 INSPECTION/TAKEOVER PROCEDURES

- 1.1 Prior to application for certificate of Substantial Performance, carefully inspect the Work and ensure it is complete, that major and minor construction deficiencies are complete, defects are corrected and building is clean and in condition for occupancy. Notify Departmental Representative in writing, of satisfactory completion of the Work and request an inspection.
- 1.2 During Departmental Representative inspection, a list of deficiencies and defects will be tabulated. Correct same.
- 1.3 When Departmental Representative considers deficiencies and defects have been corrected and it appears requirements of Contract have been performed, make application for certificate of Substantial Performance.
- 1.4 Submit a final statement of accounting giving total adjusted Contract Price, previous payments, and monies remaining due.
- 1.5 Departmental Representative will issue a final change order reflecting approved adjustments to Contract Price not previously made.

2 CLEANING

- 2.1 Remove stains, paint, labels, caulking compound, spots, marks and dirt from decorative work, electrical and mechanical fixtures and equipment, fitments, walls, doors, windows, partitions. Vacuum, dust, clean and polish surfaces. Touch-up damaged painted areas.
- 2.2 Vacuum clean and dust behind grilles, louvres and screens.
- 2.3 Broom clean and wash exterior walks, steps and platforms.
- 2.4 Remove dirt and other disfigurations from exterior surfaces.
- 2.5 Clean and sweep roofs, gutters, areaways and paved areas.
- 2.6 Obtain Departmental Representative's authorization before commencing with final cleaning.

3 AS-BUILT RECORDS

- 3.1 Keep an accurate record of 'as-built' conditions. Record clearly as the Work progresses, using industry standard drafting procedures, any variations from work, engineering or shop drawings. Maintain documents in clean, dry, legible condition.
 - 3.2 As-built drawings are in addition to any 'as-built' or 'record' drawings that may be required of Subcontractors under various trade sections.
 - 3.3 In addition to the information provided from the various Subcontractors as-built or record drawings shall include revisions arising from approved Field Orders, Change Orders and Supplementary Instructions.
 - 3.4 Record drawings to be kept and maintained on site, available for the periodic review of the Departmental Representative and Consultant.
 - 3.5 Record drawings to be turned over to Departmental Representative and Consultant after Substantial Completion inspection.
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4 **DATA BINDERS**

- 4.1 Collect and assemble all manufacturer's data in logical order and insert in suitable hard cover, loose leaf binders approximately 215 mm x 280 mm (8-1/2" x 11"). Mark each section with a labelled tab protected with a celluloid cover.
- 4.2 Organize contents into applicable sections of work to parallel project specification breakdown using broad scope headings: Architectural, Mechanical and Electrical.
- 4.3 Binders shall be submitted to Departmental Representative in triplicate with at least the following:
- .1 Identification on, or readable through, the front cover stating general nature of the Data Binder.
 - .2 Neatly typewritten index near the front of Data Binder, furnishing immediate information as to location in the Data Binder of emergency data regarding the installation.
 - .3 Complete instructions regarding operation and maintenance of equipment involved.
 - .4 Complete nomenclature of replaceable parts, their part numbers, current cost, and name and address of manufacturer and nearest vendor of parts.
 - .5 Cleaning and maintenance instructions for surfaces and materials.
 - .6 Description of equipment, operation and maintenance instructions for mechanical, electrical and sprinkler equipment.
 - .7 Warranties and bonds.
 - .8 Complete list of mechanical equipment supplied and installed under the contract. Include name tag information such as make, type, size, capacity, serial number, etc.
- 4.4 Where contents of Data Binder include manufacturers' catalogue pages, clearly indicate the precise items included in this installation and delete, or otherwise clearly indicate, manufacturers' data with which this installation is not concerned.
- 4.5 One complete set of final reviewed shop drawings (bound separately) indicating corrections and changes made during fabrication and installation.
- 4.6 One (1) copy of survey as specified in Section 01 33 00.
- 4.7 Submit Data Binders in triplicate to Departmental Representative at time of application for 'Substantial Performance of the Work'.

5 **DEMONSTRATION OF SYSTEMS**

- 5.1 Demonstrate and instruct the Departmental Representative and Owner's personnel in operation and maintenance of all systems.
- 5.2 Refer to the various Sections of the Specifications for the specific testing requirements.

End of Section

1 General

1.1 **WORK INCLUDED**

- .1 This section of the work covers the requirements for demolishing, salvaging and removing wholly or in part the various items designated on the drawings or required to be removed or partially removed for the receipt of the work of this contract.
- .2 Demolition and preparatory work includes, but is not necessarily limited to:
 - .1 Alteration and renovations to existing building.
 - .2 Cutting and removing of existing roofing and other components of existing building, for installation of new roofing and other work as indicated on the drawings.
 - .3 Patching, making good openings and chases in floors, ceilings, roofs, etc., after the installation of the work.
 - .4 Removal of rubbish, debris, demolished fixtures, fitments and items not scheduled to remain the Owner's property, resulting from the demolition and preparatory work.
 - .5 Dust Control during the operations of the work of this section.

1.2 **WORKS UNDER OTHER SECTIONS**

- .1 Temporary dustproof and security enclosures - under Section 01 50 00.
- .2 Capping, diverting, cutting-off or removal of services in areas being altered which are affected by the changes - under Mechanical and Electrical.

1.3 **QUALITY ASSURANCE**

- .1 Comply with pertinent codes, regulations and insurance carriers providing coverage for this work.
- .2 Execute the work in strict accordance with 'The Occupational Health and Safety Act and Regulations for Construction Projects' latest addition. Keep copy of the Act at the place of the Work at all times.

1.4 **SUBMITTALS**

- .1 Submit demolition, cutting, patching and finishing schedule to Departmental Representative for review. Schedule to show timing and phasing of the work in the various areas of the existing building. Deviation from schedule will not be permitted without approval.

1.5 **PROTECTION**

- .1 Refer to Summary of Work Section 01 11 00.
 - .2 Use all means necessary to protect existing objects designated to remain and in the event of damage, immediately make all repairs and replacements necessary to the approval of, and at no additional cost to CFIA.
 - .3 Provide protection required to enable existing building and equipment to remain in continuous and normal operations, and maintain construction schedule.
-

2 Products

2.1 **MATERIALS**

- .1 Demolished materials become Contractor's property unless indicated or directed otherwise by Departmental Representative. Remove materials from site daily, unless such materials are specified or shown on Contract Documents to be reused or turned over to Owner.
- .2 Carefully remove, handle and store materials to be reused or turned over to Owner to prevent damage. Materials that are damaged during removal will be inspected by Departmental Representative. The Departmental Representative will determine extent of damage and accept or reject materials for reuse. Provide new materials to match existing materials rejected by the Departmental Representative at no additional cost to CFIA.

3 Execution

3.1 **PREPARATION**

- .1 Notify the Departmental Representative at least two full working days prior to commencing of the work.
- .2 The drawings do not purport to show all objects existing on the site.
- .3 Before commencing the work, carefully check drawings and verify with the Departmental Representative regarding all objects to be removed and all objects to be preserved.
- .4 Schedule all work in a careful manner with all necessary consideration for the requirements of the Owner, his employees and the public.
- .5 Avoid interference with the use of, and passage to and from, adjacent buildings and facilities.
- .6 Before starting the operations, arrange with the appropriate trade concerned for the disconnection of all utility services, affecting the work.
- .7 Preserve in operating condition all active utilities to remain.

3.2 **DEMOLITION AND PREPARATORY WORK**

- .1 In order to afford the least interference with the efficient operations of the existing building and to keep the risk of fire to a minimum at all times, the Contractor shall ensure that demolished materials are continuously removed from the buildings and grounds as they accumulate, that no hazard condition is left during non-working hours and that full measures are taken by sprinkling and other means to keep dust to a minimum and to confine what dust there is within the working area.
 - .2 Maintain proper and safe means of fire exit from all zones of the existing building to the approval of the authorities having jurisdiction.
 - .3 Confine operation to those parts of the buildings which are to be altered or renovated. Do not damage existing construction beyond that necessary for performance of new work and repair such damage as required.
 - .4 Materials arising from the demolition and preparatory work shall become the property of the Contractor unless indicated otherwise and be removed from the site.
 - .5 Materials and equipment to be relocated for reuse in the new work shall be carefully removed in re-usable condition, transported and stored on the site where directed by the Departmental Representative and protected against damage.
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- .6 Existing footings, foundations, pipe lines, electrical conduit and wiring shall not be undermined, damaged, or endangered by digging, cutting or any other operation in the performance of the work. Undermined, damaged or endangered work to be made good at no additional cost to CFIA.
- .7 Cut openings through existing assemblies and components to accommodate new work. Be responsible for damage to existing structure, assemblies and components. Make good surfaces disturbed with materials to match existing.
- .8 Where items are to be removed from existing structure or surfaces that are to remain in place, remove those items complete with hangers, brackets and other readily removable supports and fastenings:
 - .1 Remove bolts, but not inserts embedded in concrete or masonry.
 - .2 Remove bolt and rivet fastenings from steel structure.
- .9 Demolish work into sections of practical size for removal without alteration or damage to the existing building remaining in place.
- .10 Upon completion of demolition, clean surfaces in demolition areas.
- .11 Join and make good new work to existing in such a manner that the joint is structurally sound and inconspicuous.
- .12 Cuts, breaks and other temporary openings into existing surfaces, which are required for installation or application of new fixtures, fitments, materials or services shall be, at completion of work, patched and/or made good and finished to blend with surrounding finishes. Openings to allow passage of ducts shall be closed tight to perimeters of duct at all locations where fire dampers are required.
- .13 In areas where work is required to be performed over acoustic ceilings composed of lay-in panels in a supporting grid, panels shall be carefully removed to avoid damage and replaced when the work is completed. If existing lay-in panels in a room are damaged and cannot be matched with new panels, then all the panels in that room shall be replaced with new units to the Departmental Representative's approval at no additional expense to CFIA.
- .14 Where fireproofing membranes or coverings to existing structural steel members and open web steel joists are disturbed, restore the fire protection with materials and methods acceptable by the authorities having jurisdiction.
- .15 Materials and other equipment not required for re-use shall not be stored or sold from the site.
- .16 Burning of materials on site is prohibited.
- .17 Maintain the existing building in a weather and watertight condition at all times.
- .18 Maintain security of existing building.

3.3 **WORK TO EXISTING ROOF FOR INSTALLATION OF THE NEW WORK**

- .1 It is essential that the existing building be maintained watertight at all times, therefore, the Contractor shall furnish all temporary protection, enclosures, tarpaulins, required.
 - .2 Seal off or temporarily dam open roof edges to prevent any incidence of water into existing building or structure.
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- .3 Prepare existing roof for receipt of new roofing and other components as indicated on drawings and in the specifications.
- .4 Execute the work to a schedule that will expedite the job as a whole, and perform the work in parts as may be required to allow other trade work to be executed.

End of Section

1 General

1.1 **REFERENCES**

- .1 ANSI/MSS SP-58, Pipe Hangers and Supports - Materials, Design and Manufacture.
- .2 ASTM A123/A123M: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .3 ASTM A307: Standard Specifications for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
- .4 ASTM A653/A653M: Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
- .5 CSA-G40.20/G40.21-M: General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
- .6 CAN/CSA-S16.1: Limit States Design of Steel Structures
- .7 CSA W47.1: Certification of Companies for Fusion Welding of Steel Structures
- .8 CSA W47.2: Certification of Companies for Fusion Welding of Aluminum
- .9 CSA W48 Series: Electrodes
- .10 CSA W59-M: Welded Steel Construction (Metal Arc Welding)
- .11 CSA-W117.2: Safety in Welding, Cutting and Allied Processes
- .12 CAN/CGSB-1.181-99: Ready Mixed Organic Zinc Rich Coating
- .13 CISC/CPMA 2.75: Canadian Institute of Steel Construction/Canadian Paint Manufacturers Association "A Quick-Drying Primer for Use on Structural Steel"
- .14 CISC: Canadian Institute of Steel Construction, "Code of Standard Practice"
- .15 SSPC: Steel Structures Painting Council, "Steel Structures Painting Manual, Vol. 2"

1.2 **SUBMITTALS**

- .1 Shop Drawings
 - .1 Submit shop drawings for each item. Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details and accessories. Each shop drawing submission shall bear signature and stamp of qualified professional engineer registered or licensed in province of Ontario
 - .2 Clearly indicate any deviation from the specifications or drawings.
- .2 Test Reports: Provide certified test reports showing compliance with specified performance characteristics and physical properties.

1.3 **PRODUCT DELIVERY, STORAGE AND HANDLING**

- .1 Coordinate deliveries to comply with construction schedule and arrange ahead for strategic off-the-ground, covered storage locations. Do not load areas beyond the designed limits.
- .2 Handle and store metal materials at job site in a manner to prevent damage to other materials, to existing buildings or property.

1.4 **COORDINATION**

- .1 Supply to other Sections, materials requiring setting and/or building-in of other trades. This includes inserts, anchors, frames, sleeves, etc. Verify locations of said materials.
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1.5 **PROJECT CONDITIONS**

- .1 Field Measurements: Take measurements at the building to assure proper fitting, fabrication, and erection of the work. Check dimensions in the field, whether or not shown, upon which the accurate fitting together and building-in of the metal fabrication work may depend or which affects the proper installation of the work of others.

2 Products

2.1 **MATERIALS**

- .1 Metals - General: free from defects which impair strength or durability, or which are visible; new, of best quality and free from rust, waves or buckles, and clean, straight throughout entire length, of sharply defined profiles and true in web and flange.
- .2 Steel - General:
- .1 Structural Shapes, Plates: New material conforming to CSA-G40.20/G40.21-M, Grade 350W for W and H shapes, and Grade 300W for other shapes, and plates.
- .2 Hollow Structural Sections: New material conforming to CSA-G40.20/G40.21-M Grade 350W, Class H.
- .3 Stainless Steel Fasteners: Type 304 or Type 316 to suit.
- .4 Pipe and Boiler Clamps: Galvanized carbon steel to MSS-SP58, type 42, ULC listed.
- .5 Galvanizing, sheet steel: commercial quality to ASTM A653/A653M, Grade A, with zinc coating designation Z275, minimized spangle, in accordance with CSSBI Technical Bulletin No. 6. Galvanized sheets temper rolled and un-passivated zinc coating where required to receive paint or other applied finish
- .6 Welding Materials: Conforming to CSA W48.1-M and CSA W59-M.
- .7 Common or Ordinary Bolts and Anchor Bolts (for general applications): Unfinished bolts conforming with ASTM A307, Grade A, with hexagon heads and nuts where exposed in the finish work. Use hot dipped galvanized where used in exterior connections or in unheated areas inside the building.
- .1 Common bolts: of lengths required to suit thickness of material being joined, but not projecting more than beyond nut, without the use of washers.
- .2 Anchor bolts: of lengths noted, but projecting not less than beyond nut unless otherwise noted.
- .8 Primer Paint: Solvent reducible alkyd, red oxide, in fast drying, lead and zinc-chromate free formulation conforming to CISC/CPMA 2.75. Use one brand of primer throughout the work.
- .9 Galvanized Primer: Zinc rich conforming to CAN/CGSB-1.181 for new galvanized metal. For galvanized fabrications touch-up to remain unpainted in finished work, use W.R. Meadows of Canada Ltd. "Galvafroid" or Kerry Industries "Z.R.C." or Niagara Paint Inc. "PL052898" zinc rich coating.
- .10 Grout: V-3 Non-Metallic Grout by W.R. Meadows of Canada Ltd., or U. Set by U.S.E. Hickson Products Ltd

2.2 **FABRICATION**

- .1 Fabricate the work true to dimensions, square, plumb and level. Joints and intersecting members shall be accurately fitted with adequate fastenings.
- .2 Finished work shall be free from distortion and defects detrimental to appearance and performance.
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- .3 Unless otherwise specified, noted or approved, all connections shall be welded.
- .4 Where not possible connections shall be bolted or secured in an approved manner. Exposed fastenings shall be countersunk, bolts cut off flush with nuts and made as inconspicuous as possible. Exposed fastenings where approved shall be of the same material, colour and finishes as the base metal on which they occur.
- .5 Shop and field connections shall comply with CSA S16.
- .6 Connections to structural steel members shall be welded. No bolting or drilling of holes shall be done unless approved in writing by the Consultant.
- .7 Fabricate items that are to be built into masonry or concrete and deliver to project site for setting; furnish items complete with bolts, anchors, clips, etc., ready to set. Furnish, completely install and connect other items. Erect items to proper lines and levels, plumb and true, and in correct relation to adjoining work. Secure parts in a rigid and substantial manner using concealed connections where practicable.
- .8 Provide bolts, shims, blocks, nuts, washers, wedging pieces, etc., required for complete installation, unless otherwise noted.
- .9 Metal members shall be isolated where necessary in an approved manner to prevent corrosion due to metal to metal contact, or contact between masonry and concrete and metal.

2.3 **WELDING**

- .1 Execute welding to avoid damage or distortion to the Work. Should there be, in the opinion of Consultant or Inspection and Testing company, doubt as to adequacy of welds, such welds shall be tested for efficiency and any work not meeting specified Standards shall be removed and replaced with new work satisfactory to Consultant. Execute welding in accordance with the following standards:
 - .1 CSA W48: for Electrodes. If rods are used, only coated rods are allowed.
 - .2 CSA W59: for design of connections and workmanship.
 - .3 CAN/CSA-W117.2: for safety.
- .2 Welding shall be done by a fabricator fully approved by the Canadian Welding Bureau under the requirements of CSA W47.1.
- .3 Thoroughly clean welded joints and expose steel for a sufficient space to perform welding operations. Neatly finish welds. Where exposed to view and finish painted, apply weld continuously and grind to a uniformly smooth finish.

2.4 **PRIMING**

- .1 Prime all steel, whether exposed in the finish work or not, except as indicated below:
 - .1 Do not prime stainless steel and non-ferrous metals.
 - .2 Do not paint surfaces embedded in concrete.
 - .3 Do not paint surfaces in friction connections.
 - .2 Clean but do not paint surfaces being welded in field.
 - .3 Clean steel to SSPC SP3 (SP6) and remove loose mill scale, weld flux and splatter.
 - .4 After installation make good primed coat.
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2.5 **GALVANIZING**

- .1 Unless otherwise specified galvanize exterior ferrous metals including members exposed to exterior elements when in final location; members embedded on the exterior side of exterior walls; members built into roof construction; members imbedded in concrete; members specified in this Section or noted on Drawings

3 Execution

3.1 **EXAMINATION**

- .1 Examine substrate surfaces to receive the work of this Section and ensure that work done as part of the work of other Sections is complete and that there are no conditions which will adversely affect the performance of this work.
- .2 Verify the accuracy and alignment of structural framing to which work of this Section is connected.
- .3 Do not proceed with work until unsatisfactory conditions have been corrected. Commencement of work implies acceptance of surfaces and conditions.

3.2 **ERECTION**

- .1 Fit joints and intersecting members accurately. Make work in true planes with adequate fastenings. Build and erect work plumb, true, square, straight, level and accurate to sizes detailed, free from distortion or defects detrimental to appearance or performance.
- .2 Weld as specified herein.
- .3 Take adequate care to prevent damage to any material such as weld burns, etc.
- .4 Include all cutting and patching of masonry walls where necessary. Obtain Contractor's approval of cut-outs in advance.
- .5 Insulate where necessary to prevent electrolysis due to dissimilar metal to metal contact, or metal to masonry and concrete. Use bituminous paint, butyl tape, building paper or other approved means.
- .6 Install materials in a good and workmanlike manner, cleaning and grinding all welding laitance and touching up primer where necessary.

3.3 **CONNECTIONS**

- .1 Weld or high strength bolt main member connections. Use CISC double angle header connections wherever possible. High strength bolted connections shall be bearing type using 19mm dia. bolts conforming to ASTM A325M. Secondary members may be bolted with machine bolts.
- .2 Perform high tensile bolted connections in accordance with CSA-S16.1. Accurately space holes of size larger than the nominal diameter of the bolt. Install bearing type high tensile bolted connections unless shown otherwise on Drawings. Provide compressor or electrical equipment capable of supplying and maintaining required pressure at the wrench. Make connections without the use of erection bolts, some high tensile bolts will serve that purpose. Prevent nuts on bolts, except high tensile bolts, from becoming loose by burring bolt thread, by welding or by lock washers or lock nuts.
- .3 Execute welding as specified under shop welding in Part 2 and as follows:
 - .1 Provide continuous welds on exterior work to provide proper weathering.
 - .2 Take necessary safety precautions in accordance with CSA Standards when welding is carried out in cold weather.

3.4 **FIELD TOUCH-UP**

- .1 Paint bolt heads, washers, nuts, field welds and previously un-primed items. Touch up shop primer damaged during transit and installation with material to match shop primer or galvanize coating.
- .2 Clean off dirt on installed miscellaneous metal surfaces.

3.5 **SCHEDULE OF METAL FABRICATION ITEMS**

.1 General

- .1 Provide metal fabrication items specified herein and items not indicated to be supplied under other Sections.
- .2 Refer to drawings for details of metal fabrication work and related items not specifically listed in this Section.
- .3 Where work is required to be built into work of other Sections supply such members to respective Sections.
- .4 Provide anchor bolts and expansion bolts or other means of anchorage required for building into floors, walls and ceilings, where it is necessary to secure metal and wood to concrete, masonry or steel work. Supply anchor bolts, nuts and similar hardware to the respective Sections for fastening.

.2 Steel Sections

- .1 Supply and install steel sections which are:
 - .1 Not shown on structural drawings.
 - .2 Shown in outline, but not identified on structural drawings.
 - .3 Not noted on drawings to be supplied by another section.
 - .4 Not specified to be supplied under another section.
- .2 Cutting of these steel sections in the field shall be done under this section and as directed. The cost of field cutting shall be borne by the trades requiring such cutting.
- .3 Where sections are required to be built into masonry or concrete, supply such members to respective trades.

.3 Brackets, Miscellaneous Steel

- .1 Supply and install steel brackets, angles, sections and items indicated, detailed or required for completion of the project, and which are not to be supplied under another Section. Sizes, shapes and spacing as indicated.

.4 Anchors, Bolts and other Anchorages

- .1 Provide all anchors, bolts and expansion bolts or other means of anchorage required where it is necessary to secure metal to building structure, other than anchorages specified under other sections. Supply anchor bolts, nuts and similar hardware to the respective sections for fastenings.

3.6 **RECONSTRUCTION, ALTERATIONS AND MAKING GOOD**

- .1 Do all re-construction, alterations, fitting, patching and making good of the existing building and to join new work to existing.

End of Section

-
- 1 General
 - 1.1 **QUALITY ASSURANCE**
 - .1 Lumber identification: By grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
 - .2 Plywood identification: By grade mark in accordance with applicable CSA standards.
 - .3 Align and plumb faces of furring and blocking to tolerance of 1:600.
 - 2 Products
 - 2.1 **MATERIAL**
 - .1 Lumber: Acceptable to authorities having jurisdiction and unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with CSA O141 and NLGA Standard Grading Rules for Canadian Lumber, latest edition.
 - .2 Furring, blocking, nailing strips, grounds, rough bucks, curbs, fascia backing and sleepers: S2S, Standard or better grade.
 - .3 Douglas fir plywood: CSA O121, standard construction.
 - .4 Canadian softwood plywood: CSA O151, standard construction.
 - .5 Nails, spikes and staples: CSA B111.
 - .6 Bolts: 12.7 mm (1/2") diameter unless indicated otherwise, complete with nuts and washers.
 - .7 Galvanizing: CAN/CSA G164, use galvanized fasteners for exterior work, interior highly humid areas, pressure-preservative and fire-retardant treated work
 - .8 Pressure treated wood preservative: Chromated-copper-arsenate (CCA), Wolman CCA Type C, by Arch Wood Protection Inc., CCA treated wood by Timber Specialties, CCA treated wood by Osmose Inc., or other acceptable equivalents. For painted surfaces use clear type and for concealed surfaces use green tinted type. Provide compatible surface applied preservative for cut ends.
 - 3 Execution
 - 3.1 **INSTALLATION - GENERAL**
 - .1 Install members true to line, levels and elevations.
 - .2 Construct continuous members from pieces of longest practical length.
 - .3 Install spanning members with "crown-edge" up.
 - .4 Install materials so that grade-marks and other defacing marks are not visible or are removed by sanding.
 - 3.2 **FURRING AND BLOCKING**
 - .1 Install furring and blocking as required to space-out and support finishes, facings, fascia, soffit, siding and other work as required.
 - 3.3 **NAILING STRIPS, GROUNDS AND ROUGH BUCKS**
 - .1 Install rough bucks, nailers and linings as required to provide backing for frames and other work.
 - 3.4 **CURBS, FASCIA BACKING**
 - .1 Install wood fascia backing, nailers, curbs and other wood supports as required and secure using galvanized fasteners.
-

3.5 **FASTENERS**

- .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .2 Countersink bolts where necessary to provide clearance for other work.

3.6 **PRESSURE TREATED WOOD**

- .1 Use pressure treated wood as follows:
 - .1 Wood cants, fascia backing, curbs, nailers on roof deck.
 - .2 Wood furring on outside surface of exterior masonry and concrete walls.
- .2 Treat wood cut ends in contact with masonry or concrete with wood preservative before setting in place. Apply preservative in accordance with the manufacturer's written instructions.
- .3 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.

End of Section

1 General

1.1 **SUMMARY**

.1 Section Includes:

- .1 Labour, Products, equipment and services necessary to complete the work of this Section.

1.2 **RELATED SECTIONS**

- .1 Section 07 55 53 - Elastomeric Protected Membrane Roofing.
.2 Section 07 62 00 - Metal Flashings and Trim.

1.3 **STANDARDS**

- .1 ASTM A653/A653M-13 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
.2 ASTM D903-98(2010) Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
.3 ASTM D1970/D1970M-13a Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials used as Steep Roofing Underlayment
.4 CAN/ULC S704-11 Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
.5 Canadian Roofing Contractors Association Specification Manual, current edition.
.6 SMACNA Architectural Series, current edition.

1.4 **PROTECTION**

- .1 Protect the work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned, shall be replaced at no cost to the Owner.

1.5 **DELIVERY AND STORAGE**

- .1 Deliver and store materials to manufacturer's instructions and CSSBI guidelines.
.2 Do not store material on roof.
.3 Store materials under cover on elevated platforms, protected from weather and construction activities.
.4 Remove and replaced damaged material.

1.6 **WARRANTY**

- .1 Provide all applicable warranties offered by the material manufacturers.
.2 Defective sheet metal installation covered under the warranty shall include but not be limited to, loss of securement, corrosion, fading of finish, change of colour and staining of adjoining or adjacent materials or surfaces.
.3 Carry out all replacement and repair work during the warranty period as directed by the Consultant and at no additional cost to the CFIA.
.4 Inspect the sheet metal installation 60 days before expiry of warranty and correct defects within 15 days of inspection. This inspection shall be performed at no additional cost to the CFIA.
.5 Provide 20 year leak-free warranty from manufacturer.
-

2 Products

2.1 **MATERIALS**

- .1 Prefinished sheet metal: Galvanized steel, 0.71 mm (24 gauge) core nominal thickness, Z275 zinc coating to ASTM A653/A653M, prefinished in 10,000 series (Kynar 500) or an approved equivalent. Standard colour as listed in 10,000 series colour chart to Departmental Representative's approval.
 - .2 Metal Roof Profile: Heritage series by Ideal Roofing, or approved equal. Metal panels to be supplied with no stiffener bars between battens. Panel width: minimum 500 mm (20").
 - .3 Roof Sheathing: Supply gypsum glass mat reinforced silicone treated board conforming to ASTM C1177/C1177M, non combustible according to ASTM E136/CAN/ULC-S114 thermal barrier as tested to UL 1256/CAN/ULC-S126, flame spread 0, smoke developed 0 to ASTM E84/CAN/ULC-S102 and ASTM D3273 with a rating of 10, no mould growth after 4 weeks exposure, 6 mm (1/4") or for fire rating requirement 16 mm (5/8") thick gypsum board 1200 mm (4') wide, maximum practical length, tapered edge as required.
 - .4 Galvanizing, steel shapes: hot dip galvanized to ASTM A123/A123M.
 - .5 Galvanizing, sheet steel: commercial quality to ASTM A653/A653M, Grade A, with zinc coating designation Z275, minimized spangle, in accordance with CSSBI Technical Bulletin No. 6. Galvanized sheets temper rolled and un-passivated zinc coating where required to receive paint or other applied finish
 - .6 Starter strips: Galvanized steel, 0.87 mm (22 gauge) core nominal thickness, Z275 zinc coating to ASTM A653/A653M. Starter strips to be continuous.
 - .7 Banding strip: hot dipped galvanized sheet steel, 3 mm (1/8" core nominal thickness, Z275 coating designation to ASTM A653/A653M, 25 mm (1") wide.
 - .8 Nails: CSA B111, hot dipped galvanized steel flat head roofing nails of length and thickness to suit application.
 - .9 Fasteners for steel substrates: Flat head, self-tapping steel screw, galvanized, by Fastening House, or approved equivalent. Length: to suit material thickness.
 - .10 Fasteners for masonry and concrete: Tapcon fasteners with Climaseal corrosion resistant finish, or an approved equivalent, of sufficient length to provide a minimum 38 mm (1-1/2") penetration into substrate.
 - .11 Split storm collar: 1.6 mm (1/16") thick two piece aluminum storm collar complete with neoprene gasket, stainless steel nuts and bolts by flashing accessory manufacturer. Diameter to suit application.
 - .12 Touch-up paint: as recommended by the prefinished sheet metal manufacturer.
 - .13 Membrane underlayment: Composite peel and stick membrane comprised of rubberized or modified asphalt and polyethylene, to ASTM D1970/D1970M. Complete with compatible primer.
 - .14 Insulation: Polyisocyanurate Board Insulation: to CAN/ULC-S704, Type II, Class 1, Grade 2, HCFC-free, with glass-fiber mat facer on both major surfaces, 38 mm (1-1/2") thick, minimum LTTR R11.
 - .15 Insulation Adhesive: Low Rise Foam Adhesive: 2 component, solvent-free, elastomeric urethane adhesive; Peel Adhesion: min. 16 lbsf./in. to ASTM D903.
 - .16 Snow Guards: two-pipe snow guards, prefabricated, noncorrosive units designed to be installed without penetrating metal roof panels, and complete with predrilled holes, clamps, or hooks for anchoring.
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2.2 **FABRICATION - GENERAL**

- .1 Fabricate cap flashings, counter flashings, closures, starter strips, and other miscellaneous sheet metal work with prefinished sheet metal in general accordance with applicable CRCA FL series specifications and SMACNA Architectural Series and as indicated.
- .2 Use competent mechanics and work accurately to details indicated.
- .3 Fabricate cap flashings, starter strips, and base counter flashings less than 300 mm (12") in height in 2400 mm (8') maximum lengths. Form counter flashings between 300 mm and 600 mm (12" and 24") in height in 1200 mm (4') maximum lengths.
- .4 Provide a counter flashing and an intermediate vertical flashing where the cap flashing is greater than 600 mm (24") above the top of the roofing membrane. Form vertical flashings in 1200 mm (4') maximum lengths.
- .5 Provide an S-Lock joint at all end joints and at all horizontal joints between the cap flashing and the vertical flashing and between the vertical flashing and base counter flashing.
- .6 Mitre and form locking standing seams at all horizontal and canted corners. Make allowance for movement at joints.
- .7 Hem all exposed edges at least 12 mm (1/2") for appearance and stiffness.
- .8 Form sections square, true, and accurate to size, free from distortion, oil canning and other defects detrimental to appearance or performance.
- .9 Apply isolation coating to metal surfaces to be embedded in concrete or mortar joints.

3 Execution

3.1 **INSTALLATION**

- .1 Remove and discard existing metal roof, plywood, insulation and wood blocking.
 - .2 Cut new reglet joint into concrete parapets 50 mm above new roof panels. Reglet joint to be minimum 12 mm deep.
 - .3 Install cap flashings, counter flashings, starter strips, and other miscellaneous sheet metal work in general accordance with applicable CRCA FL series, SMACNA Architectural series and as detailed.
 - .4 Do not use exposed fasteners unless approved before installation or where shown on Drawings.
 - .5 Sheathing: Mechanically fasten sheathing to steel deck with screws spaced 400 mm oc each way. Provide minimum 12 screws each board. Place sheathing with long axis of each sheet transverse to ribs, with end joints staggered and fully supported on ribs. Butt boards together to moderate contact. Adjust spacing so screws are centred on ribs. Ensure sheathing is pulled tight with steel deck at each screw. Tape joints in gypsum board sheathing.
 - .6 Provide membrane underlayment beneath sheet metal flashings at all locations, except where membrane flashings are present.
 - .7 Provide continuous starter strips where indicated or required to present a true, non-waving, leading edge. Fasten starter strips to substrate at a minimum of 300 mm (12") on centre.
-

- .8 Provide continuous banding strips along top of membrane flashings where indicated on Drawings and at locations and where membrane flashings terminate at the base of a wall and no other means of mechanical securement is specified or indicated. Fasten banding strips to substrate at a minimum of 150 mm (6") on centre.
- .9 End joints where adjacent lengths of metal flashing meet shall be made using an S-lock joint. Insert the end of one length in a 25 mm (1") deep S lock formed in the end of the adjacent length. Extend concealed portion of the S lock 25 mm (1") outwards and nail to substrate. Face nailing of joints will not be permitted.
- .10 Insert top edge of sheet metal flashing under cap flashings to form weather tight junctions. Turn top edge of flashings into recessed reglets or mortar joints a minimum of 25 mm (1"). Fasten sheet metal flashing into reglet joint at a minimum spacing of 450 mm (18").

3.2 **MEMBRANE UNDERLAYMENT**

- .1 Ensure all surface areas are free from frost, dust, grease, oil, loose or spalled material.
- .2 Apply primer as per Manufacturer's printed instructions and allow to dry.
- .3 Install membrane underlayment over entire concrete deck. Install membrane on same day as priming.
- .4 Proceed only when weather is favourable. Should installation be undertaken at temperature below 4°C, consult manufacturer regarding special procedures.
- .5 Maintain the recommended minimum sidelap and endlap in accordance with the manufacturer's printed instructions.
- .6 Roll the membrane underlayment immediately after placement to ensure continuous adhesion. The roller to be of the type and size recommended by the manufacturer.
- .7 Ensure the continuity of the membrane underlayment is maintained at all penetrations and terminations. Apply membrane sealant as required to fill inaccessible gaps following the manufacturer's instructions.
- .8 Extend self-adhering membrane to underside of new reglet on adjacent concrete parapets.
- .9 Do not cover the membrane underlayment until it is reviewed and approved by the Consultant.

3.3 **INSULATION**

- .1 Install polyisocyanurate insulation between metal furring, as indicated on drawings, adhered to self-adhering membrane with foam insulation adhesive.

3.4 **SHEET METAL ROOFING**

- .1 Install metal roof with concealed fasteners, fastend to wood straps, following written instructions of metal roof manufacturer.
- .2 Install all trims, closures, caps as required to provide complete roof installation.
- .3 Install metal roof to provide battens evenly spaced and to provide even panel widths on outside panels of each space between concrete parapets.
- .4 Install metal into reglet joints and caulk.

3.5 **SNOW GUARDS**

- .1 Install snow guards to manufacturer's recommendations for location of system. Comply with manufacturer's written installation instructions for installation and layout
-

3.6

CLEANING

- .1 Daily as the work proceeds and on completion, remove all surplus materials and debris resulting from the foregoing work.
- .2 Remove all stains, caulking or other adhesive from all affected surfaces.

End of Section

- 1 General
- 1.1 **SUMMARY**
 - .1 Section Includes:
 - .1 Labour, Products, equipment and services necessary to complete the work of this Section.
- 1.2 **SYSTEM DESCRIPTION**
 - .1 Provide 2 ply SBS modified bituminous sheet roofing work, including but not limited to following:
 - .1 Concrete deck.
 - .2 Tapered Roof insulation.
 - .3 Base sheet membrane.
 - .4 Cap sheet membrane.
 - .5 Base and cap sheet flashings.
- 1.3 **SUBMITTALS**
 - .1 Shop Drawings: Reviewed and signed by manufacturer's technical representative, showing method of installation and layout of each layer.
 - .2 Maintenance Data: Provide necessary maintenance data and repair instructions, recommendations for periodic inspections, care and maintenance.
- 1.4 **QUALITY ASSURANCE**
 - .1 Perform work using skilled and experienced roofing mechanics fully conversant with standards, methods and techniques required for installation of roofing system specified herein. Ensure roofing is qualified and approved by membrane manufacturer.
 - .2 Conform to Canadian Roof Contractor's Association (CRCA) Specification Manual as amended to date of this Specification, as applicable, except where indicated or specified otherwise.
 - .3 Pre-installation meeting: Two weeks prior to commencing work of this Section, arrange for manufacturer's technical representative to visit the site and review preparatory and installation procedures to be followed, conditions under which the work will be done, and inspect the surfaces to receive the work of this Section. Advise the Departmental Representative of the date and time of the meeting.
 - .4 Manufacturer's site inspection: Have the manufacturer's technical representative inspect the Work at suitable intervals during application and at conclusion of the work of this Section, to ensure the Work is correctly installed. When requested, submit manufacturer's inspection reports and verification that the work of this Section is correctly installed.
- 1.5 **DELIVERY, STORAGE AND HANDLING**
 - .1 Deliver and store materials in dry location, in original containers with manufacturer's wrappers and seals intact.
 - .2 Keep membrane materials dry, stored in rolls standing on end, selvage edge up, elevated from contact with moisture, at temperatures not less than 5 deg C or more than 49 deg C. Handle rolls with care to avoid crushing, puncturing or other damage. Ensure selvage edge is not damaged during handling and banding strips are removed before application of membrane. Do not use wet or damp membrane.

- .3 Do not expose insulation and sheathing to wet weather. Store and handle insulation to prevent broken edges and corners, punctures, indentations or other damage. Remove damaged insulation from Site.
 - .4 Protect sheet metal materials from bending and scratching.
 - .5 Store adhesive, sealants and primers between 15 deg C and 26 deg C, or restore to temperature ranges before use.
 - .6 Store combustible materials away from heat and open flames.
- 1.6 **EXTENDED WARRANTY**
- .1 Submit in duplicate copies, two warranty provisions which shall run concurrently commencing from the Date of Substantial Performance:
 - .2 Provide membrane manufacturer's warranty naming Owner as beneficiary and covering defects and deficiencies and weathertightness of complete membrane and flashings for 10 years from date Work is certified as substantially performed.
 - .3 Warranty shall cover materials and include repair or replacement at manufacturer's expense, to extent required, of work of this Section in event of leaks or other failure if such failure results from defects and deficiencies of membrane and flashings.
- 1.7 **PRE-INSTALLATION CONFERENCE**
- .1 Convene pre-installation meeting: two weeks prior to beginning work of this Section and on-site installations.
 - .1 Verify project requirements.
 - .2 Review installation conditions.
 - .3 Co-ordinate with other building sub-trades.
 - .4 Review manufacturer's instructions and warranty requirements.
- 2 Products
- 2.1 **MATERIALS**
- .1 General: Ensure materials are compatible and satisfactory to membrane manufacturer.
 - .2 Asphalt primer: ASTM D41 or as approved by manufacturer.
 - .3 Insulation adhesive: one part, moisture-cure polyurethane, to FM 1-60 and as recommended by insulation's manufacturer
 - .4 Tapered insulation: CAN/CSA-A247-M, asphalt coated fibreboard, taper cut to provide slopes indicated, on computer controlled machine and sequence packed with detailed installation instruction. Thickness shall be minimum 12 mm with 1% slope.
 - .5 Fiber Cant: Laminated wood fibreboard insulation, asphalt impregnated.
 - .6 Roofing and Flashing base sheet membrane: CGSB 37-GP-56M, Type 2, Class C, Grade 1, minimum 2.0 mm thick, 180 g/sq.m. polyester reinforcement, SBS modified asphalt coating with lightly sanded top and bottom face, applied by mopping or adhesive only
 - .7 Roofing and flashing cap sheet membrane: CGSB 37-GP-56M, Type 1, Class A, Grade 2, minimum 3.0 mm thick, 180 g/sq.m. polyester reinforcement SBS modified asphalt coating, with coloured ceramic or mineral granules top face and lightly sanded bottom face, applied by torching or adhesive only.
 - .8 Membrane and flashing adhesive: one part, as recommended by membrane manufacturer to qualify for specified warranty.

- .9 Sheet metal, Cleats and starter strips and fasteners: to Section 07 62 00.
- 3 Execution
- 3.1 **INSPECTION**
 - .1 Report any defects or irregularities in roof deck detrimental to roof application. Do not proceed until corrected.
 - .2 Ensure deck substrate scheduled to receive roof system is smooth, dry, clean and free of sharp projections.
- 3.2 **PREPARATION & DEMOLITION**
 - .1 Remove and discard existing roofing and metal flashing. Existing roofing and roof deck consist of:
 - .1 Modified bituminous membrane (2 plies).
 - .2 Concrete deck.
 - .2 Sweep roof surfaces clean, remove debris, water, dew, frost, snow, ice and foreign materials (oil/grease) which could impair work.
 - .3 Do no roofing work during rain, fog, sleet or snow, or upon surfaces covered with dust, water, dew, ice, frost, snow and similar detrimental conditions.
- 3.3 **PROTECTION**
 - .1 Protect adjacent work, building and property, existing and completed portion of roof, from damage during roofing operations.
 - .2 Hang tarpaulins to protect walls where hoisting is necessary. Keep masonry and finished surfaces clean and free of bitumen
 - .3 At conclusion of each day's work, seal exposed edges of roof insulation. Remove when resuming work.
- 3.4 **COLD WEATHER APPLICATION**
 - .1 Remove moisture from substrate before application of membrane.
 - .2 Follow daily weather forecasts to determine commencement of work or to anticipate possible suspension.
 - .3 At temperatures below 10 deg C, store membrane material in warm and dry storage until ready to use. Bring out to work area only enough rolls for immediate use.
 - .4 Unroll membrane and allow roll to relax in sunlight for 30 to 45 minutes before application. Reroll from both ends and apply in both directions.
- 3.5 **INSTALLATION**
 - .1 **General:** Use only roofing equipment approved by manufacturer of roofing membrane system.
- 3.6 **INSTALLATION - PRIMER**
 - .1 Prime concrete deck with asphalt primer in manner approved by primer manufacturer, at minimum rate of 0.50 l/sq.m. (1 gal/300 sq ft.)
 - .2 Allow primer to cure. Do not allow ponding.
- 3.7 **ROUGH CARPENTRY**
 - .1 Install wood blocking per Drawing: Roof Access Penthouse. Install scupper to drain roof.

3.8 INSTALLATION - INSULATION

- .1 Cover entire area with tapered insulation. Lay in accordance with manufacturer of tapered insulation's shop drawings, with joints staggered from insulation joints. Lay each layer in insulation adhesive applied at 0.6 l./m² (1.5 gal/100 sq.ft.).
- .2 Lay only as much roof insulation and overlayment that can be covered on same day with roofing membrane. At conclusion of day's work, seal exposed edges. Upon resumption of work, cut and remove sealed edges, square, neat and straight.
- .3 Keep insulation, tapered insulation and insulation overlay dry at all times.

3.9 INSTALLATION - CANTS

- .1 Apply hot bitumen to receiving surface and embed cant firmly by hand.
- .2 Angle cut cants to fit tightly on back and bottom where roof to wall angle varies from 90°.

3.10 BASE SHEET MEMBRANE

- .1 Ensure membrane substrate is rigid, dry, smooth, compatible, free of fins and sharp edges, and clean of debris and foreign matter and no moisture is present on substrate at time of application of membrane.
- .2 Start roofing application at lowest point of roof (edge or drain) to ensure water flows over laps of membrane. Proceed up slope at right angles to direction of flow.
- .3 Position and unroll membrane to achieve correct overlap and alignment with roof line. Re-roll 1 end minimum 3000 mm (10') and adhere to substrate. Complete application of remainder of sheet.
- .4 Unroll membrane base sheet into membrane adhesive applied at rate of 1.2 kg/sq.m. Press base sheet into adhesive. Lay base sheet with 75 mm side laps and 150 mm end laps.
- .5 Flow out bead shall be present at all locations along lap edges. Avoid excessive asphalt seepage. Maximum seepage allowed 6 mm.

3.11 BASE SHEET FLASHINGS

- .1 Apply base sheet flashing embedded in flashing adhesive applied at rate of 1.2 kg/sq.m. Press base sheet into adhesive.
- .2 Pre-cut flashing in strips 1 m wide to correct length to extend minimum 100 mm onto field of roof, up vertical surface and over any fascia minimum 50 mm. Side laps shall be 75 mm and staggered minimum of 100 mm with laps of base sheet. Dry fit pieces to proper size.
- .3 Provide base flashing reinforcements at stress points of roof, at inside and outside corners, and scupper. Install as detailed on Drawings or follow membrane manufacturer's recommendations.
- .4 Scupper: Install base roof membrane at scupper to 50 mm beyond outside edge onto vertical wall. Install metal spillout with 75 mm flange, extending 75 mm beyond outside wall. Fasten flange to concrete deck. Flash flange with one ply base flashing membrane and one ply cap flashing membrane.

3.12 CAP SHEET MEMBRANE

- .1 Do not apply cap sheet until base sheet and flashing have been applied and show no sign of defects.

- .2 Plan cap sheet application so side and end laps are offset from those of base sheet minimum 300 mm for side and 450 mm for end laps. Mark chalk line, centred on base sheets, where first course is to start. Unroll 2 m - 3 m of membrane and line it up to chalk lines or to selvage edge. If roll goes out of line by more than 13 mm, cut and re-align. Re-roll from both ends and apply in both directions.
- .3 Lay cap sheet with 75 mm side laps to cover selvage edge and 150 mm end laps.
- .4 Apply one ply of cap sheet granule side up. Position and unroll cap sheet to achieve correct overlap and alignment. Re-roll one end minimum 3000 mm (10') and adhere to substrate. Complete application of remainder of sheet. Install cap sheet in same direction as base sheet.
- .5 Apply flashing adhesive applied at rate of 1.2 kg/sq.m leaving 50 mm dry within side laps and end laps. Adhere final portion of lap with hot air welding technique.
- .6 Bevel "T" joints at end or head laps and repair fishmouths using torch heated trowel.

3.13 **CAP SHEET FLASHINGS**

- .1 Pre-cut flashing in strips 1 m wide to correct length to extend minimum 150 mm onto field of roof, up vertical surface and over any fascia minimum 50 mm. Side laps shall be 75 mm and staggered minimum of 100 mm with laps of base sheet. Dry fit pieces to proper size.
- .2 Using chalk line, lay out straight line on cap sheet surface, parallel to roof edge, 150 mm inside roof from parapet wall.
- .3 Adhere cap sheet flashings in flashing adhesive applied at rate of 1.2 kg/sq.m, leaving 50 mm dry within side laps and end laps. Adhere final portion of lap with hot air welding technique.

3.14 **FIELD QUALITY CONTROL**

- .1 Inspection: Owner may engage independent inspection company to inspect work of this Section. Give at least 2 weeks notice of starting work and allow inspector free access. Inspection may include thermographic survey of completed roof.

End of Section

-
- 1 General
- 1.1 **GENERAL**
- .1 Conform to Sections of Division 1 as applicable
- .2 Remove and discard existing roofing. Install new inverted single-ply roof system.
- 1.2 **RELATED SECTIONS**
- .1 Section 07 41 13 - Sheet Metal Roofing.
- .2 Section 07 62 00 - Metal Flashing & Trim.
- .3 Prefabricated curbs for mechanical equipment on roof and counter flashings for ducts passing through roof: Division 21, Mechanical
- 1.3 **REFERENCE STANDARDS**
- .1 Do roofing in accordance with applicable standards in Canadian Roofing Contractors Association (C.R.C.A.) Roofing Specification Manual, except where specified otherwise.
- .2 ASTM C165-07(2012) Standard Test Method for Measuring Compressive Properties of Thermal Insulations.
- .3 ASTM C209-12 Standard Test Methods for Cellulosic Fiber Insulating Board.
- .4 ASTM C920-14: Standard Specification for Elastomeric Joint Sealant.
- .5 ASTM D41/D41M-11: Asphalt Primer Used in Roofing, Dampproofing and Waterproofing.
- .6 ASTM D146/D146M-04(2012)e1: Standard Test Method for Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing.
- .7 ASTM D412-06a(2013): Standard Test Method for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .8 ASTM D816-06(2011): Standard Test Method for Rubber Cements.
- .9 ASTM D1876-08: Standard Test Method for Peel Resistance of Adhesives (T-Peel Test).
- .10 ASTM D4586/D4586M-07(2012)e1: Standard for Asphalt Roofing Cement, Asbestos-Free.
- .11 ASTM D5034-09(2013): Standard Test Method for Breaking Strength and Elongation of Textile Fabric (Grab Test).
- .12 CAN/CGSB 37GP-52M: Roofing and Waterproofing Membrane, Sheet Applied, Elastomeric.
- .13 CAN/CGSB 51.34-M86 Amend. Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .14 CAN/ULC S701-11: Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .15 CSA B111-1974 (R2003): Wire Nails, Spikes and Staples.
- 1.4 **SHOP DRAWINGS**
- .1 Submit shop drawings of all flashing conditions for Architect's review and approval.
- .2 Submit shop drawings of tapered insulation.
- .3 Indicate all flashing conditions.
-

1.5 INSPECTION

- .1 Roof inspection shall be carried out by an agency selected by the Departmental Representative to be borne by the CFIA.
- .2 Carry out procedures as directed by roofing inspector.

1.6 QUALITY ASSURANCE

- .1 Perform work using skilled and experienced roofing mechanics fully conversant with standards, methods and techniques required for installation of roofing system specified herein. Ensure roofing is qualified and approved by membrane manufacturer.
- .2 Conform to Canadian Roof Contractor's Association (CRCA) Specification Manual as amended to date of this Specification, as applicable, except where indicated or specified otherwise.
- .3 Pre-installation meeting: Two weeks prior to commencing work of this Section, arrange for manufacturer's technical representative to visit the site and review preparatory and installation procedures to be followed, conditions under which the work will be done, review manufacturer's instructions, warranty requirements and inspect the surfaces to receive the work of this Section. Advise the Departmental Representative of the date and time of the meeting.
- .4 Manufacturer's site inspection: Have the manufacturer's technical representative inspect the Work at suitable intervals during application and at conclusion of the work of this Section, to ensure the Work is correctly installed. Submit manufacturer's inspection reports and verification that the work of this Section is correctly installed.

1.7 WARRANTY

- .1 Contractor hereby warrants that membrane roof system including membrane, insulation, scrim, ballast and flashings will stay in place and leak-free for two (2) years.
- .2 For areas of complete replacement, primary material supplier to provide a 15 year non pro-rated, leak-free warranty on all components above the structural deck, including insulation and vapour retarder. Arrange for primary material supplier to conduct periodic visual inspections of roof surface in year two (2), year five (5) and year ten (10) of this warranty. Primary material supplier shall provide rooftop visual inspections, preventive maintenance and limited housekeeping services. Primary material supplier to provide roof inspection reports based upon regular inspections to CFIA corresponding to Maintenance requirements.
- .3 The total roofing installation shall meet or exceed the manufacturer's recommended specifications.

1.8 DELIVERY, STORAGE AND HANDLING OF MATERIAL

- .1 Deliver materials to job site in new, dry, unopened and clearly marked containers indicating product and manufacturer names.
 - .2 Store membrane material and containers off ground or deck and protect all materials at end of each working day with tarpaulins. If insulation is stored outdoors, it shall be stacked on pallets and covered by tarpaulins or other similar waterproof coverings.
 - .3 Store all roll materials on end to prevent their becoming deformed or damaged.
 - .4 Secure stored materials against damage from wind, ongoing work, vandalism and theft.
 - .5 Handle and apply all materials in accordance with the manufacturer's recommendations. Identify and remove from site immediately all damaged materials.
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- .6 Store sufficient adhesives in heated space to ensure materials used on roof exhibit workable consistency and adhesion to substrates. Contractor to provide portable heated storage in a location acceptable to the Departmental Representative.

1.9 **ENVIRONMENTAL CONDITIONS**

- .1 Do not install roofing during weather that might adversely affect the performance of the system. Days with wind-chill temperatures above -10 deg C. will be considered suitable for roofing activities. Contractor to provide portable heated storage as described in paragraph above to maintain adhesives at a temperature to allow roofing project to proceed.
- .2 Do not install roofing over surfaces that are wet, icy, dirty or otherwise unsuitable to the system being installed.
- .3 Secure the work in a safe and watertight fashion before the onset of inclement weather and at the end of each day's work.
- .4 Do not apply roofing with substrate temperature is below -5 deg C.

2 Products

2.1 **MATERIALS**

- .1 Extruded polystyrene insulation – to CAN/ULC S701 (type 4), one layer, thickness: 75 mm (3 inches)/ layer, total thickness: 75 mm, straight edges.
- .2 Tapered Insulation: Factory-tapered insulation boards fabricated to slope as shown on drawings, installation as shown on drawings; high-density fibreboard; to ASTM C165 and ASTM C209.
- .3 Fiber Cant: Laminated wood fibreboard insulation, asphalt impregnated.
- .4 Polyethylene Sheet: 6 mil, clear, to CAN/CGSB 51.34-M86 Amend.
- .5 Filter Fabric – Polyolefin woven fabric, colour: black; to ASTM D5034.
- .6 Caulking - One part polyurethane, to ASTM C920.
- .7 Asphalt Mastic - to ASTM D4586.
- .8 Projection Sleeve - Spun Aluminum with adjustable rubber boot.
- .9 Asphalt Primer - to ASTM D41.
- .10 Reinforcing Mesh - Woven glass fibres, to ASTM D146 Grab Tensile.
- .11 Sealing Tape – Butyl; size: 3 mm x 19 mm.
- .12 Flashing Sheet Adhesive - EPDM/SBR compatible, to ASTM D816 Lap Shear exceed 4.77 kg/cm²; to ASTM D1876 Adhesion in Peel exceed 1.25 kg/cm.
- .13 Membrane Adhesive (Membrane to substrate, membrane to membrane laps) & Tapered Insulation Adhesive - Single Component, moisture-curing polyurethane, bitumen compatible; Recovery from 350% elongation - 90% to ASTM D412; Low Temperature Elongation @ -29 deg C., 300% to ASTM D412.
- .14 Membrane Sheet and Flashing Sheet - polyester-reinforced EPDM/SBR membrane, to CGSB 37-GP-52M, Type II Membrane (Breaking strength after conditioning - Min 1,400 N; Low Temperature Flex - pass @ -40oC. to CGSB 37-GP-52M).
- .15 Polymer-Modified Mastic – Elongation @ 25 deg C, minimum 800%, to ASTM D412.
- .16 Nails - Ardox spiral, to CSA B111 sufficient length to penetrate wood deck by 25 mm (1”).
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- .17 Membrane and flashing adhesives, membrane sheet, flashing sheet, polymer-modified mastic, and sealing tape to be supplied by same manufacturer.
- .18 Quick-Set Mortar: Cementitious, two-component, non-sag, quick set mortar.
- .19 Pourable Sealer: Two-component, quick set, solvent-free, pourable urethane sealer

3 Execution

3.1 **DEMOLITION & PREPARATION**

- .1 Remove and discard existing roofing and metal flashing. Existing roofing and roof deck consist of:
 - .1 Stone ballast
 - .2 Filter fabric
 - .3 50 mm Extruded Polystyrene Insulation
 - .4 EPDM Single-Ply membrane
 - .5 2 plies #15 felt in asphalt
 - .6 Concrete deck
 - .2 Remove and discard existing metal counterflashing (including square-to-round metal skirts on four large stacks plus related rain collars), ballast, filter fabric, insulation and roof membrane.
 - .3 Remove bottom louvre from perimeter screens and store neatly for re-use.
 - .4 Provide temporary support to conduit lines. Protect conduit lines from staining.
 - .5 Remove and discard metal flanges on round stacks.
 - .6 Prime substrate as recommended by membrane manufacturer for optimum adhesion of materials.
 - .7 Prepare only as much roofing as can be maintained in watertight condition each day or before showers commence. Plan work and take whatever steps are necessary to prevent water from entering the building during roof replacement.
 - .8 Replace rotted and otherwise deteriorated wood nailers and wood decking at all roof details, including all perimeters, projections, sleepers, etc. Fasten new nailers to existing nailers with nails having annular or spiral shanks, long enough to penetrate existing nailers at least 31 mm (1 ¼"). Stagger nails at 300 mm (12") o.c. in two rows. Plywood to match thickness of existing, minimum 16 mm (5/8").
 - .9 Owner to be responsible for disconnect and reconnect of all mechanical equipment where required. Contractor shall lift units where required and re-install to original location for reconnection of services. Obtain permission from CFIA Project Manager before any equipment is shut-down. Take all reasonable steps to absolutely minimize downtime for any equipment.
 - .10 Remove obsolete conduit, curbs, sleepers and pitch boxes as shown on drawings.
 - .11 Add blocking to curbs to ensure minimum 200 mm (8") flashing above top of cant.
 - .12 Install 75 mm x 75 mm (3" x 3") fibre cants at membrane change in direction such as perimeters, curbs, sleepers.
-

3.2 TAPERED INSULATION

- .1 Install tapered insulation where shown on drawings, embedded in specified adhesive applied at 0.6 l./m².

3.3 INSTALLATION - CANTS

- .1 Apply asphalt mastic to receiving surface and embed cant firmly by hand.
- .2 Angle cut cants to fit tightly on back and bottom where roof to wall angle varies from 90°.

3.4 INVERTED ROOF SYSTEM

- .1 Install one ply of roof membrane laid in shingle fashion placed to ensure that water will flow over or parallel to, but not against exposed edges. Lay membrane to provide 100 mm (4") side laps and 150 mm (6") end laps. Membrane must be broomed to ensure full adhesion. Prior to installation of membrane inspect deck carefully to ensure smooth deck surface. Any projections to be brought to the attention of the Departmental Representative before installation of membrane.
- .2 Embed membrane in continuous spreads of membrane adhesive applied at 1.2 litres/m². Top dress membrane laps with 150 mm (6") reinforcing mesh and polymer-modified mastic. Apply 300 mm polyethylene strips over polymer-modified mastic.
- .3 Stagger all end laps minimum 900 mm (36").
- .4 Lay membrane smooth, free of wrinkles, air pockets, fishmouths and tears.
- .5 Take all reasonable precaution to minimize traffic and avoid point-loading on newly laid membrane.
- .6 Extend membrane 50 mm (2") beyond top edge of cant strips along walls, projections and outside edge.
- .7 Reinstall existing drains. Fit membrane into drain rims, butter flange with polymer-modified mastic and secure with clamping rings, and install domes and gravel guard. If internal plumbing connection required, plumbing to be done by the contractor. Co-ordinate with Departmental Representative.
- .8 At four large concrete sleepers, cut new reglet joint 150 mm above the existing metal flashing. Install sealing tape to walls to align with top 25 mm (1") of flashing sheet.
- .9 Install base flashing using reinforced flashing sheet. All flashing sheets in this specification to extend:
 - .1 at least 150 mm (6") from the bottom of the cant onto the membrane.
 - .2 at least 200 mm (8") above the top of the cant on vertical walls; fasten top 25 mm (1") with metal drive cleat (19 mm finished width, hemmed top and bottom) fastened 300 mm (12") o.c. with suitable fasteners through sealing tape.
 - .3 at least 50 mm (2") over outside edge of perimeter parapets fastened 300 mm (12") o.c. with common roofing nails.
- .10 Overlap flashing sheets by 100 mm (4"). Embed flashing sheet in continuous application of flashing sheet adhesive applied at 2 litres/m² (20 sq.ft./gal. over entire area of flashing sheet. Top dress end laps and leading edge with 150 mm (6") reinforcing mesh and trowel application of polymer-modified mastic.
- .11 Reflash plumbing vent stacks with spun aluminum/rubber-sleeved projection sleeves. Set flange in flashing sheet adhesive. Flash projection sleeve flange with flashing sheet in flashing sheet adhesive as described for perimeter flashing. Insulate with loose fill insulation. Tighten ring clamps.

- .12 Fabricate and install new metal flanges on round stacks and new scuppers on Penthouse Roofs per Section 07 62 00. Set flange in flashing sheet adhesive and fasten to deck. Flash flange with flashing sheet in flashing sheet adhesive as described for perimeter flashing.
- .13 Install new pitch boxes and conduit goose-necks where applicable. Set flange in flashing sheet adhesive. Flash flange with flashing sheet in flashing sheet adhesive as described for perimeter flashing. For pitch boxes: minimum height of metal box is 150 mm; fill with quick set mortar to within 50 mm of top and finish with pourable sealer, filled sufficiently to provide positive drainage. Install metal cap fitted tightly to projecting pipes and projections, sealed with caulking.
- .14 Install 6 mil polyethylene sheet over entire membrane.
- .15 Install 1 layer of 75 mm (3") extruded polystyrene insulation. Place insulation to provide drainage channels. Bevel edge of insulation to match contour of edge details.
- .16 Install woven polyolefin fabric over entire area.
- .17 Install 900 mm x 900 mm (36" x 36") pavers at roof access doors and ladders.
- .18 Install round, river stone ballast at rate of 48 kg./m² (1,000 lbs/100 sq.ft.).

3.5 TEMPORARY TIE-INS

- .1 Extend new membrane 150 mm (6") onto the existing roof membrane, embedded in cold-applied adhesive applied at 0.8 litres/m² (2 gals/100 sq.ft.) Remove temporary tie-ins by cutting evenly over the edge of the previously installed roof system.

3.6 LARGE CONCRETE SLEEPERS (FOUR)

- .1 Remove and discard obsolete equipment. Arrange for Owner to redirect any conduit extending from top surface of sleepers.
- .2 Install self-adhering membrane over top of sleepers extending 75 mm on each side.
- .3 Scrape clear all loose coating or debris from side walls of sleepers. Apply waterproof coating to exposed concrete surface, from self-adhering membrane to roof flashing.

3.7 FINISH

- .1 Clear from roof all debris and bitumen deposited by spills or machine tracking.
- .2 Re-installation louvres above perimeter flashing.
- .3 Clean mastic or adhesive from all ventilators, conduit or roof-top equipment. Paint any units not completely cleaned with 2 coats of asphalt-compatible aluminum paint.

End of Section

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- 1 General
- 1.1 **SCOPE OF WORK**
- .1 Work of this section comprises installation of metal counterflashing in areas of new and replacement roofing.
- 1.2 **RELATED WORK**
- .1 Section 07 41 13 - Sheet Metal Roofing.
- .2 Section 07 52 16 – SBS Modified Bitumen Roofing.
- .3 Section 07 55 53 - Elastomeric Protected Membrane Roofing.
- 1.3 **REFERENCES**
- .1 S.M.A.C.N.A. – Sheet Metal and Air Conditioning Contractors National Association, Architectural Sheet Metal Manual.
- 1.4 **SHOP DRAWINGS**
- .1 Submit shop drawings in accordance with Section 01 33 00.
- .2 Submit shop drawings of all flashing conditions for Departmental Representative's review and approval.
- 1.5 **INSPECTION**
- .1 Roof inspection shall be carried out by an agency selected by the Departmental Representative to be borne by the CFIA.
- .2 Carry out procedures as directed by the roof inspector.
- 1.6 **STORAGE AND HANDLING**
- .1 Secure stored materials against damage from wind, ongoing work, vandalism and theft.
- .2 Identify and remove from site immediately all damaged materials
- 1.7 **WARRANTY**
- .1 Submit a standard CRCA written warranty for the Work of this Section stating that the metal flashing Work is warranted against leakage or latent defects for 2 years from the date of Substantial Performance of the Work.
- .2 Warranty shall provide for removal of Products which fail to meet specified criteria, replacement with new Products conforming to specifications, and restoration of Work damaged by removal and replacement including labour and installation costs.
- 2 Products
- 2.1 **MATERIALS**
- .1 Prepainted Sheet Steel: 0.455 mm (26 ga.) minimum thickness, commercial quality to ASTM A653/A653M, with Z275 zinc coating designation, prepainted with Perspectra series paint system, in colour selected Departmental Representative from standard colour chart.
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- .2 Sheet Steel: 0.607 mm minimum thickness, commercial quality to ASTM A653/A653M, with Z275 zinc coating designation.
- .3 Galvanizing, steel shapes: hot dip galvanized to ASTM A123/A123M.
- .4 Starter Strips: Furnish a continuous run of starter strips of Z275 galvanized sheet metal, 0.91 mm thick, of height shown on Drawings, with metal flashing interlocked to the starter strip.
- .5 Sealant: Multi-component modified polyurethane sealant, CAN/CGSB-19.24, Type 2, Class B.
- .6 Fasteners: Conforming to CSA B111 of same material as sheet metal secured, of type, length and size suitable for the particular conditions. Where exposed fasteners are permitted, use colour matched nylon heads with cupped neoprene washers.
- .7 Touch-up paint: as recommended by the prefinished sheet metal manufacturer.

2.2 **SHEET METAL FABRICATION**

- .1 Fabricate flashings, closures, starter strips, and other miscellaneous sheet metal work with prefinished sheet metal in general accordance with applicable CRCA FL series specifications and as indicated.
- .2 Use competent mechanics and work accurately to details indicated.
- .3 Provide an S-Lock joint at all end joints and at all horizontal joints between the cap flashing and the vertical flashing and between the vertical flashing and base counter flashing.
- .4 Mitre and form standing seams at all corners. Make allowance for movement at joints.
- .5 Hem all exposed edges at least 13 mm for appearance and stiffness.
- .6 Form sections square, true, and accurate to size, free from distortion, oil canning and other defects detrimental to appearance or performance.

3 Execution

3.1 **INSTALLATION**

- .1 Install flashings, starter strips, and other miscellaneous sheet metal work in general accordance with applicable CRCA FL series and as detailed.
 - .2 Install new metal flashing on perimeters, walls, curbs, expansion joints, flashed sleepers and projections. Departmental Representative to select colour from standard colours, except as indicated in the Products section above
 - .3 Metal base flashing shall extend to top of insulation surface, extending 37 mm onto top surface of filter fabric. Exposed flashing sheet will not be accepted.
 - .4 Flashing shall be applied using a s-lock type joint which will prevent buckling of metal and provide proper contraction and expansion, and produce a surface free of warp, wave, buckle, dents and other defects. Corners shall square and surface straight and true to plains. All metal shall have hemmed edges.
 - .5 Install sheet metal with concealed fasteners. Exposed fasteners permitted only with Departmental Representative's approval. Metal to be installed firmly to avoid movement or stripping by wind. Fasten into vertical surfaces only. No fastening into canted surfaces will be accepted.
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- .6 Finish joints at horizontal mitred joints and canted corners with folded standing seams
- .7 Pipe and Boiler Clamps
 - .1 Fabricate clamps to ANSI/MSS SP-58 and manufacturers' recommendations. Sizes, dimensions to suit project conditions.
 - .2 Design clamps to support systems under all conditions of operation, allow free expansion and contraction, prevent excessive stresses from being introduced into pipework or equipment.
- .8 Stack Skirts and Collars
 - .1 Fabricate and install enclosures complete with steel support framing and concealed fastenings.
 - .2 Fabricate to sizes and dimensions to suit project conditions.
 - .3 Finish exposed parts with acrylic enamel, applied at the shop. Prime other parts of enclosure and framing
- .9 Apply sealant where required to form weathertight seal between flashing and adjoining surface and between flashing and other work of this Section. Sealant work consists of bedding between members where possible and with neatly formed sealant bead where exposed.

End of Section

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- 1 General
- 1.1 **QUALITY ASSURANCE**
- .1 Install work level to tolerance of 3 mm in 3000 mm (1/8" in 10'-0").
- .2 Select studs with maximum deflection of L/360 at lateral force of 240 Pa (5 psf) for maximum heights indicated.
- 1.2 **DELIVERY, STORAGE, AND HANDLING**
- .1 Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- .2 Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.
- 2 Products
- 2.1 **MATERIALS**
- .1 Exterior gypsum soffit board: Meets or exceeds requirements of ASTM C1177, gypsum sheathing, water-resistant treated core, noncombustible when tested in accordance with ASTM E136, maximum flame spread 5 and smoke developed 0 when tested in accordance with ASTM E84, 12.7 mm (1/2") thick.
- .2 Steel studs: ASTM C645, minimum 0.46 mm (0.018") base metal thickness, hot-dipped galvanized to ASTM A653/A653M G60 (Z180) zinc coating, roll formed, widths as indicated, with knock-out holes for mechanical and electrical services. Use 20 gauge studs for cement board and fiber reinforced panels.
- .3 Furring runners and channels: ASTM C645, minimum 0.46 mm (0.018") base metal thickness, hot-dipped galvanized to ASTM A653/A653M G60 (Z180) zinc coating, roll formed.
- .4 Channel bridging: 1.37 mm (0.0538") bare steel thickness, 38 mm (1-1/2") deep with minimum 12.7 mm (1/2") wide flange.
- .5 Hangers, tie wires, inserts, anchors: Manufacturer's standard.
- .6 Casing beads, corner beads: 0.48 mm (25 gauge) hot dipped galvanized steel, perforated flanges, designed to be concealed with joint compound; one piece length per location.
- .7 Joint and laminating compounds: As recommended by gypsum board and cement board manufacturer, high bond, low shrinkage and asbestos-free.
- .8 Joint tape: 50 mm (2") wide reinforced tape.
- .9 Soffit vent: continuous perforated PVC vent, 70 mm (2-3/4") wide nominal, colour as selected by Departmental Representative
- 3 Execution
- 3.1 **EXTERIOR GYPSUM BOARD CEILINGS (SOFFITS)**
- .1 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.
- .2 Provide additional ceiling suspension hangers within 150 mm (6") of each corner and at maximum 600 mm (24") around perimeter of light fixtures and diffusers.
- .3 Apply soffit boards horizontally with end joint occurring over supports. Allow 2 mm to 3 mm (1/8") space between butted ends. Fasten board at 300 mm (12") oc. Finish joints and fasteners as specified using compounds recommended by manufacturer of board.
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- .4 Cut board to fit within 6 mm (1/4") of fixtures and other vertical surfaces. Apply galvanized casing bead.
- .5 Provide control joints at 9000 mm (30') o.c. maximum.

3.2 **INSTALLATION - ACCESSORIES**

- .1 Erect casing beads, corner beads straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured by screw fasteners. Fit corners accurately, free from rough edges.
- .2 Provide corner beads at external corners of gypsum board partitions and where indicated.
- .3 Provide casing beads at gypsum board terminations, at gypsum board wall/ceiling junctions, where gypsum board butts against surfaces having no trim concealing junction and where indicated.
- .4 Construct control joints of two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint. Provide continuous polyethylene dust barrier behind and across control joints.
- .5 Install continuous perforated PVC vent as indicated.

3.3 **INSTALLATION - TAPING AND FILLING**

- .1 Fill joints, casing beads, corner beads, screwholes and depressions on gypsum board surfaces exposed to view to provide smooth seamless surfaces and square neat corners.
- .2 Apply joint compounds and reinforcing tapes in accordance with manufacturer's specifications.
- .3 Fill joints and apply joint compounds by three-coat method. Apply cover coat 175 mm (7") wide, level coat 250 mm (10") wide, and skim coat 300 mm (12") wide.
- .4 Embed reinforcing tape in a cover coat of joint compound. Apply level coat of joint compound when cover coat has dried. Apply skim coat of compound when level coat has dried.
- .5 Feather edges of compounds into surfaces of gypsum boards. After skim coat has dried for at least 24 hours sand to leave smooth for decoration. Do not sand paper face of gypsum board.
- .6 At internal corners: First fill gaps between boards with joint compound. Embed creased reinforcing tape into a thin coat of joint compound applied 50 mm (2") wide at each side of corner. Apply cover coat. Apply skim coat to one side of joint, and when dry apply skim coat to other side.
- .7 At external corners: Fill to nose of corner bead with joint compound and sand smooth.
- .8 At screwheads and nailheads: Fill holes and depressions with a three coat application of joint compound and sand smooth.

End of Section

1 General

1.1 **SUBMITTALS**

- .1 Samples: Submit 300 mm x 300 mm sample of each type of finish showing colour and texture.

1.2 **QUALITY ASSURANCE**

- .1 Installer: Trained and approved by the manufacturer and having a minimum three years experience in the installation of the work described in this Section and can show evidence of satisfactory completion of projects of similar size, scope and type.
- .2 Maintenance seminars: Provide recommendations on Product maintenance procedures.
- .3 Pre-installation meeting: Two weeks prior to commencing work of this Section, arrange for manufacturer's technical representative to visit the site and review preparatory and installation procedures to be followed, conditions under which the work will be done, and inspect the surfaces to receive the work of this Section. Advise the Departmental Representative of the date and time of the meeting.
- .4 Manufacturer's site inspection: Have the manufacturer's technical representative inspect the Work at suitable intervals during application and at conclusion of the work of this Section, to ensure the Work is correctly installed. When requested, submit manufacturer's inspection reports and verification that the work of this Section is correctly installed.
- .5 Mock-up: At Site, in area designated by Departmental Representative, erect sample showing each colour, texture, and finish approximately 1200 mm x 2400 mm in size. Do no work until sample has been approved. Approved sample shall become standard of comparison for work of this Section. Remove sample installation when directed unless sample can be satisfactorily incorporated into Work.

1.3 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials in original unopened packages and containers with labels intact.
- .2 Store materials in enclosed area protected from sunlight and elements and at temperatures recommended by manufacturer.
- .3 Where necessary provide protection from weather and other damage prior to, during and immediately after application. Care must be taken to prevent condensation and or heat built-up when using tarp or plastic to prevent damage to work of this Section.

1.4 **PROJECT CONDITIONS**

- .1 Ambient air and surface temperatures shall be minimum 4 degree C during time of installation and for at least 24 hours after installation. Provide supplementary heat for installation in temperatures less than 4 degree C. Protect installation from exposure to rain until cured.
- .2 Protect adjacent surfaces from spills, dropping and any other damage due to work of this Section.

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- 2 Products
- 2.1 **MATERIALS**
- .1 Stucco system: Lite Coat by Durabond Products Ltd., or acceptable equivalent by STO or Dryvit.
 - .2 Base coat: Acrylic base, non-combustible to CAN4-S114-M, Durex Uniplast/Stucco Binder by Durabond Products Ltd.
 - .3 Primer: 100% acrylic based, Durex Brush Coat by Durabond Products Ltd.
 - .4 Finish coat: Marble Coat 1.0 by Durabond Products Ltd., colour as selected by Departmental Representative.
 - .5 Sealant, primer, backer rod, and tape: In accordance with manufacturer's recommendations, non-staining and non-sag.
 - .6 Perimeter bead, control joints and stops: Minimum 0.65 mm thick zinc, shaped to provide closure against vertical surfaces, stop for stucco finish and flange for fastening.
 - .7 Plastic lath: to ASTM C 933, of type and weight to suit plaster system and support spacing.
- 2.2 **MIXES**
- .1 Mix products in accordance with manufacturer's recommendations.
 - .2 Do not alter products by adding antifreeze accelerators, rapid binders or any other additives except for small amount of clear water as directed on product label.
- 3 **EXECUTION**
- 3.1 **EXAMINATION AND PREPARATION**
- .1 Do not commence installation until surface is structurally sound, clean, and dry, substrate surface temperature is over 4 degree C residual moisture or damage from moisture and is even with no irregularities greater than 3 mm in 1200 mm.
- 3.2 **INSTALLATION – LATH**
- .1 Apply plastic lath taut. Locate end joints over framing members; stagger end joints on alternate courses; on vertical surfaces lap lower sheet over upper sheet.
- 3.3 **INSTALLATION - TRIMS**
- .1 Securely set trims flush with finish stucco surface.
 - .2 Provide corner bead on external angles where stucco occurs, including corners, door returns and similar changes of plane. Extend bead full length of such angles without joints except where length of run is greater than standard available lengths, provide neatly butted, mitre corners.
 - .3 Provide casing bead at junction of stucco and dissimilar materials and where stucco surfaces are terminated. Mitre corners.
 - .4 Control joints. Locate control joints to limit maximum panel size to 12 sq.m., with horizontal joints at 3 m centers and vertical joints at 6 m centers, and to pattern indicated.

3.4 **INSTALLATION - STUCCO**

- .1 Apply stucco system to a minimum thickness of 6 mm.
- .2 Apply 2 coats of base coat. Apply second coat after first coat has set thoroughly. Bring second coat flush with screeds, rod and darby to true surface, comb entire surface to ensure bond for finish coat.
- .3 Apply finish coat primer with brush or roller over clean dry base coat and allow to dry before applying finish coat. Prime joints to receive sealant.
- .4 After primer has dried, trowel apply finish coat to a true, even, dense, light textured surface to match reviewed sample.
 - .1 Avoid application in direct sunlight.
 - .2 Use tarps over scaffolding to protect from shadow texture lines.
 - .3 Apply finish in continuous application, always working to wet edge.
 - .4 Stop work at corners, joints or aesthetic reveals.
 - .5 Adjust work schedule to suit weather conditions and take measures against wind, dust, dirt, rain and freezing.
 - .6 Avoid installing separate batches side by side.
 - .7 Do not apply finish in joints to receive sealant.
- .5 Apply full bead of sealant to panel joints, free of air bubbles, tooled to a concave profile.

End of Section

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- 1 General
 - 1.1 **SUBMITTALS**
 - .1 Shop drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify current model production.
 - .5 Certification of compliance to applicable codes.
 - .2 Quality Assurance: in accordance with - Quality Control.
 - .3 Health and Safety Requirements: do construction occupational health and safety in accordance with Health and Safety Requirements.
 - 1.2 **DELIVERY, STORAGE, AND HANDLING**
 - .1 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Construction/Demolition Waste Management and Disposal.
 - 2 Products
 - 2.1 **MATERIALS**
 - .1 Materials and products in accordance with General Sections
 - .2 Do verification requirements in accordance with Sustainable Requirements: Contractor's Verification.
 - 3 Execution
 - 3.1 **PAINTING REPAIRS AND RESTORATION**
 - .1 Do painting in accordance with General Section.
 - .2 Prime and touch up marred finished paintwork to match original.
 - .3 Restore to new condition, finishes which have been damaged.
 - 3.2 **CLEANING**
 - .1 Clean interior and exterior of all systems including roof drains.
 - 3.3 **FIELD QUALITY CONTROL**
 - .1 Site Tests: conduct following tests in accordance with Quality Control.
 - .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
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3.4 **DEMONSTRATION**

- .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

3.5 **PROTECTION**

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

3.6 **CLEANING**

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

End of Section

- 1 General
 - 1.1 **REFERENCES**
 - .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.1-06, Canadian Electrical Code, Part 1 (20th Edition), Safety Standard for Electrical Installations.
 - 1.2 **DEFINITIONS**
 - .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.
 - 1.3 **DESIGN REQUIREMENTS**
 - .1 Operating voltages: to CAN3-C235.
 - .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
 - 1.4 **SUBMITTALS**
 - .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data: submit WHMIS MSDS in accordance with General Section Sustainable Requirements.
 - .3 Shop drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario
 - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure coordinated installation.
 - .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
 - .4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
 - .5 Submit 3 copies of 600 x 600 mm minimum size drawings and product data to authority having jurisdiction inspection authorities.
 - .6 If changes are required, notify Departmental Representative of these changes before they are made.
 - .4 Quality Control: in accordance with - Quality Control.
 - .1 Provide CSA certified equipment and material.
 - .2 Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction inspection authorities for special approval before delivery to site.
 - .3 Submit test results of installed electrical systems and instrumentation.
 - .4 Permits and fees: in accordance with General Conditions of contract.
 - .5 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
-

- .6 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.
 - .5 Manufacturer's Field Reports: submit to Departmental Representative Engineer manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.
 - 1.5 **QUALITY ASSURANCE**
 - .1 Quality Assurance: in accordance with Quality Control.
 - .2 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices in accordance with authorities having jurisdiction as per the conditions of Provincial Act respecting manpower vocational training and qualification.
 - .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
 - .2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.
 - .3 Health and Safety Requirements: do construction occupational health and safety in accordance with Health and Safety Requirements.
 - 1.6 **DELIVERY, STORAGE AND HANDLING**
 - .1 Material Delivery Schedule: provide Departmental Representative with schedule within 2 weeks after award of Contract.
 - .2 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Construction/Demolition Waste Management and Disposal.
 - 1.7 **SYSTEM STARTUP**
 - .1 Instruct Departmental Representative and operating personnel in operation, care and maintenance of systems, system equipment and components.
 - .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.
 - .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant will aspects of its care and operation.
 - 1.8 **OPERATING INSTRUCTIONS**
 - .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
 - .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
 - .3 Safety precautions.
 - .4 Procedures to be followed in event of equipment failure.
-

- .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
 - .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
 - .4 Post instructions where directed.
 - .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
 - .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.
- 2 Products
- 2.1 **MATERIALS AND EQUIPMENT**
- .1 Provide material and equipment in accordance with Common Product Requirements.
 - .2 Material and equipment to be CSA certified. Where CSA certified material and equipment is not available, obtain special approval from authority having jurisdiction inspection authorities before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.
 - .3 Factory assemble control panels and component assemblies.
- 2.2 **WARNING SIGNS**
- .1 Warning Signs: in accordance with requirements of authority having jurisdiction inspection authorities Departmental Representative Engineer.
 - .2 Porcelain enamel decal signs, minimum size 175 x 250 mm.
- 2.3 **WIRING TERMINATIONS**
- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.
- 2.4 **EQUIPMENT IDENTIFICATION**
- .1 Identify electrical equipment with nameplates and labels as follows:
 - .1 Nameplates: lamicoid 3 mm thick plastic engraving sheet melamine, black matt white finish face, black white core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.
 - .2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.
 - .3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.
 - .4 Allow for minimum of twenty-five (25) letters per nameplate and label.
 - .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
 - .6 Identify equipment with Size 3 labels engraved "ASSET INVENTORY NO." as directed by Departmental Representative.
 - .7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
 - .8 Terminal cabinets and pull boxes: indicate system and voltage.
-

2.5 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, numbered coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.6 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	<u>Prime</u>	<u>Auxiliary</u>
up to 250 V	Yellow	
up to 600 V	Yellow	Green
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other	Red	Yellow

2.7 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
 - .1 Paint outdoor electrical equipment "equipment green" finish to.

2.8 LIGHTNING PROTECTION

- .1 Manufactures shall be certified by the fire marshal. Acceptable hardware manufacturers
- .2 Lightning protection hardware and system installation shall meet or exceed the requirements of CAN/CSA-B72-M87 and those listed below. installers to have minimum five years experience installing lightning protection systems for commercial buildings in the province of Ontario and to be licensed to carry out such installations.
- .3 Air terminals to be solid copper or solid copper alloy not less than 9.5 mm diameter with treaded end to connect to base. terminals to be installed not more than 8 m on centres with a terminal not more than 0.5 m from each edge and not more than 0.5 from any corner of the roof. all tips of terminals to project not less than 300 mm above the top of the object to be protected.
- .4 Intercepting and down conductors to be bare braided copper cables not less than 2 awg.
- .5 Interconnection conductors (jumpers) to be bare braided copper cables not less than 6 awg or solid copper straps not less than 1.3 mm x 12.5 mm in cross section dimensions

- .6 All connections from cable to air terminal, cable to ground rods, cable to cable, and cable to steel shall be made using welded copper connections or approved mechanical connectors and withstand a pull test of 900 n. Mechanical connectors to be bronze with stainless steel fasteners. All fasteners to be installed such as to withstand a direct pull of 450 n and at the required spacing for each application.
 - .7 Conductors and hardware shall not penetrate the roof. where flashing penetration is required, make good and weather tight all penetrations using weather proof caulking.
 - .8 Intercepting cables are to form a closed loop around the periphery of the roof and run within 0.5 m of the roof edge. horizontal cross conductors to run every 15 m on centres and to be connected to adjacent cross conductors every 50 m. all cable bends to be of the sweeping type.
 - .9 All metallic objects (bodies) on roof, including hvac equipment, vents, rails, gutters, mast, skylights, and ladders are to be bonded to the intercepting conductors.
 - .10 Down conductors to be installed at each corner and not more than 35 m on centres and terminated to an intercepting conductor at the upper end and to a ground electrode at the lower end. down conductors shall not be insulated from the structure and shall be electrically connected at the top and bottom with any reinforcing steel. routing of down conductors is to avoid equipment and openings including but not limited to doors, windows, lights, signage, vents, and hose bibbs.
 - .11 A ground rod electrode shall be installed facing each ground down conductor at least 600 mm from the outside of the foundation and driven into the earth to a depth of 2.8 to 3 m. where bedrock is 1.2 m or less below ground level a plate electrode may be used.
 - .12 Lightning ground electrodes to be copper, copper clad steel, or cupronickle rods not less than 12 mm in diameter and 3 m in length and to be installed at least 2 m from any other grounding systems, gas mains, gas tank, and oil or gasoline tanks in contact with the earth. if lightning protection system's ground resistance exceeds permissible levels, supplemental rod electrodes shall be installed or copper plates not less than 0.4 m² in area and 1.5 mm thick may be used as ground electrodes to achieve required resistance levels.
 - .13 Lightning protection system ground to be bonded to ground mediums from other systems such as electrical service, telephone service and metallic water pipes by means of a buried copper conductor not smaller than 6 awg copper conductor.
 - .14 Additional to building, owner, and installer's identification data, the certificate of installation shall include the following: a diagram of the building marking the location of each grounding, the nature and condition of soil at each grounding, and the method of each grounding.
- 3 Execution
- 3.1 **INSTALLATION**
- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- 3.2 **NAMEPLATES AND LABELS**
- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.
- 3.3 **CONDUIT AND CABLE INSTALLATION**
- .1 Install conduit and sleeves prior to roof refinishing.
-

3.4 **LIGHTNING PROTECTION**

- .1 All work lightning protection work shall be carried out in accordance with:
 - .1 Electrical drawings.
 - .2 All applicable codes, bylaws and best-recommended practices.
 - .2 For the purposes of this project, 'provide' shall mean to supply and install.
 - .3 For the purposes of this project, 'demolish' shall mean materials and equipment are to be removed from their installed location and disposed of. contractor shall be responsible for disposal of garbage in accordance with codes, standards and regulations, and provide his own waste removal services.
 - .4 Where materials and equipment are identified as 'salvage', they shall be removed from their installed location without damage and handed to the owner at the designated drop location within the facility.
 - .5 Contractor to:
 - .1 Familiarize himself with the project site and report any discrepancies or site conditions which may affect work to consultant prior to commencing work. If discrepancies are not identified prior to commencing work, contractor responsible for implementing works per consultants direction.
 - .2 Verify equipment routing.
 - .3 Demolish all items marked for demolition back to source.
 - .4 Verify all dimensions prior to equipment purchase.
 - .5 Protect building structure from damage.
 - .6 Ensure adjacent areas are not affected by any work on this project.
 - .7 Obtain related permits to carry out the work of this project.
 - .8 Provide ground resistance verification of the entire system and submit report of deficiencies, if any.
 - .6 The intent of this project is to provide lightning protection for the building and rooftop equipment.
 - .1 Visually inspect the building roof and exterior walls and the surrounding ground and report any conditions that will impact the execution of this project.
 - .2 Provide lightning protection system complete with all air terminals, intercepting conductors, interconnecting conductors, down conductors, ground rods or plates and all associated hardware.
 - .3 Provide testing of the entire lightning protection system's resistance to ground. provide at least one access to concealed ground electrode systems for test purposes. provide manpower and instrumentation as needed for testing. Notify departmental representative 5 working days in advance before the testing is performed. provide testing results for consultant review. If the testing results are not satisfactory for the new work, improve the grounding resistance to levels as required by the installation code for lightning protection systems, CAN/CSA-B72-M87.
 - .4 Upon completion of construction, provide a "certificate of installation" to the owner.
 - .5 Patch, paint and repair damage to the building resulting from the work of this project.
-

- .6 Patch and repair damage to the surrounding area, including pavement, concrete walks, and grassed areas, resulting from the work of this project.
- .7 When the work is substantially performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining work. once the work is completed, remove waste products and debris created during construction and leave all areas pertaining to this project clean.

3.5 **CO-ORDINATION OF PROTECTIVE DEVICES**

- .1 Ensure circuit protective devices such as over current trips, relays and fuses are installed to required values and settings

3.6 **CLEANING**

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

End of Section

ROOF ASSEMBLIES					
RF-1		<ul style="list-style-type: none"> ROUND RIVER STONE FILTER FABRIC EXTRUDED POLYSTYRENE INSULATION (R-15) POLYETHYLENE SHEET POLYESTER-REINFORCED EPDM/SBR MEMBRANE IN COLD-APPLIED ASPHALTIC ADHESIVE EXISTING CONCRETE DECK 	RF-3		<ul style="list-style-type: none"> 2-PLY MODIFIED BITUMEN IN COLD-APPLIED ASPHALTIC ADHESIVE TAPERED FIBRE BOARD ROOF INSULATION EXISTING CONCRETE DECK
RF-2		<ul style="list-style-type: none"> NEW METAL ROOF - HERITAGE PROFILE 2-LAYERS STEEL STRAPPING POLYISOCYANURATE INSULATION ADHERED WITH INSULATION ADHESIVE SELF-ADHERING MEMBRANE EXISTING CONCRETE DECK 	RF-4		<ul style="list-style-type: none"> NEW METAL ROOF - HERITAGE PROFILE GALVANIZED STEEL Z-GIRT SELF-ADHERING MEMBRANE 19mm EXTERIOR GRADE GYPSUM SHEATHING 38mm STEEL DECK

2 ROOF ASSEMBLIES
A2-01 1:10

GENERAL NOTES:

A. CONTRACTOR TO NOTIFY DEPARTMENTAL REPRESENTATIVE IMMEDIATELY OF ANY DISCREPANCIES BETWEEN DRAWINGS AND SITE CONDITIONS NOTED DURING DEMOLITION/CONSTRUCTION.

B. DO NOT SCALE DRAWINGS.

C. WORK AROUND ALL EXISTING ROOF, WALL, AND PARAPET PENETRATIONS. FULLY SEAL AND / OR FLASH AS REQUIRED.

D. ALL ROOFTOP EQUIPMENT AND SECURITY DEVICES TO REMAIN INTACT THROUGHOUT WORK UNLESS OTHERWISE NOTED.

E. TAPERED INSULATION TO BE INSTALLED AS INDICATED BY HATCHING WITH MINIMUM 1% SLOPE. UNLESS NOTED OTHERWISE.

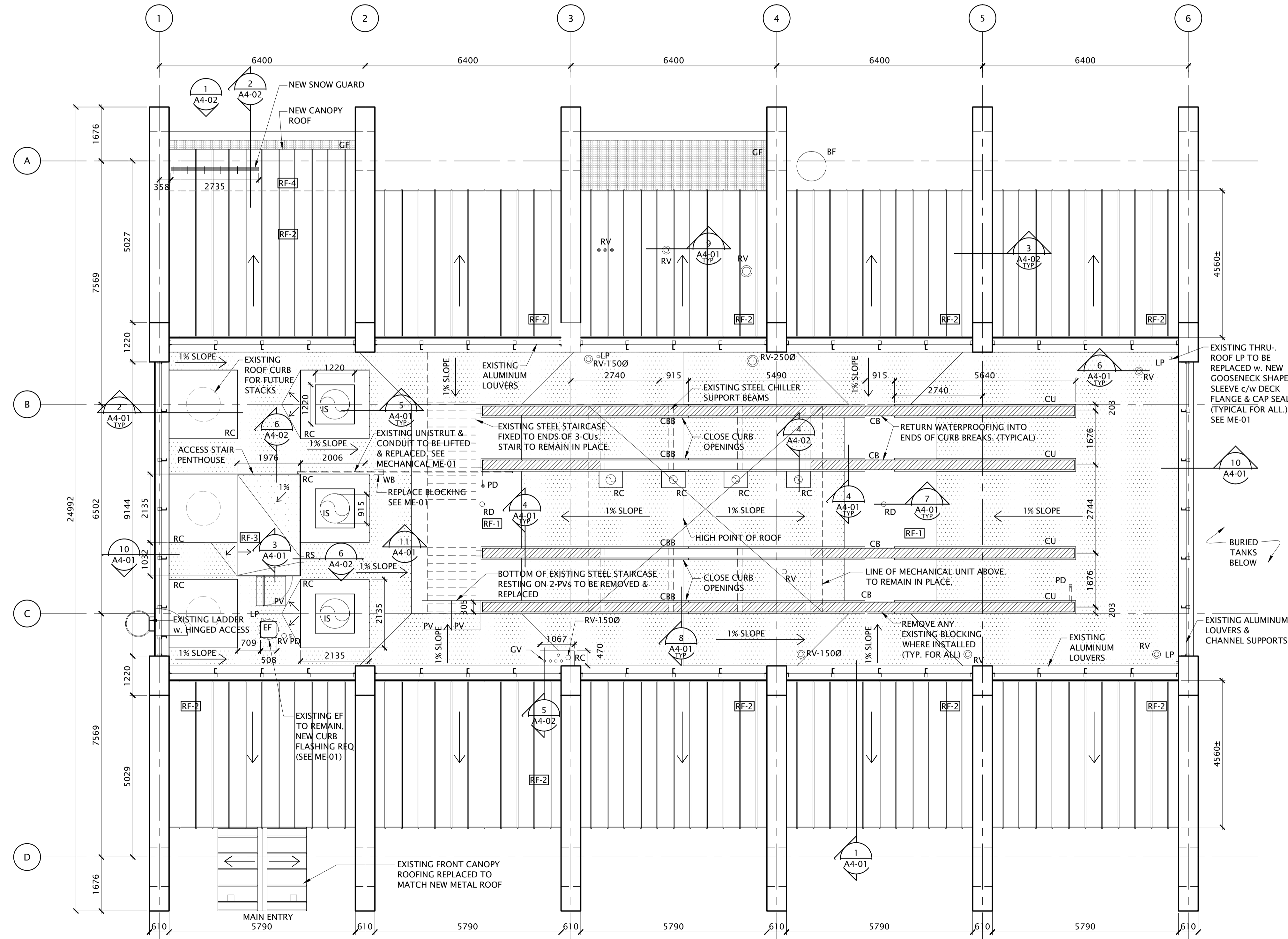
F. PATCH AND MAKE GOOD ALL DAMAGES TO EXISTING BUILDING OR LANDSCAPING CAUSED BY THE WORK OF THIS CONTRACT.

G. WORK AREAS OF LOW HEADROOM INCLUDE SPACE BENEATH CHILLER AND STAIRCASES.

DRAWING LEGEND:

BF	BOILER FLUE
CB	CURB BREAK
CBB	CURB BREAK BLOCKED
CU	CURB UPSTAND
EF	EXHAUST FAN
GF	GRATED FLOOR
GV	GAS VENT
IS	INSULATED STACK
LP	LIGHTNING PROTECTION
PD	PIPE DROP
PV	NEW PAVERS 900x900
RC	ROOF CURB
RD	ROOF DRAIN
RS	ROOF SCUPPER
RV	ROOF VENT
WB	WOOD SUPPORT BLOCK

	SLOPED ROOF (1% TYPICAL, UNLESS NOTED OTHERWISE)
	EXTENT OF NEW CAP FLASHING & MEMBRANE ON TOP OF CURB UPSTANDS. CUT MEMBRANE & CAP FLASHING TO FIT TIGHT TO CHILLER SUPPORT BEAMS. SEAL ALL TERMINATIONS (TYP.)



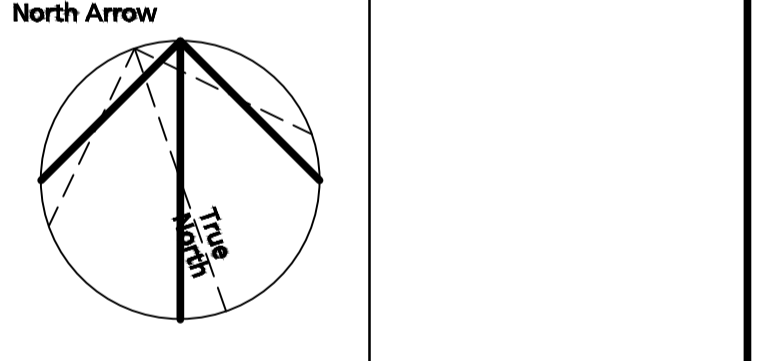
1 ROOF PLAN
A2-01 1:75

DATE	ISSUED FOR	REV
2014-07-04	ISSUED FOR TENDER	1
2014-05-29	ISSUED FOR 99% CLIENT REVIEW	B
2014-05-05	ISSUED FOR 66% CLIENT REVIEW	A

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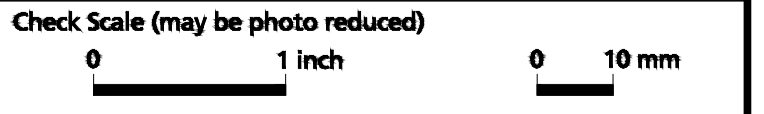


Project Manager N. DE GIOVANNI	Drawn S. WHALEY
Project Leader N. MACEWEN	Checked N. MACEWEN
Date 2014-04-28	Scale AS INDICATED

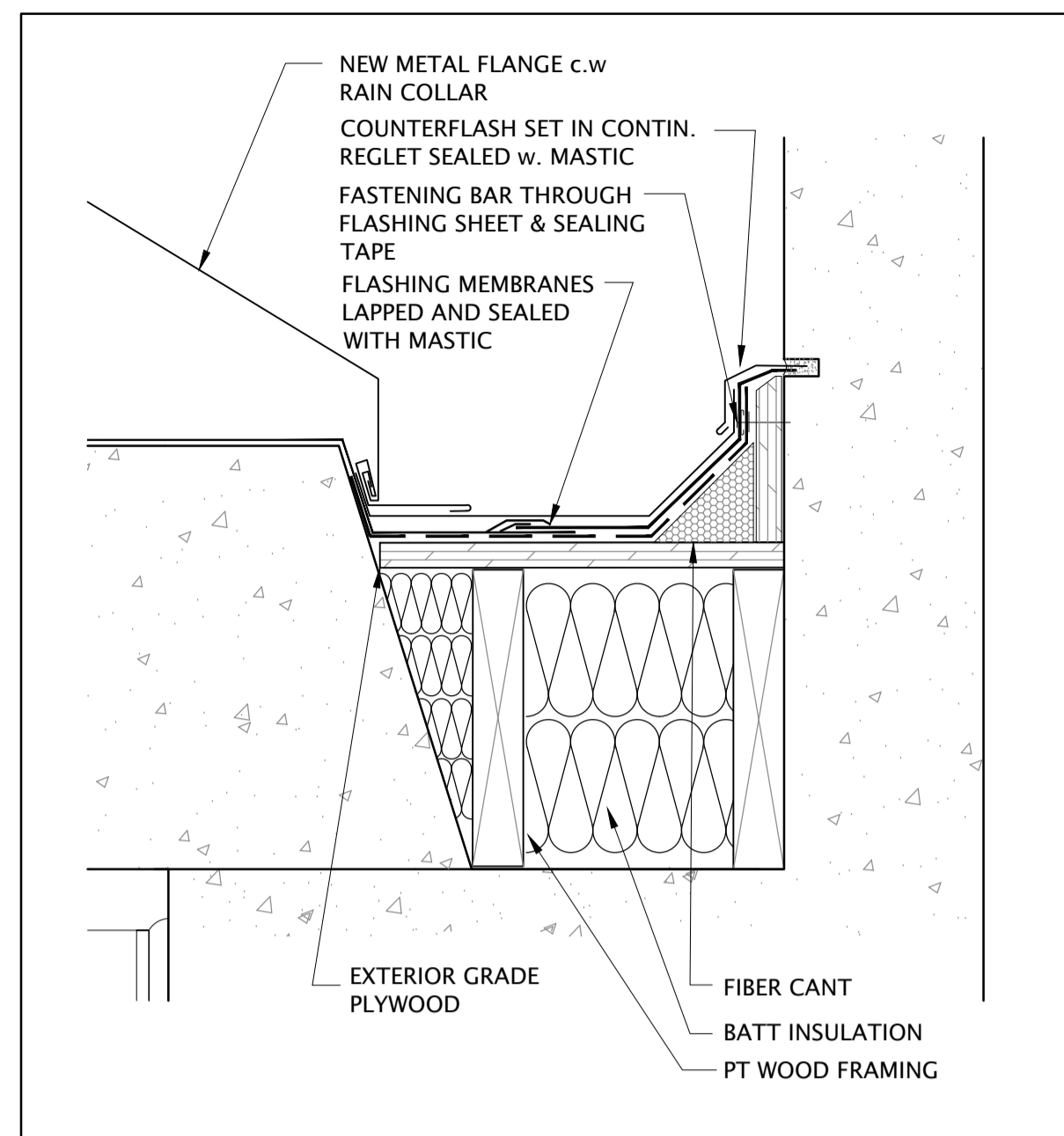
Client
CANADIAN FOOD INSPECTION AGENCY (CFIA)
3851 FALLOWFIELD RD, OTTAWA ONT.

Project
CFIA ROOF REPLACEMENT
CENTRAL HEATING & COOLING PLANT

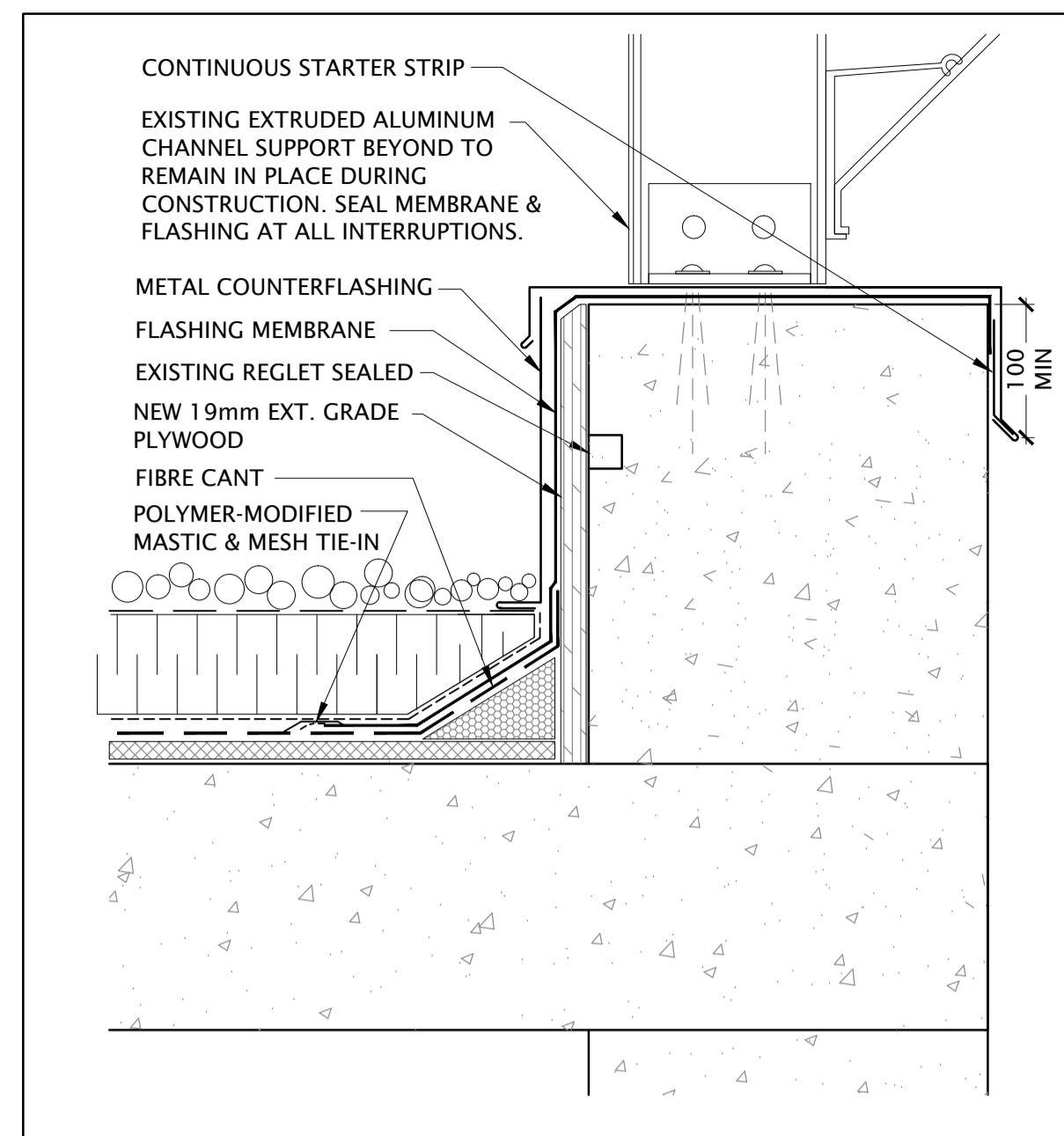
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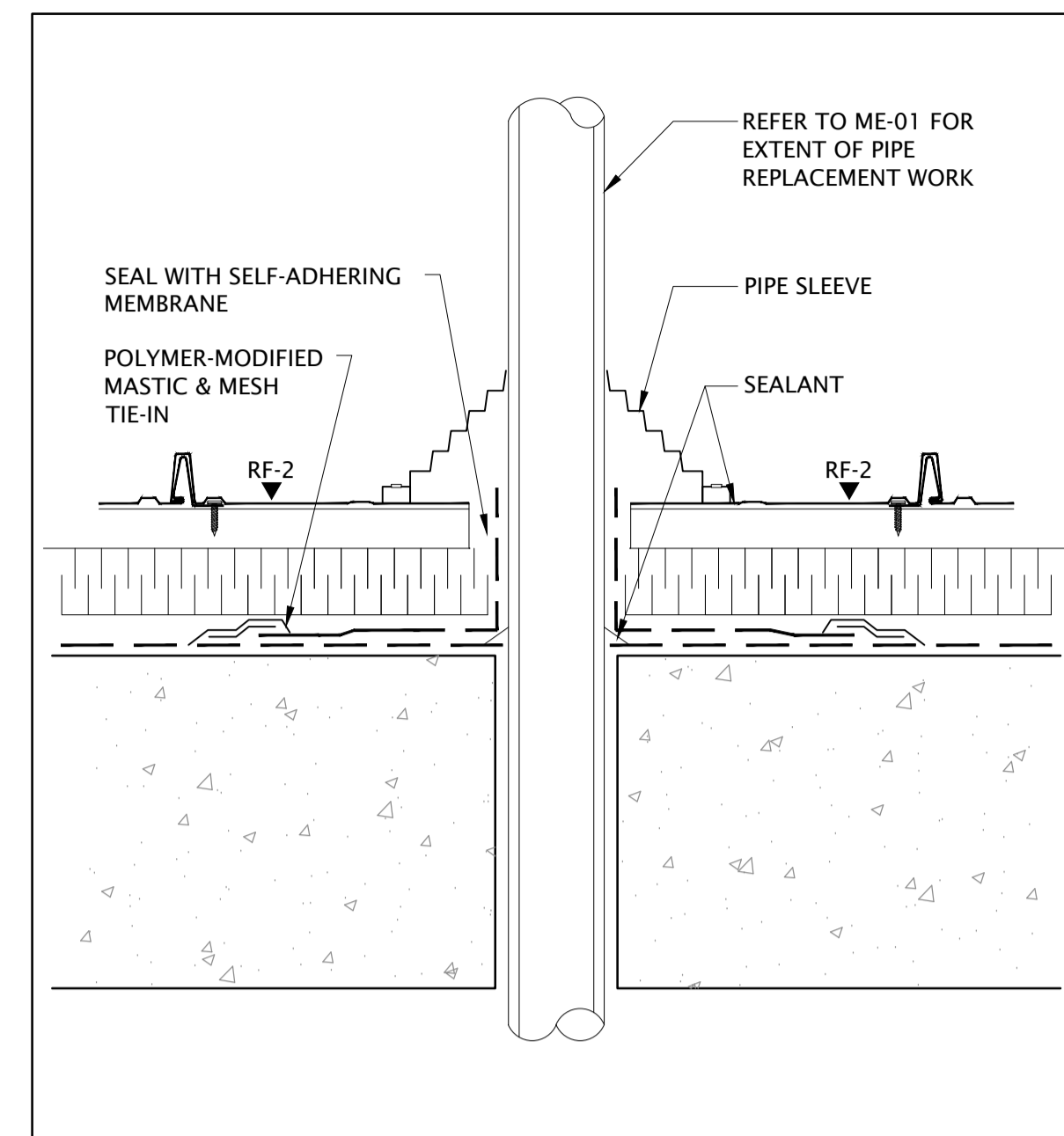
Project No. ECOT13-0071	Drawing No. A2-01
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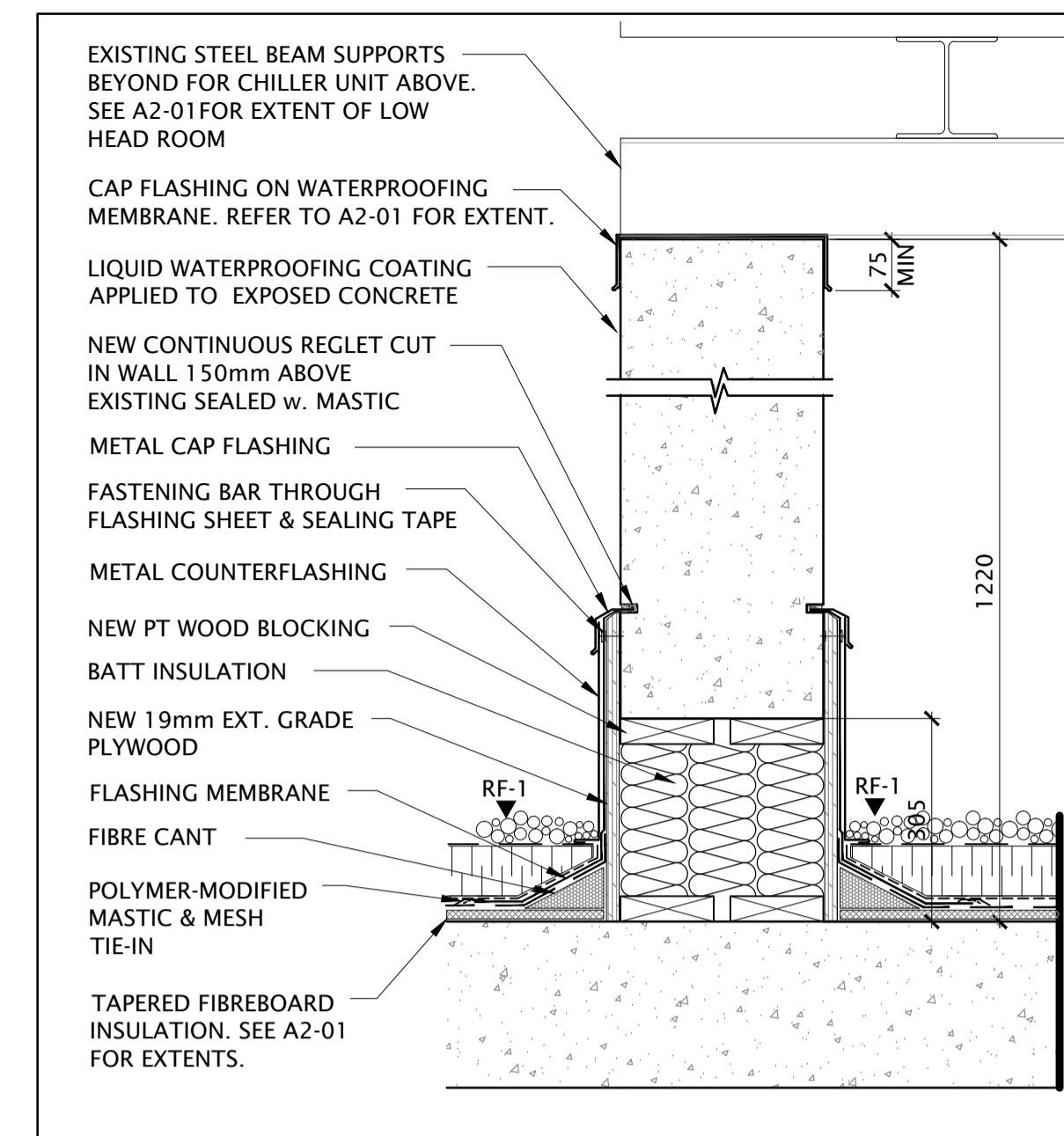
11 CURB DETAIL AT STAIR PENTHOUSE
A4-01 1:5



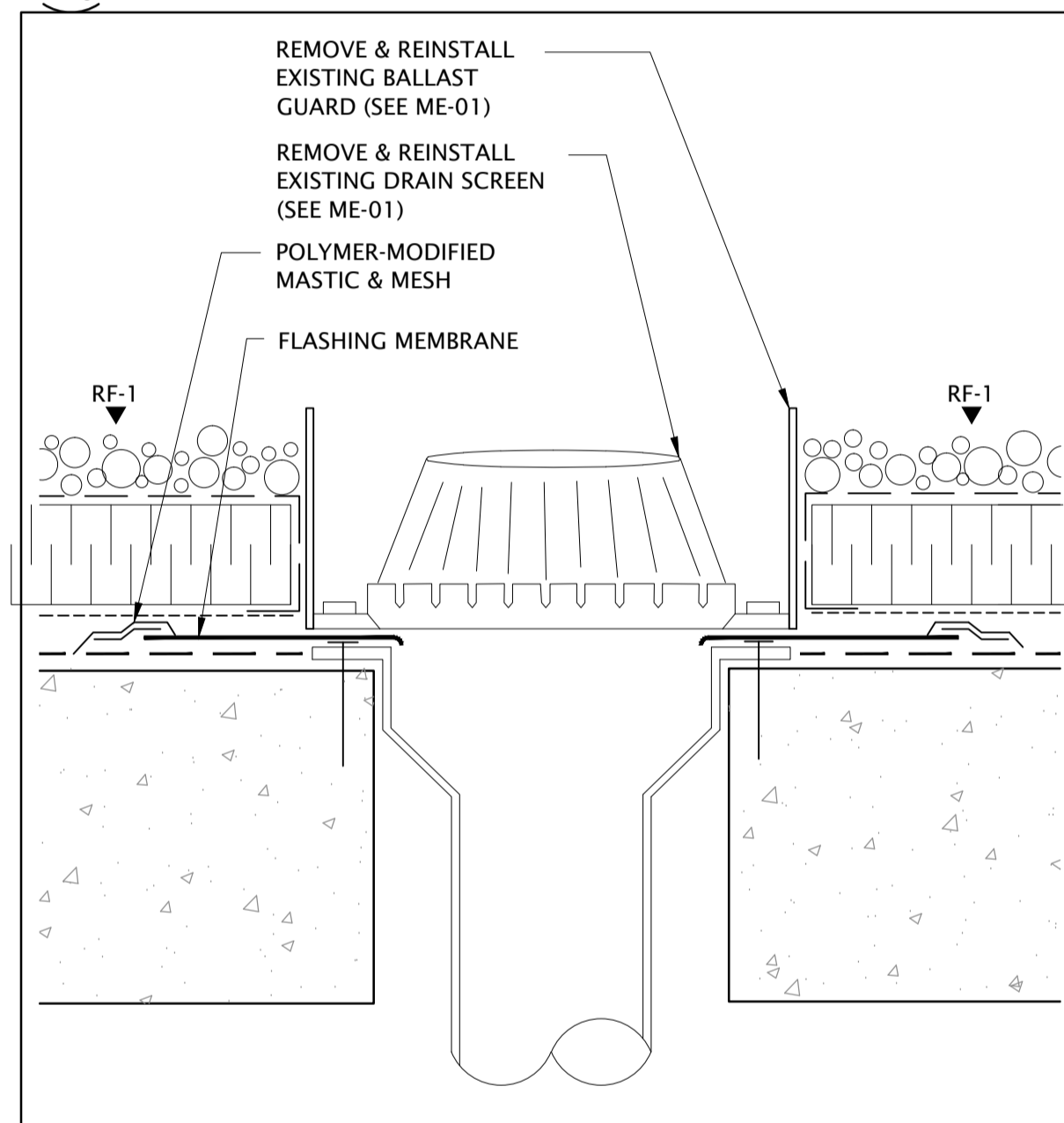
10 TYPICAL PERIMETER END PARAPET
A4-01 1:5



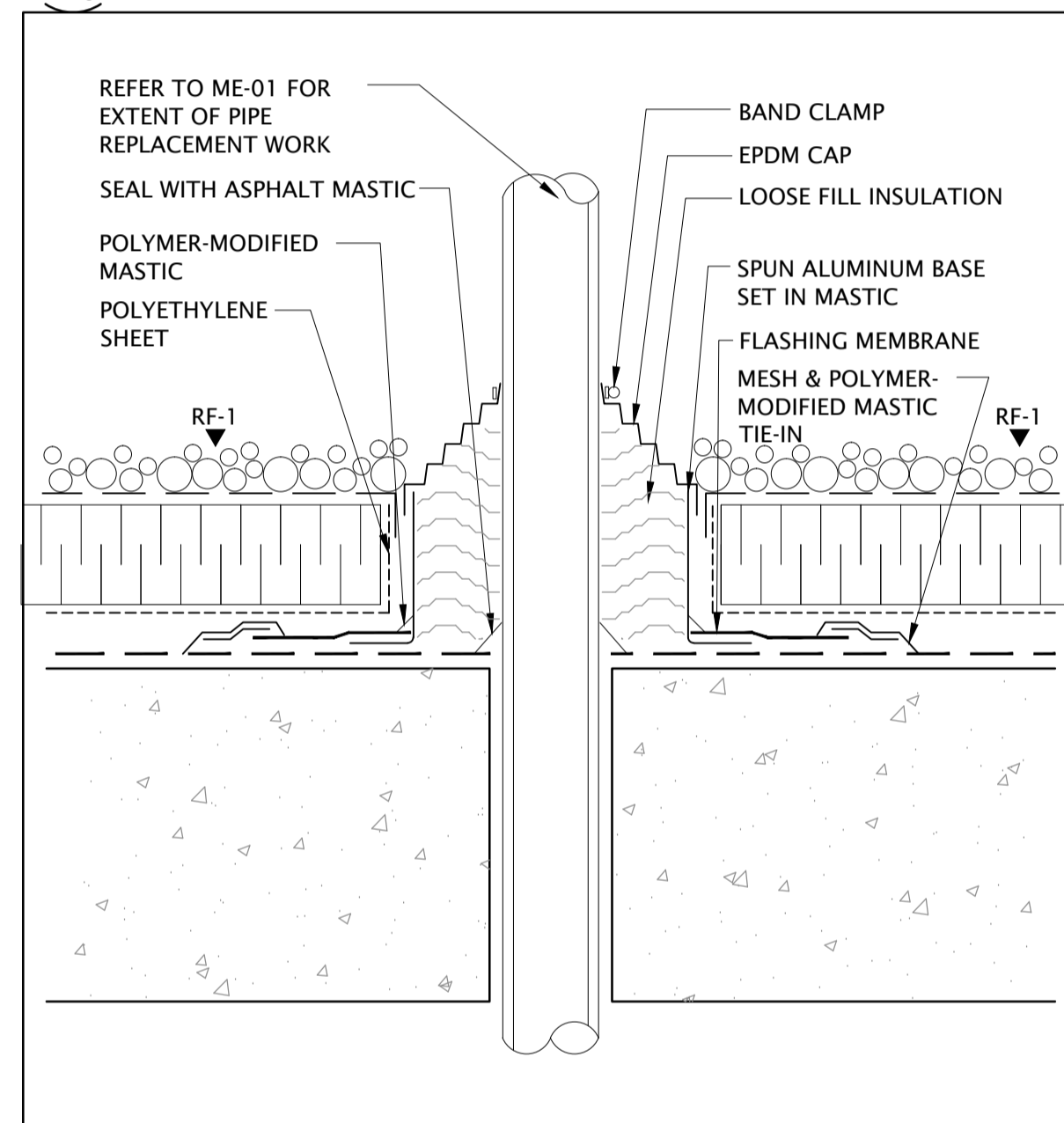
9 PIPE PENETRATION AT METAL ROOF
A4-01 1:5



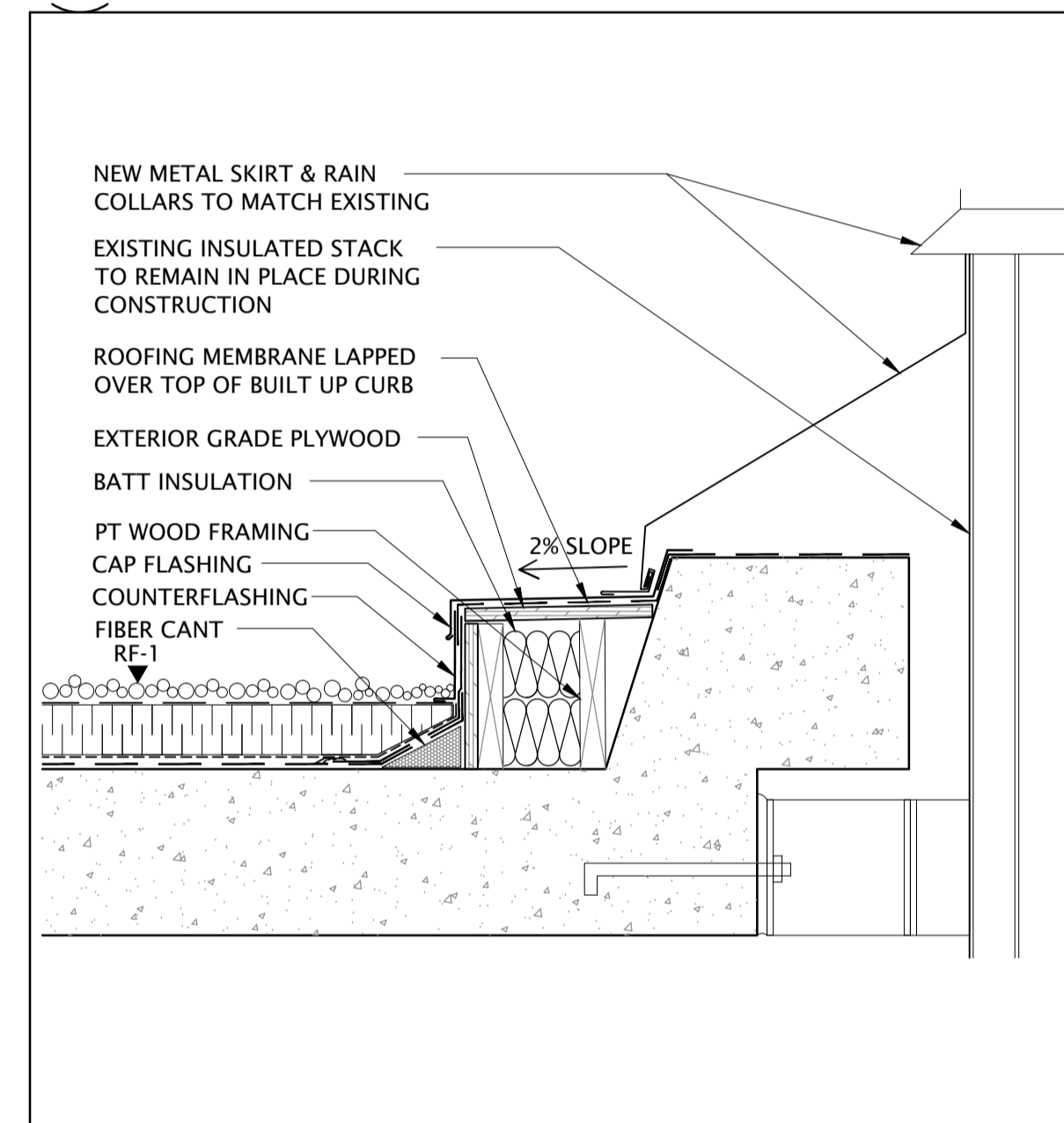
8 TYPICAL BLOCKING AT CURB BREAKS
A4-01 1:10



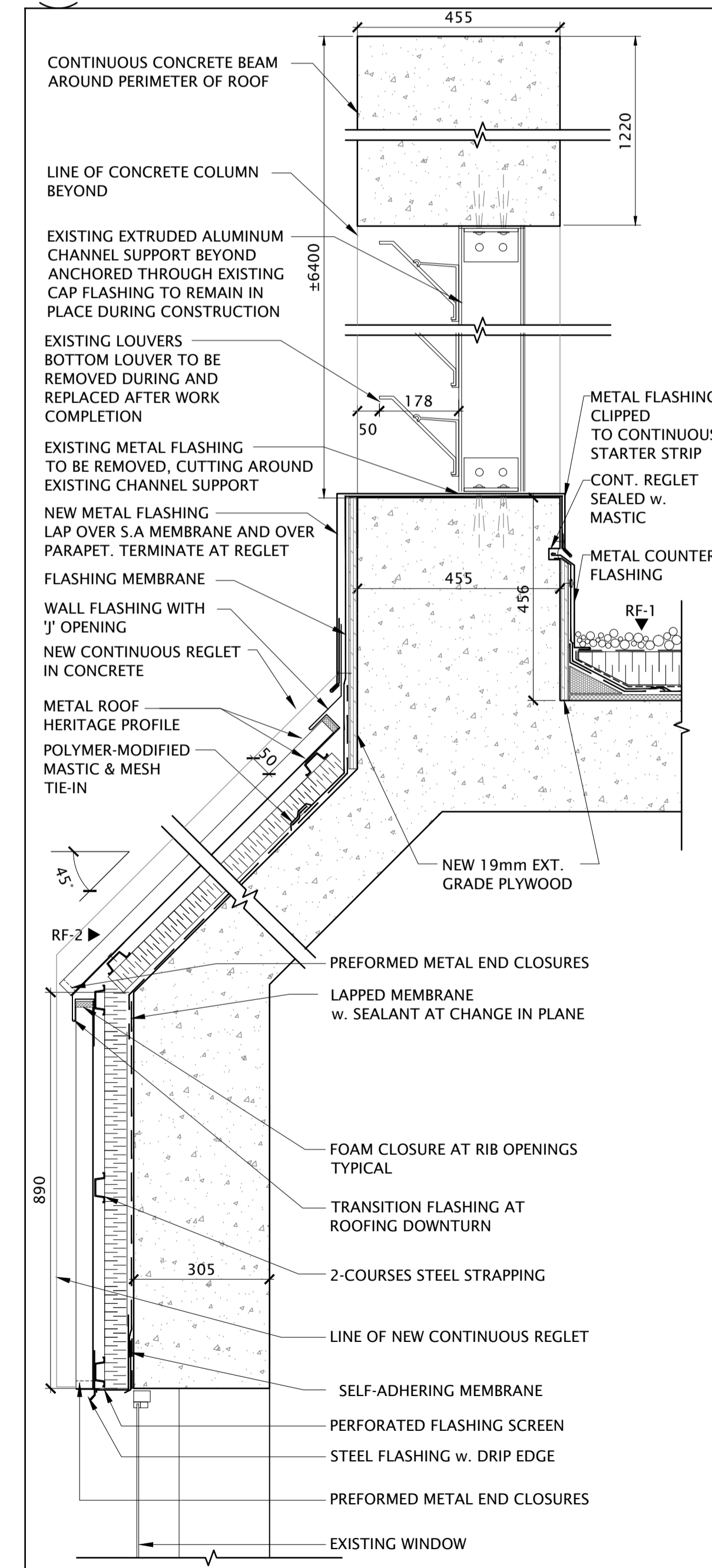
7 TYPICAL ROOF DRAIN
A4-01 1:5



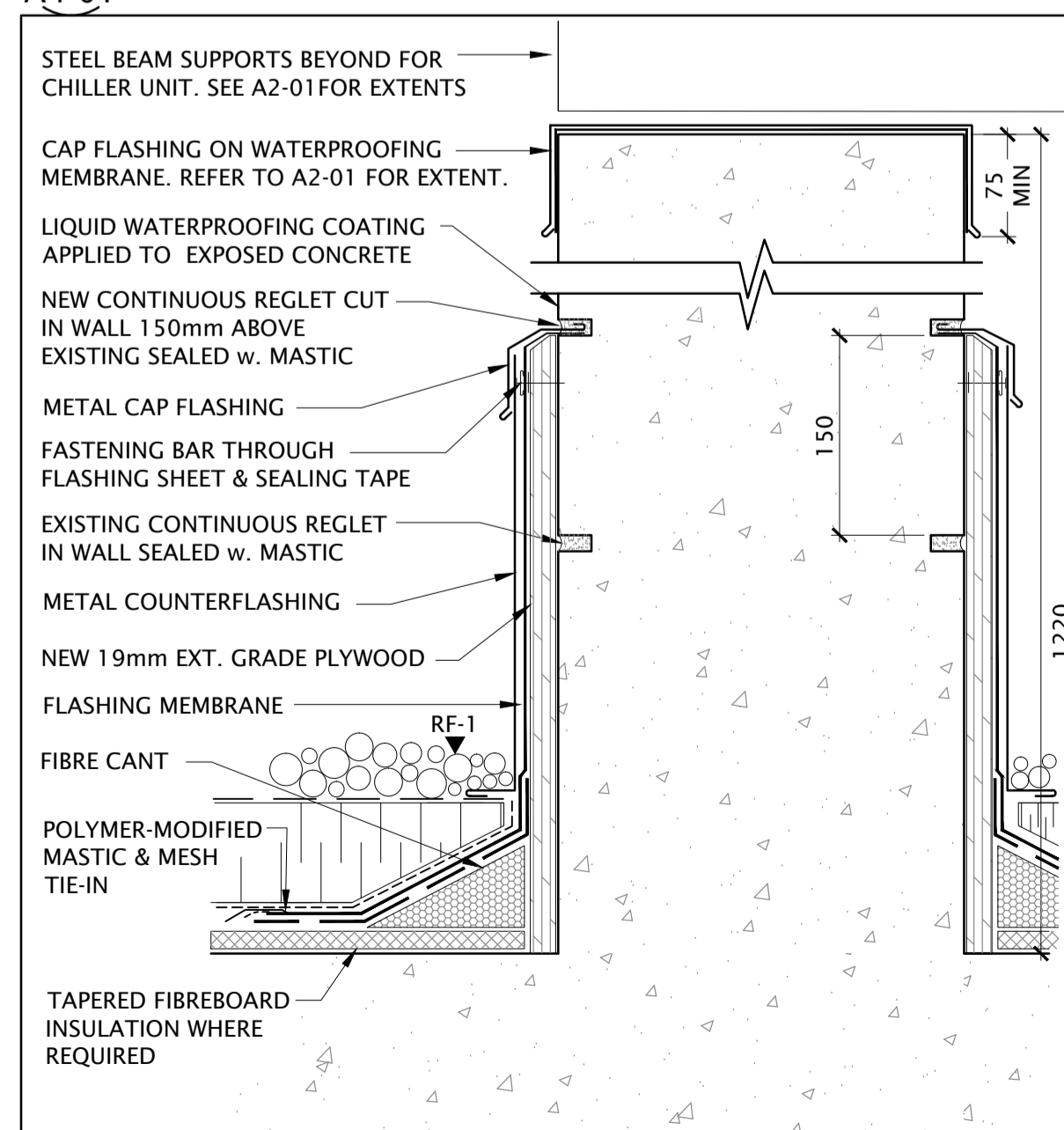
6 TYPICAL VENT STACK FLASHING
A4-01 1:5



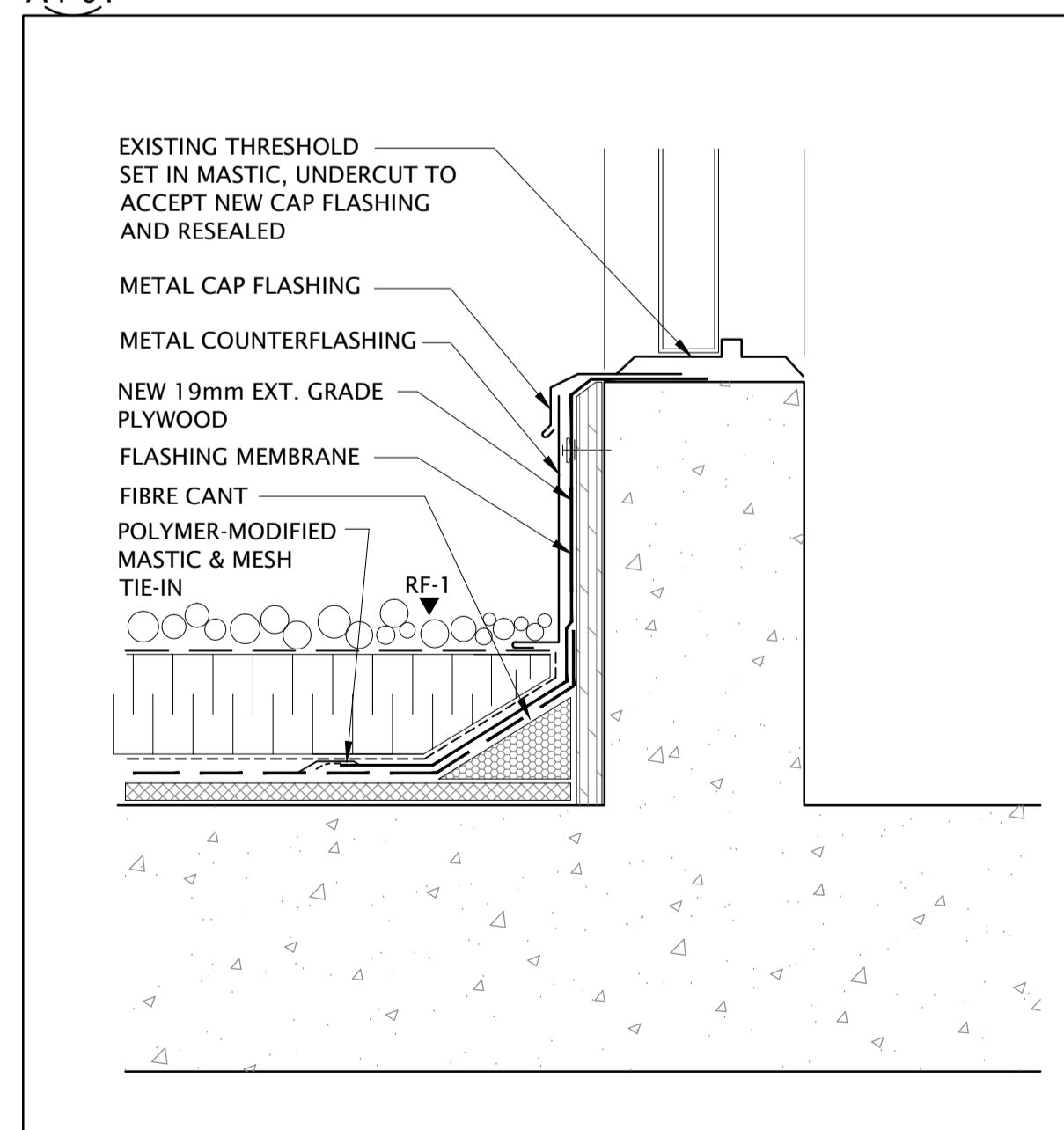
5 CURB AT INSULATED STACK (3)
A4-01 1:10



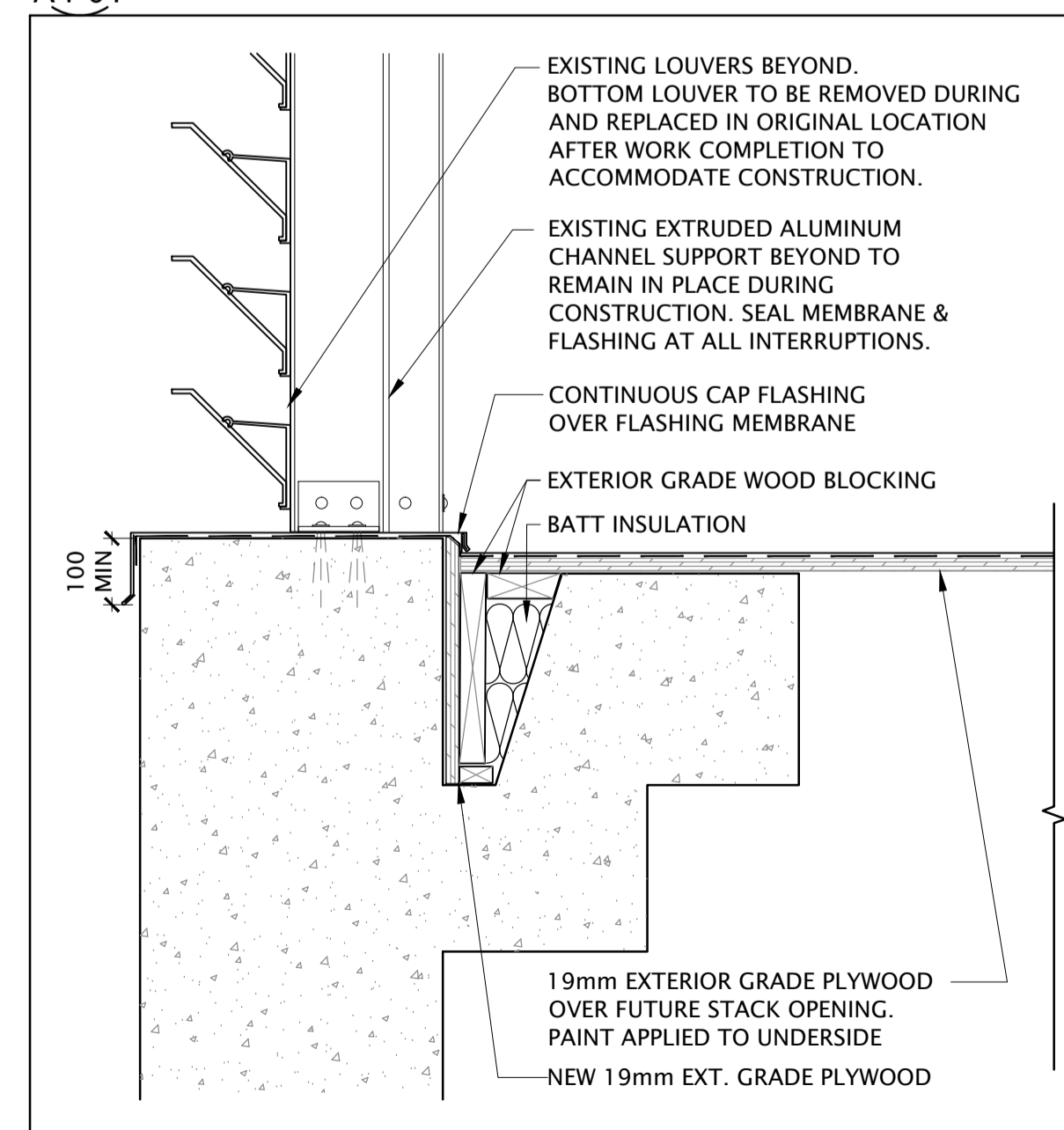
1 SLOPED METAL ROOF @ PARAPET
A4-01 1:10



4 TYPICAL WALL FLASHING AT UPSTANDS
A4-01 1:5



3 CURB AT PENTHOUSE DOOR
A4-01 1:5



2 CURB AT EXTERIOR WALL
A4-01 1:10

DATE	ISSUED FOR	REV
2014-07-04	ISSUED FOR TENDER	1
2014-05-29	ISSUED FOR 99% CLIENT REVIEW	B
2014-05-05	ISSUED FOR 66% CLIENT REVIEW	A

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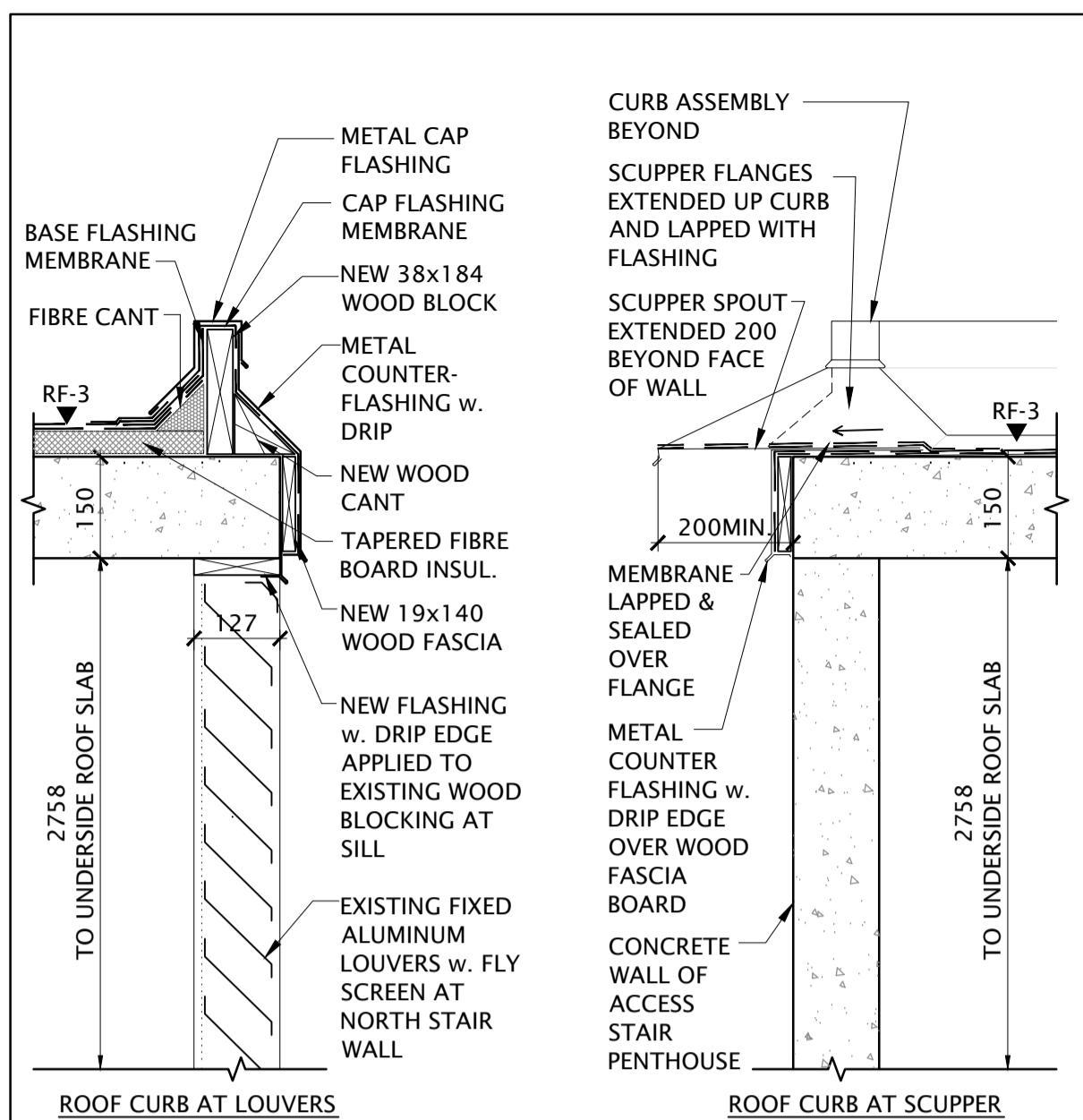
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Project Leader N. MACEWEN	Checked N. MACEWEN
Date 2014-04-28	Scale AS INDICATED

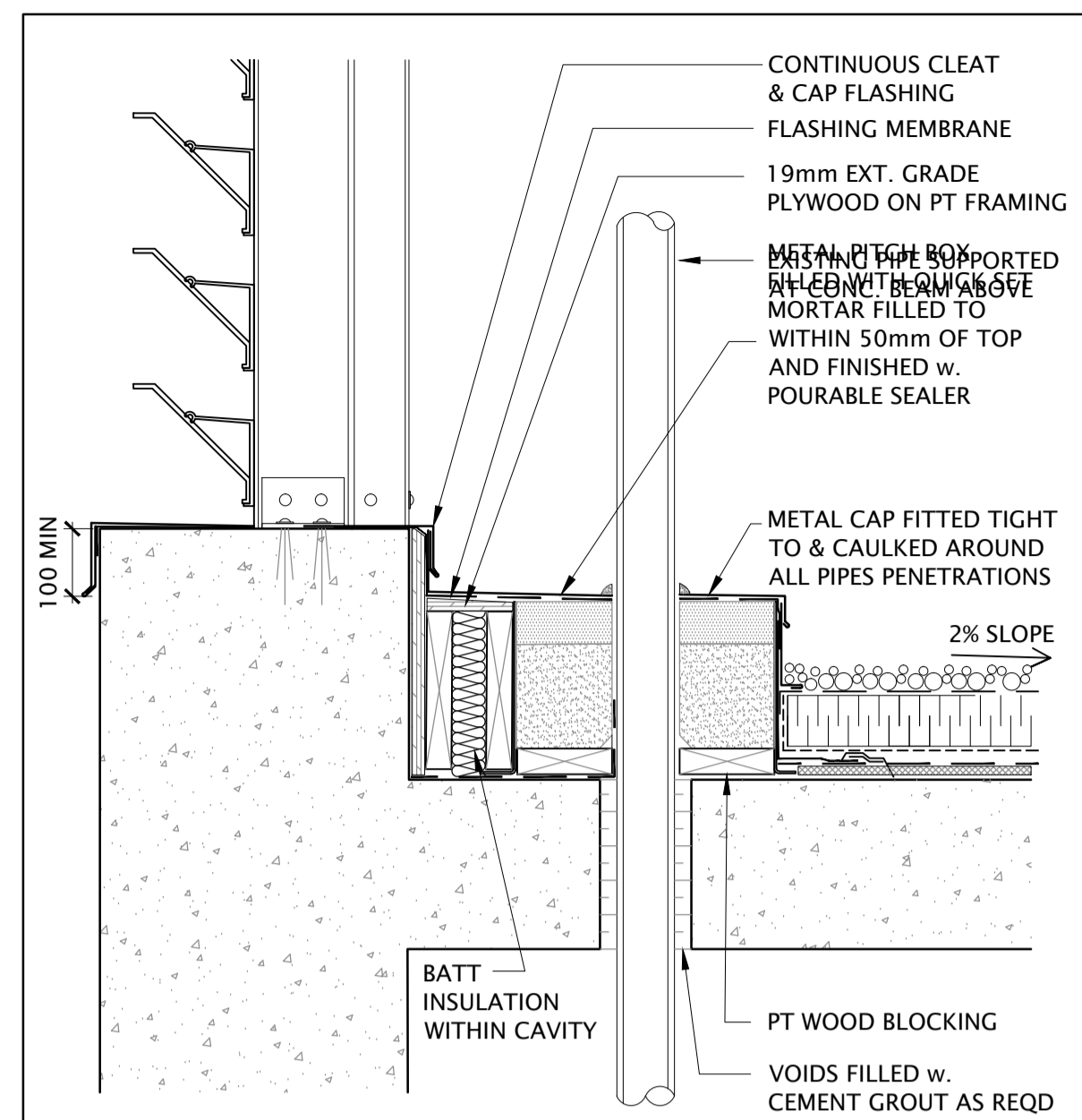
Client
CANADIAN FOOD INSPECTION AGENCY (CFIA)
3851 FALLOWFIELD RD, OTTAWA ONT.

Project
CFIA ROOF REPLACEMENT CENTRAL HEATING & COOLING PLANT

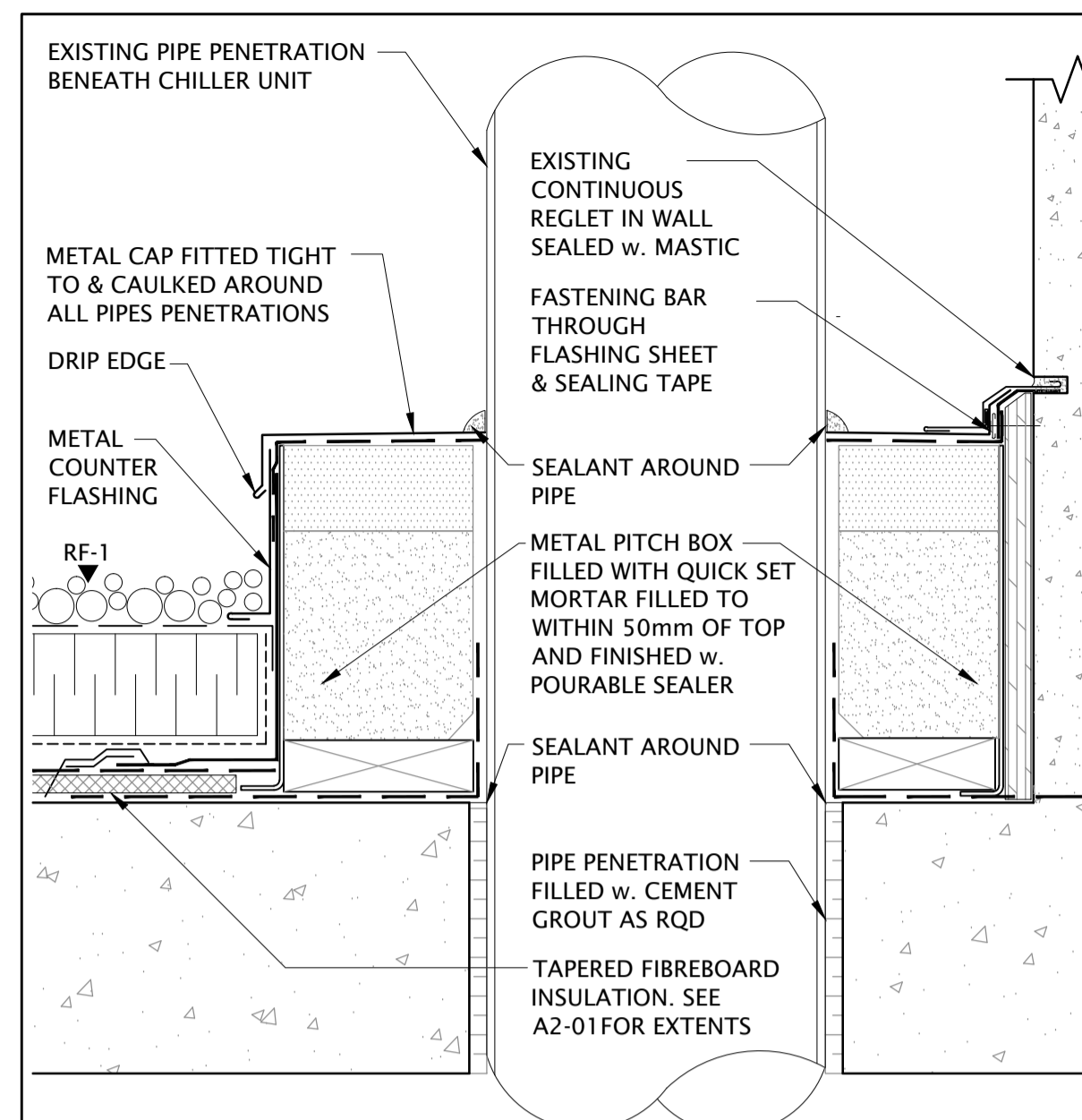
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Project No. ECOT13-0071	Drawing No. A4-01



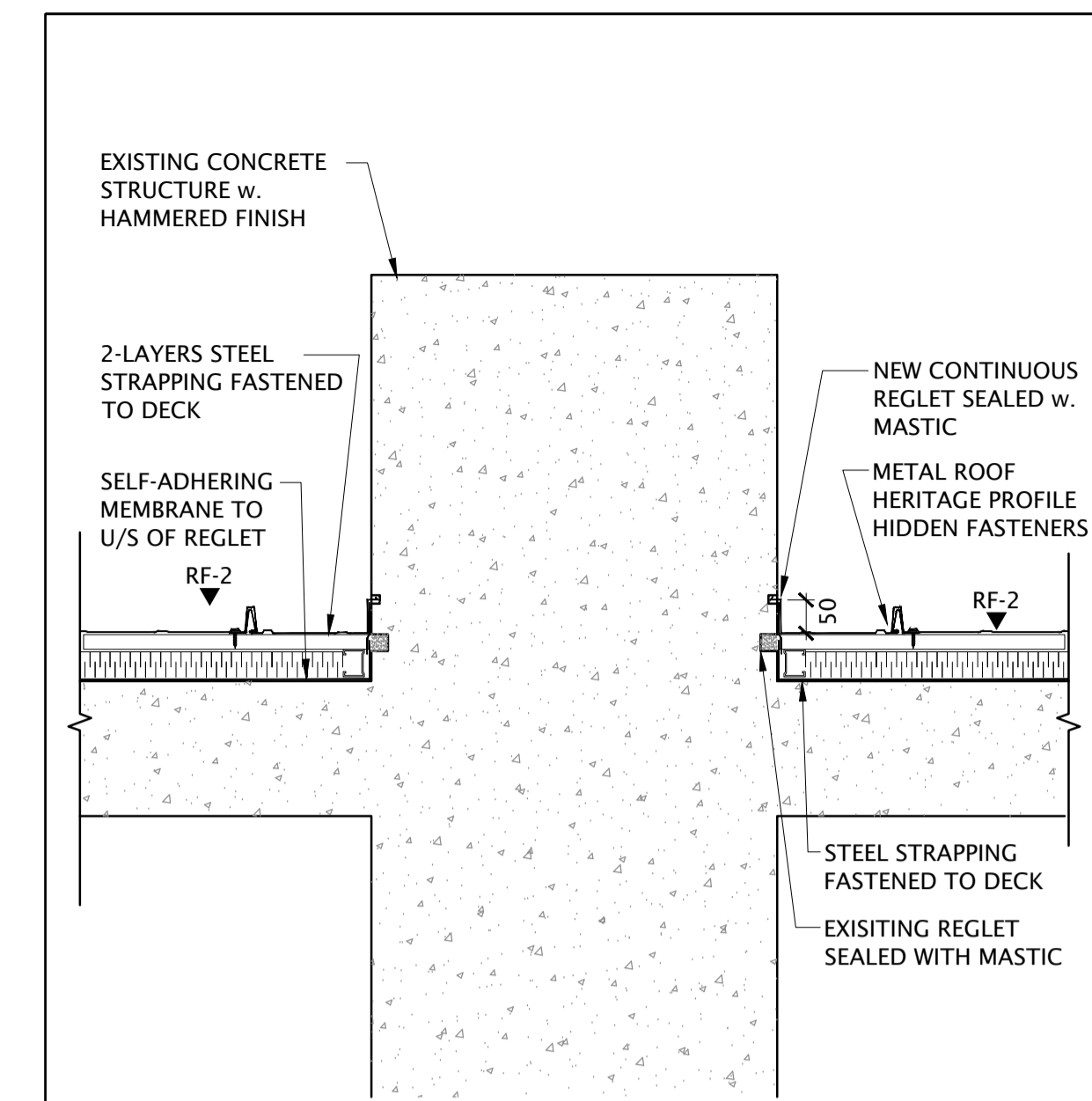
6 STAIR PENTHOUSE ROOF DETAILS
A4-02 1:5



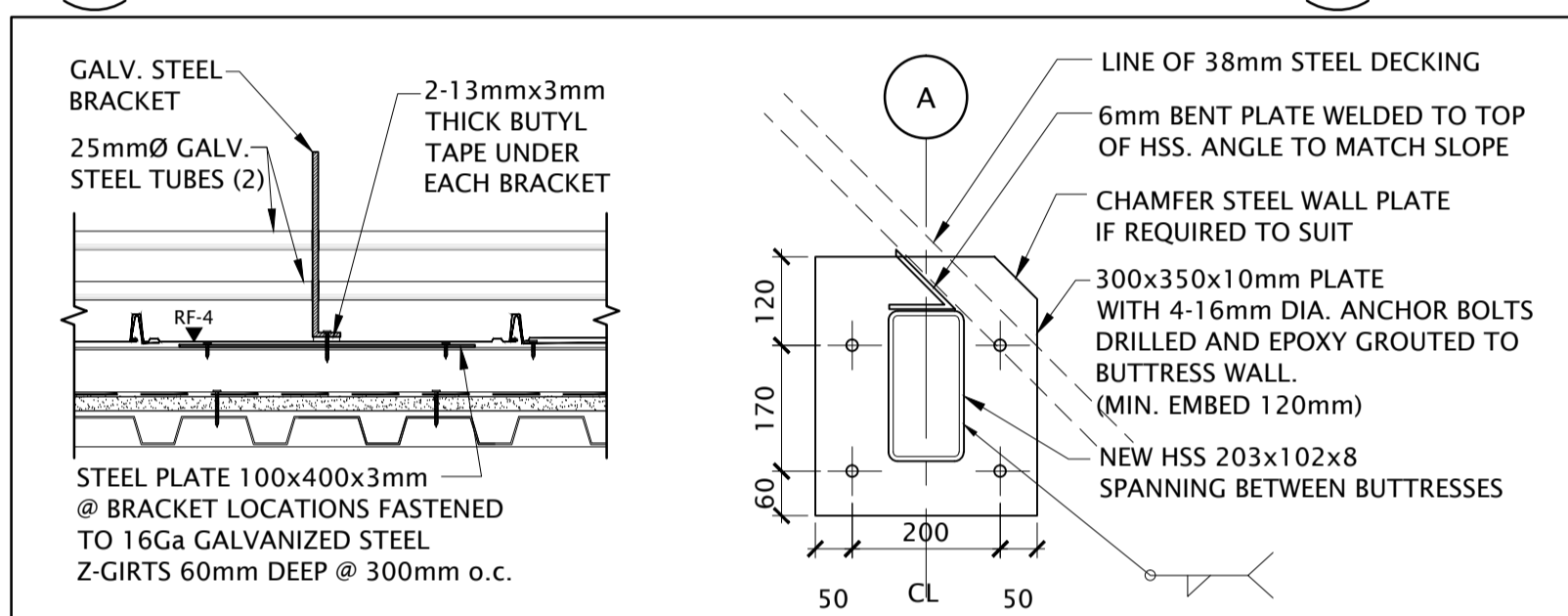
5 PITCH BOX AT PERIMETER PARAPET
A4-02 1:10



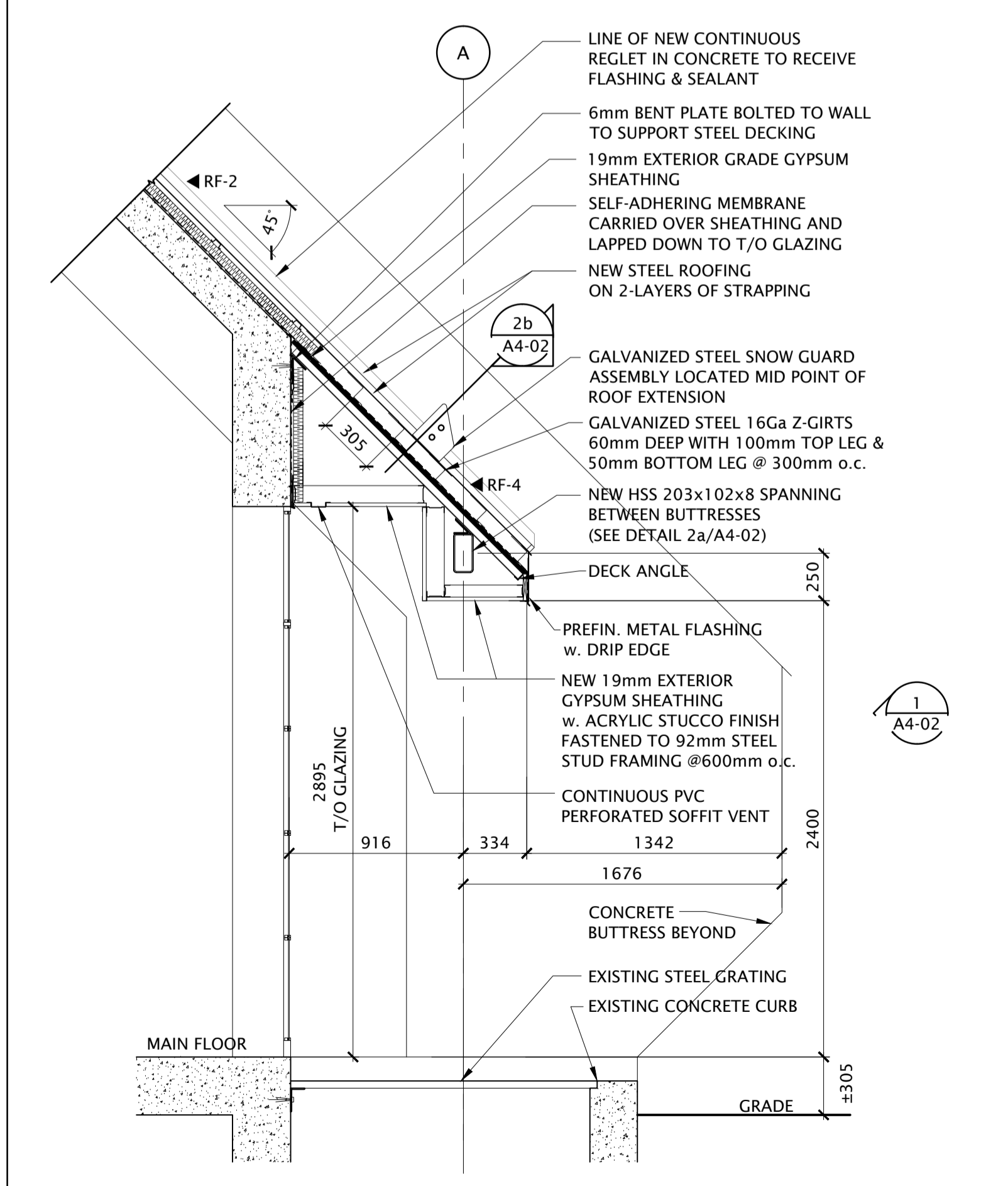
4 PIPE PENETRATION AT CURB UPSTAND
A4-02 1:5



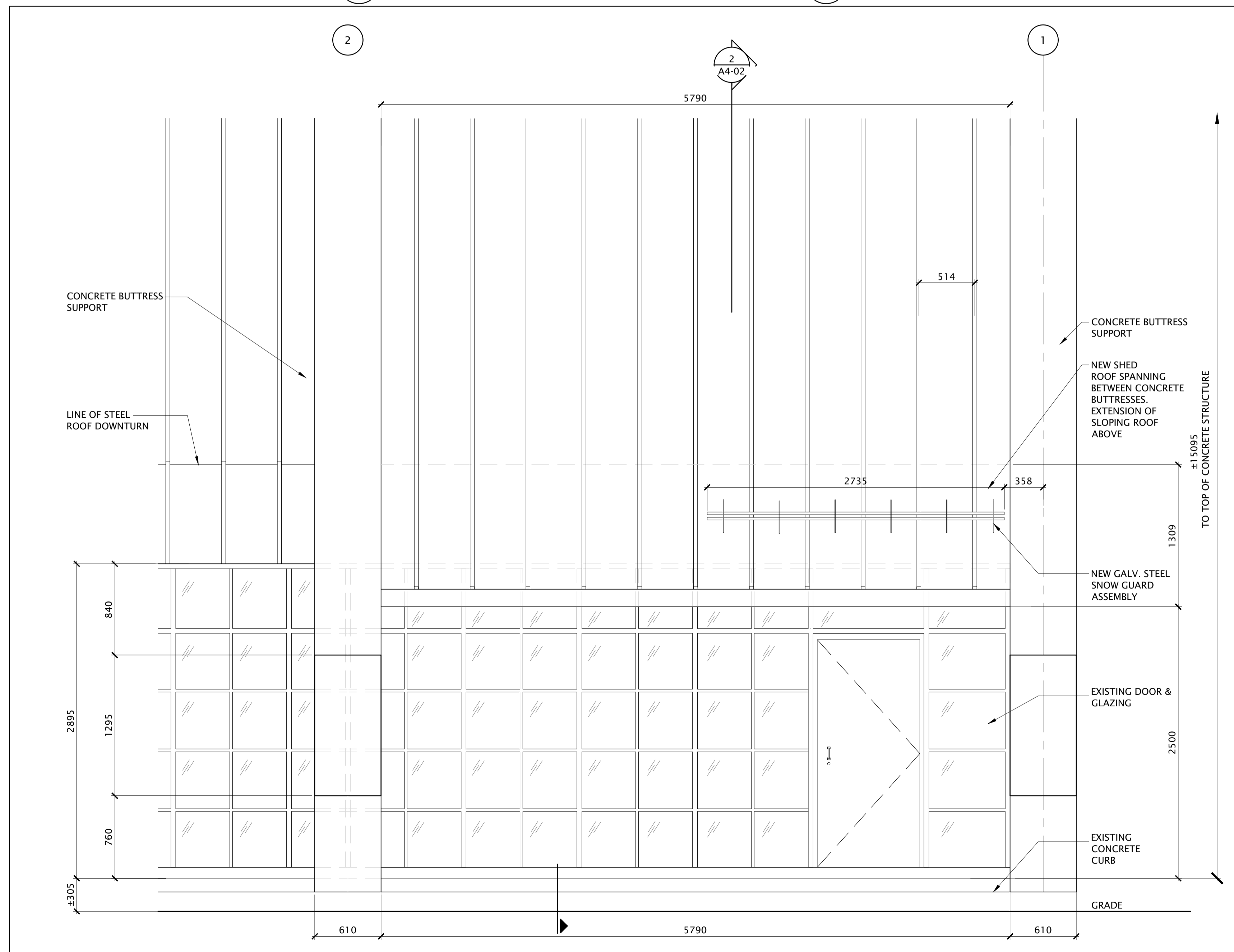
3 SLOPED METAL ROOF AT STRUCTURE
A4-02 1:10



2b SNOW GUARD A4-02 1:10
2a STEEL HSS PLATE DETAIL A4-02 1:10



2 SECTION THROUGH CANOPY
A4-02 1:25



1 NEW CANOPY ELEVATION
A4-02 1:25

DATE	ISSUED FOR	REV
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2014-05-29	ISSUED FOR 99% CLIENT REVIEW	B
2014-05-05	ISSUED FOR 66% CLIENT REVIEW	A

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Project Manager N. DE GIOVANNI	Drawn S. WHALEY
Project Leader N. MACEWEN	Checked N. MACEWEN
Date 2014-04-28	Scale AS INDICATED

Client
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Project
CFIA ROOF REPLACEMENT
CENTRAL HEATING & COOLING PLANT

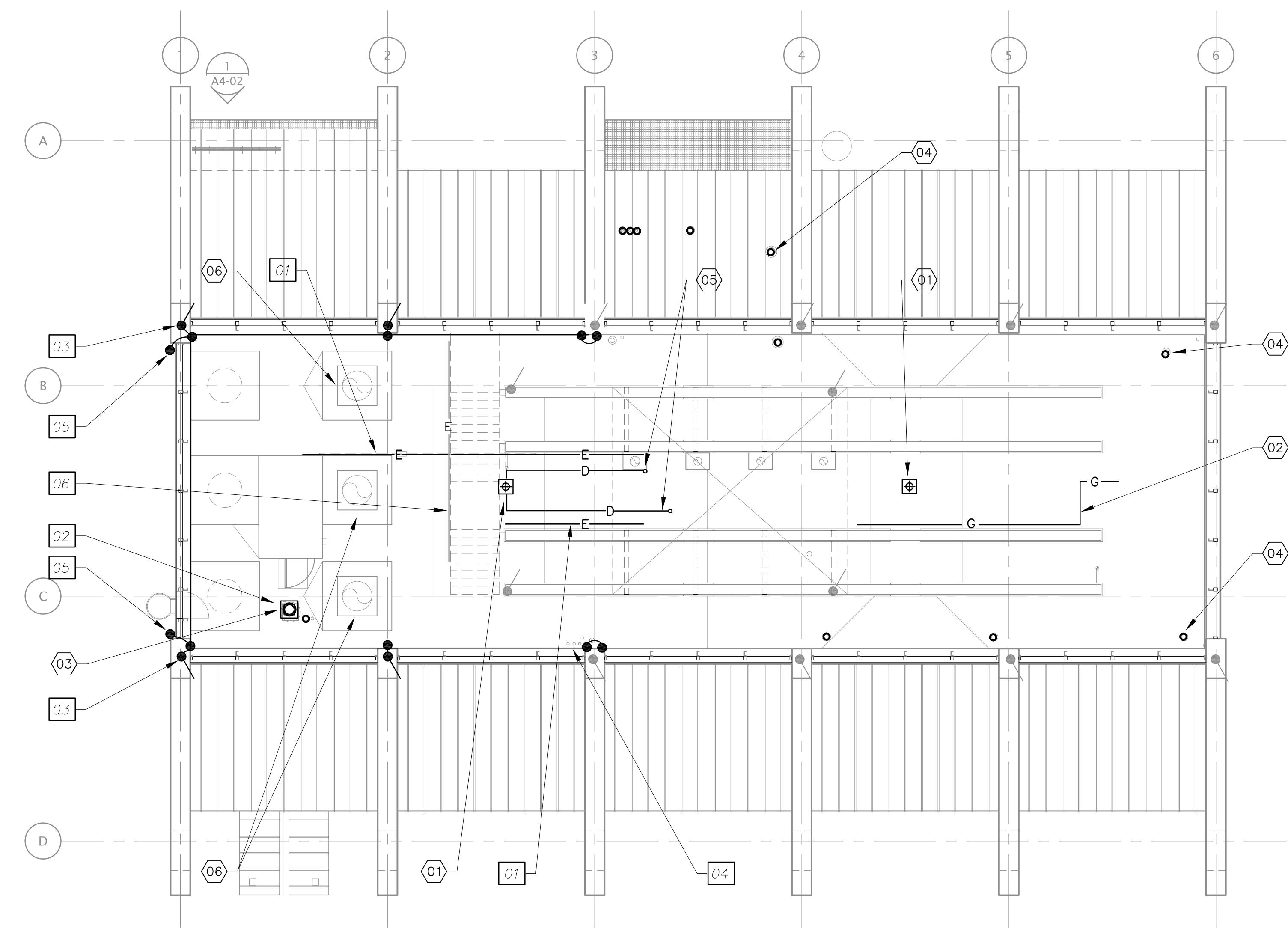
Drawing Title
ROOF DETAILS

Check Scale (may be photo reduced)
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Project No. ECOT13-0071	Drawing No. A4-02
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DATE	ISSUED FOR	REV
2014-07-04	ISSUED FOR TENDER	03
2014-05-29	ISSUED FOR 99% CLIENT REVIEW	02
2014-05-01	ISSUED FOR 66% CLIENT REVIEW	01

LEGEND	
DESIGNATION	SERVICE
----	EXISTING TO BE REMOVED
---	EXISTING EQUIPMENT/DEVICES TO REMAIN
—	NEW EQUIPMENT/DEVICES
○	PLUMBING VENT
□	GOOSE NECK VENT
⊕	EXHAUST FAN
⊕	ROOF DRAIN
—G—	GAS LINE
—R—	REFRIGERANT PIPING
—E—	ELECTRICAL/SECURITY/COMM CONDUIT/WIRING
—D—	PLUMBING DRAIN PIPING
▨	LOUVER



1 ROOF PLAN
ME1-01 1:100

GENERAL NOTES

- 01 CONTRACTOR MUST VERIFY DIMENSIONS AND CONDITIONS ON SITE BEFORE PROCEEDING WITH ANY PORTION OF THIS WORK. DO NOT SCALE FROM DRAWINGS.
- 02 ALL WORK TO COMPLY WITH THE NATIONAL BUILDING CODE AND MUNICIPAL REGULATIONS.
- 03 PROVIDE MINIMUM 2 DAY NOTICE PRIOR TO ANY CRITICAL SYSTEM SHUTDOWNS.
- 04 COORDINATE CONSTRUCTION PHASING AND TEMPORARY SERVICES WITH PROJECT MANAGER. BUILDING TO REMAIN OPERATIONAL AT ALL TIMES DURING BUSINESS HOURS. ALL WORK INVOLVING DISRUPTION OF SERVICES TO OTHER BUILDINGS ON CAMPUS TO BE COMPLETED AFTER BUILDING OPERATING HOURS.

Mechanical Notes

- 01 REPLACE EXISTING ROOF DRAIN EXTENSION COLLAR MEMBRANE CLAMP AND DOME STRAINER IN COORDINATION WITH ROOF REPLACEMENT. RESEAL AS REQUIRED.
- 02 REPLACE GAS LINE MOUNTING BRACKETS WITH NEW RUBBER MOUNTING HARDWARE. PROVIDE TEMPORARY SUPPORTS OF PIPING DURING ROOF REPLACEMENT. PROTECT AND MAINTAIN GAS SERVICE TO BUILDING AT ALL TIMES.
- 03 REMOVE AND RE-INSTALL EXHAUST FAN TO ALLOW FOR RE-FLASHING CURB. PROVIDE NEW 350MM ROOF CURB AND FLASHING. COORDINATE WITH GENERAL TRADES TO LIMIT FAN DOWNTIME TO A MINIMUM. INCLUDE FOR AFTER HOURS WORK.
- 04 TYPICAL: EXTEND EXISTING PLUMBING VENTS IN COORDINATION WITH ROOF REPLACEMENT. WELDED EXTENSION TO BE MINIMUM 600MM ABOVE MEMBRANE. RESEAL AS REQUIRED. ROOFING CONTRACTOR TO PROVIDE AND INSTALL NEW VENT FLASHING.
- 05 TYPICAL: LIFT DRAIN LINES AND PROVIDE TEMPORARY SUPPORTS OF PLUMBING IN COORDINATION WITH ROOF REPLACEMENT. REPLACE MOUNTING BRACKETS WITH NEW HARDWARE AND REPLACE ANY DAMAGED PIPING AND FITTINGS.
- 06 REPLACE BOILER COLLAR AND CLAMPS WITH HEAVY GAUGE GALVANIZED STEEL HARDWARE. REFER TO ARCHITECTURAL FOR ADDITIONAL DETAILS.

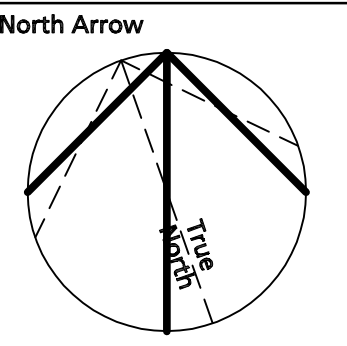
Electrical Notes

- 01 LIFT CONDUITS, JUNCTION BOXES AND PROVIDE TEMPORARY SUPPORTS OF ELECTRICAL AND SECURITY CONDUITS DURING ROOF REPLACEMENT. REPLACE MOUNTING BRACKETS WITH NEW HARDWARE. PROTECT AND MAINTAIN SERVICES TO BUILDING AT ALL TIMES. TYPICAL OF ALL CONDUITS ON ROOF.
- 02 REMOVE AND RE-INSTALL EXHAUST FAN CONNECTION TO ACCOMMODATE ROOF REPLACEMENT. REPLACE ALL EXPOSED LIQUID TIGHT CONDUITS AND CONNECTORS. COORDINATE WITH GENERAL TRADES TO LIMIT FAN DOWNTIME TO A MINIMUM. INCLUDE FOR AFTER HOURS WORK.
- 03 TYPICAL: PROVIDE NEW 500mm HIGH COPPER LIGHTNING PROTECTION AIR TERMINALS AND EXTEND TO EXISTING SYSTEM.
- 04 PROVIDE BARE COPPER CONDUCTOR AROUND PERIMETER OF ROOF TO ACCOMMODATE SYSTEM EXTENSION. RELOCATE AND REPLACE AS REQUIRED BARE COPPER CONDUCTOR AND THERMAL WELDS AT ROOF TO ACCOMMODATE REPLACEMENT. CONNECT NEW CONDUCTOR TO PERIMETER AIR TERMINAL. SECURE ALL INTERCEPTING CONDUCTORS TO ROOF STRUCTURE WITH COPPER FASTENERS SPACED NO MORE THAN 1.5m APART.
- 05 PROVIDE BARE COPPER DOWN CONDUCTOR TO PERIMETER GROUND GRID BELOW. PROVIDE 10m LONG 19mm DIAMETER COPPER CLAD GROUND RODS. INSTALL SUCH THAT TOP OF ROD IS 600mm BELOW GRADE. INTERCONNECT RODS WITH 95mm² BARE COPPER. SECURE ALL DOWN CONDUCTORS TO THE BUILDING WITH COPPER FASTENERS SPACED NO MORE THAN 1.5m APART. INSTALL IN CORNER AND COORDINATE FINAL LOCATION WITH DEPARTMENT REPRESENTATIVE. REFER TO SPECIFICATIONS.
- 06 PROVIDE FLEX CONDUIT AND PROPERLY STRAP ROOF DISH WIRING STRAPPED TO METAL STAIR. CONNECT DISH TO LIGHTNING PROTECTION SYSTEM WITH BARE COPPER CONDUCTOR CONNECTED TO PERIMETER INTERCEPTING CONDUCTOR.

NORR
ARCHITECTS ENGINEERS PLANNERS
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This drawing shall not be used for construction purposes until the seal appearing hereon is signed and dated by the Architect or Engineer.

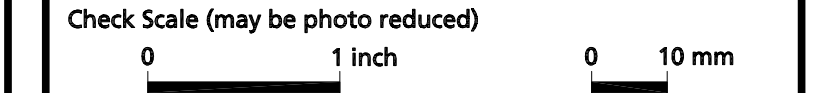


Project Manager NDIGDIVANNI	Drawn M.T.
Project Leader NMACEWEN	Checked AM./C.P.
Date 2014-04-28	Scale 1:100

Client
CANADIAN FOOD INSPECTION AGENCY (CFIA)
3851 FALLOWFIELD RD, OTTAWA ONT.

Project
CFIA ROOF REPLACEMENT
CENTRAL HEATING & COOLING PLANT

Drawing Title
MECHANICAL & ELECTRICAL MODIFICATIONS FOR ROOF REPLACEMENT



Project No. ECOT13-0071	Drawing No. ME-01
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