END

1.0 SUMMARY OF WORK

.1 The work of this contract comprises roof rehabilitation and related work at the Jasper Train Station in the Town of Jasper, Jasper National Park, Alberta.

.2 Tenants will occupy the building during entire project period. Cooperate with Departmental Representative in scheduling operations to minimize conflict and to facilitate tenant use.

2.0 WORK RESTRICTIONS

.1 Commence work upon notification of acceptance and complete by March 31, 2014.

.2 Execute work with least possible interference or disturbance to the normal use of building. Make arrangements with Departmental Representative to facilitate work as stated.

.3 Maintain existing services to building and provide for tenant, visitor, and vehicle access.

.4 Where security is reduced by work, provide temporary means to maintain security. Review measures with Departmental Representative before proceeding.

.5 Smoking is not permitted on site.

.6 Do not block exit doors and routes.

3.0 WORK BY OTHERS

.1 Co-operate with other Contractors in carrying out their respective work and carry out instructions from Departmental Representative.

.2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative, any defects which may interfere with proper execution of Work.

4.0 USE OF PREMISES

.1 Limit use of premises for Work, for storage, and for access, to allow:
- .1 Tenant occupancy.
- .2 Work by other contractors.
- .3 Public usage.

.2 Co-ordinate use of premises under direction of Departmental Representative.

.3 Obtain and pay for use of additional storage or work areas needed for operations.

.4 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

.5 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

5.0 PROJECT MEETINGS

.1 Departmental Representative will schedule a project start-up meeting following notice of acceptance. Agenda to include lines of communication, contact information, scheduling, and coordination.

.2 Subsequent meetings will be called as required.

.3 Contractor to record minutes and distribute to all participants.

6.0 SCHEDULE

.1 On award of contract submit bar chart construction schedule for work, indicating anticipated progress stages.

.2 Take necessary measures to complete work within scheduled time. Do not change schedule without approval of Departmental Representative.

.3 Schedule Work in consultation with Departmental Representative to minimize impact on tenants' and public's use of the building.

7.0 SUBMITTALS

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work.

.2 Shop drawings: Drawings and diagrams to illustrate details of a portion of Work.

.1 Submit electronic copy of shop drawings for each requirement requested in specification Sections.

.3 Where indicated, submit shop drawings stamped and signed by a professional engineer licensed in Province of Alberta, Canada.

.4 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.5 Product data: Manufacturer's catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products.
.1 Submit 5 copies of product data, or electronic documentation.
.2 Delete information not applicable to project.
.3 Cross-reference product data information to applicable portions of Contract Documents.

.6 Samples: examples of materials, equipment, quality, finishes, workmanship. Submit quantity, size, type as stated in respective specification section.
.1 Where colour, pattern or texture is criterion, submit full range of samples.
.2 Reviewed and accepted samples will become standard of workmanship and material against which installed work will be verified.

.7 Operation and Maintenance Data:
.1 Submit 3 copies of Operation and Maintenance Data for requirements requested in specification Sections.

.8 Project photos: Document progress of Work by digital photographs grouped in folders by date, and copied to a CD labelled with the project title, number and date.
.1 Viewpoints and frequency to be determined in conjunction with Departmental Representative.
.2 Submit photographs monthly with progress statement.

8.0 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications.

.2 Construct in locations acceptable to Departmental Representative.

.3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in orderly sequence, to not cause delays in Work.

.4 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

9.0 ENVIRONMENTAL PROCEDURES

.1 Fires and burning of rubbish on site is not permitted.

.2 Protect trees and plants on site. Wrap trees and shrubs adjacent to construction work in burlap.

.3 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, Permits.

.4 After receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.5 Departmental Representative will issue stop work order until satisfactory corrective action has been taken.

10.0 REGULATORY REQUIREMENTS

.1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Comply with the Standards and Guidelines for the Conservation of Historic Places in Canada. Copies are available at: http://www.historicplaces.ca/en/pages/standards-normes.aspx

.3 Comply with National Parks Act.

.4 Hazardous Material Discovery:
.1 Stop work immediately when material resembling spray or trowel-applied asbestos, PCB (polychlorinated biphenyl) or mould is encountered during work. Notify Departmental Representative.

11.0 RELICS AND ANTIQUITIES

.1 Protect relics, antiquities and items of historical and scientific interest found during course of the Work. Bring such items to immediate attention of Departmental Representative and await instructions before proceeding with the work in the location where the items are found.

12.0 FIRE SAFETY REQUIREMENTS

.1 Comply with the National Building Code of Canada 2010 (NBC) for fire safety in construction and the National Fire Code of Canada 2010 (NFC) for fire prevention, fire fighting and life safety in buildings in use.

.2 Comply with Human Resources and Social Development Canada (HRSDC), Fire Commissioner of Canada (FCC) standards:

.1 No. 301: Standard for Construction Operations

.2 No. 374: Fire Protection Standard for General Storage (Indoor and Outdoor)

.3 Available from HRSDC, Fire Protection Services, Policies and Standards, Fire Commissioner of Canada Standards, or the following internet site: http://www.hrsdc.gc.ca/eng/labour/fire_protection/policies_standards/commissioner/index.shtml

.4 Retain all fire safety documents and standards on site.

.3 Protect and maintain emergency access to fire department connections and access routes.

13.0 FIELD QUALITY CONTROL

.1 Carry out Work using qualified licensed workers in accordance with Provincial Act respecting manpower vocational training and qualification.

.2 Permit employees registered in Provincial apprenticeship program to perform specific tasks only if under direct supervision of qualified licensed workers.

.3 Determine permitted activities and tasks by apprentices, based on level of training attended and demonstration of ability to perform specific duties.

.4 Specification section identifies specific work experience requirements.

.5 Work to conform to the minimum applicable standards of the Canadian General Standards Board, the Canadian Standards Association, the National Building Code of Canada 2010 (NBC) and applicable Provincial and Municipal codes. In the case of conflict or discrepancy the most stringent requirement applies.

.6 Allow Departmental Representative access to Work.

.7 Independent Inspection/Testing Agencies may be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.

.8 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

14.0 TEMPORARY UTILITIES

.1 Existing services required for the work, excluding communications equipment, may be used by the Contractor without charge. Ensure capacity is adequate prior to imposing additional loads, to a maximum of 110 Volts. Connect and disconnect at own expense and responsibility.

.2 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.3 provide temporary heat and ventilation in enclosed areas as required to:
.1 Facilitate progress of Work.
.2 Protect Work and products against dampness and cold.
.3 Prevent moisture condensation on surfaces.
.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
.5 Provide adequate ventilation to meet health requirements for safe working environment.

.4 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.

.5 Provide and maintain temporary fire protection during performance of the Work.

.6 Notify Departmental Representative and utility companies of intended interruption of services, obtain requisite permission.

.7 Give Departmental Representative 48 hours notice related to each necessary interruption of any mechanical or electrical service throughout the course of the work. Keep duration of these interruptions to a minimum. Carry out all interruptions during periods determined by Departmental Representative.

15.0 CONSTRUCTION FACILITIES

.1 The Contractor’s construction yard will be located on site and determined in consultation with the Departmental Representative.

.2 Scaffold to be designed in accordance with CSA-S269.2 and to minimum standards outlined in Occupational Safety & Health Standards.

.1 Submit scaffolding drawings sealed by a professional engineer registered in the Province of Alberta.

.3 Provide and maintain scaffolding, ladders, swing staging, platforms, hoists, etc. as needed to execute the Work.

.4 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders, independent of finished surfaces.

.5 Provide and maintain lockable weatherproof sheds for storage of tools, equipment and materials.

.6 Contractor may provide site office if required. If provided, office to be heated to 22 degrees C, lighted to 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing lay-down table.

.7 Existing public washroom facilities may be used by Contractor's personnel during the building’s normal operating hours, but are to be used at the responsibility of the Contractor. Keep facilities clean. Contractor responsible for providing facilities at other times.

.8 Provide marked and fully stocked first-aid case in a readily available location.

.9 Provide common-use signs related to information, instruction, use of equipment, public safety, etc. in both official languages or by the use of commonly understood graphic symbols.

.10 Do not unreasonably encumber site with materials or equipment. Move stored products or equipment, which interfere with operations of building.

.11 Advertising is not permitted on this project.

.12 Contractor is responsible for the construction yard and work area security at all times. Ensure the construction zone is secure against entry when the work site is closed.

16.0 PROTECTION

.1 Provide temporary controls in order to execute Work expeditiously. Remove from site after use.

.2 Erect and maintain minimum 1.8 m high temporary fencing panels to support and resist overturning from all loads, including wind loads, and provide protection, complete with signs as required by authority having jurisdiction. Erect where directed by Departmental Representative.

.1 The minimum 1.8 m high fencing panels are to be prefabricated, interlocking, modular steel units. Snow fencing is not an acceptable alternative.

.2 Provide lockable pedestrian gates as directed. Equip gates with locks and keys.

.3 Provide weather-tight closures to unfinished openings. Design enclosures to withstand wind pressure and snow loading.

.4 Provide weather-tight enclosures for maintaining required temperatures specified in individual sections. Design enclosures to withstand wind pressure and snow loading.

.5 Provide protection for finished and partially finished building finishes and equipment during performance of Work. Protect finished work against damage until take-over.

.6 Maintain sidewalks clear of debris, ice and snow.

17.0 COMMON PRODUCT REQUIREMENTS

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended.

.2 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.3 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.4 Ensure quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.

18.0 EXAMINATION & PREPARATION

.1 Examine site and conditions likely to affect Work and be familiar and conversant with existing conditions.

.2 Before commencing work, provide photographs of surrounding properties, objects and structures liable to be damaged or be the subject of subsequent claims.

19.0 EXECUTION

.1 Remove items as shown or specified.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.4 Change in Materials: Submit request for substitution to Departmental Representative. Do not make change until approval granted.

.5 Submit written request in advance of cutting or alteration which affects:

.1 Structural integrity of elements of project.

.2 Integrity of weather-exposed or moisture-resistant elements.

.3 Efficiency, maintenance, or safety of operational elements.

.4 Visual qualities of sight-exposed elements.

.6 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.7 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.8 Patch and make good surfaces cut, damaged or disturbed, to Departmental Representative's approval. Match existing material, colour, finish and texture.

.9 Refinish surfaces to match adjacent finishes. Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

20.0 CLEAN UP

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris.

.2 Clean up work area as Work progresses. At the end of each work period, and more often if ordered by Departmental Representative, remove debris from site, neatly stack material for use, and clean up generally.

.3 Do not burn waste materials on site.

.4 Provide on-site containers for collection of waste materials.

.5 Dispose of waste materials and debris off site.

.6 Upon completion, remove temporary protection and surplus materials. Make good defects noted.

21.0 PROJECT

.1 Acceptance of Work Procedures:

CLOSEOUT AND SUBMITTALS

.1 Contractor's Inspection: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
.2 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
.3 Departmental Representative Inspection: Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
.4 Contractor to correct Work as directed.
.5 Completion Tasks: submit written certificates that tasks have been performed as follows:
  .1 Work: completed and inspected for compliance with Contract Documents and ready for final inspection.
  .2 Defects: corrected and deficiencies completed.
.6 Final Inspection: When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
  .1 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

.2 Record Documents: Record information on set of drawings, and in copy of Project Manual, provided by Departmental Representative.

.3 Contract Drawings and Shop Drawings: mark each item to record actual construction, including:

.1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.2 Field changes of dimension and detail.

.3 Changes made by change orders.

.4 Details not on original Contract Drawings.

.5 References to related shop drawings and modifications.

.4 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.5 Project Manuals: Submit three project manuals at the time of substantial performance, and in the format of 'letter'-sized 'D'-ring binders.

.1 Table of Contents for Each Volume:

.1 Title of project;

.2 Date of submission;

.3 Names, addresses, and telephone numbers of Contractor(s) with name of responsible parties.

.2 Manuals to contain all project information including:

.1 Product data;

.2 Material specifications;

.3 Paint colour formulae;

.4 Progress photographs;

.5 Maintenance schedules and procedures;

.6 Warranties and bonds.

.3 For each item of equipment and each system include description of unit or system, and component parts.

.1 Give function, normal operation characteristics and limiting conditions.

.2 Include manufacturer's printed operation and maintenance instructions.

.3 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.4 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.4 For building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.6 Maintenance Materials: Submit specified maintenance materials.

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.7 Warranties and Bonds: List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.1 Obtain warranties and bonds, executed in triplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

.2 Incorporate into Project Manual.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

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

.3 Attestation and Proof of Compliance with Occupational Health and Safety (APC).

.4 Province of Alberta
- .1 Occupational Health and Safety Act and Regulations.

.5 American National Standards Association (ANSI) A10.3 - Safety Requirements for Powder-Actuated Fastening Systems.

.6 National Building Code of Canada (NBCC) 2010 - Part 8 Safety Measures at Construction and Demolition Sites.

1.2 SUBMITTALS

.1 Make submittals in accordance with Section 01 00 10 General Instructions.

.2 Submit within 7 days after date of Notice to Proceed and prior to commencement of Work:
- .1 Site-specific Health and Safety Plan including:
  - .1 Results of site specific safety hazard assessment.
  - .2 Results of safety and health risk or hazard analysis for site tasks and operations.
- .2 Completed and signed Attestation and Proof of Compliance with Occupational Health and Safety form.

.3 Submit 2 copies of Contractor's authorized representative's work-site health and safety inspection reports to Departmental Representative.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit copies of incident and accident reports.

1.2 SUBMITTALS (Cont'd)

.6 Submit WHMIS MSDS - Material Safety Data Sheets.

.7 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to beginning of Work.

1.4 MEETINGS

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

1.5 PROJECT/SITE CONDITIONS

.1 Work at site might involve contact with:
.1 Lead-containing paint.

1.6 GENERAL REQUIREMENTS

.1 Perform site specific safety hazard assessment related to project.

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

.3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 working days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 5 working days after receipt of comments.

.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.

.5 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for

1.6 GENERAL REQUIREMENTS (Cont'd)

.5 Medical Surveillance:(Cont'd) any new site personnel to Departmental Representative.

1.7 RESPONSIBILITY

.1 Assume resposibility as Prime Contractor for work under this contract.

.2 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 performance of Work.

.3 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.

1.8 COMPLIANCE REQUIREMENTS

.1 Comply with Alberta Occupational Health and Safety Act, Alberta Occupational Health and Safety Regulation, and Alberta Occupational Health and Safety Code.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

.3 Comply with NBCC 2010 Part 8.

1.9 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition becomes evident during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.10 POSTING OF DOCUMENTS

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

1.11 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.12 POWDER ACTUATED DEVICES

.1 Use powder actuated devices in accordance with ANSI A10.3 and only after receipt of written permission from Departmental Representative.

1.13 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END

PART 1 - GENERAL

1.1 WASTE MANAGEMENT GOALS

.1 Accomplish maximum control of solid construction waste.

.2 Preserve environment and prevent pollution and environment damage.

1.2 WASTE REDUCTION WORKPLAN (WRW)

.1 Prepare WRW prior to project start-up.

.2 WRW should include but not be limited to:
.1 Deconstruction/disassembly techniques and sequencing.
.2 Schedule for deconstruction/disassembly.
.3 Clear labelling of storage areas.
.4 Details on materials handling and removal procedures.
.5 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.

.3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

.4 Describe management of waste.

.5 Identify opportunities for reduction, reuse, and recycling of materials.

.6 Post WRW or summary where workers at site are able to review content.

.7 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.

.8 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

1.3 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

.1 Prepare MSSP and have ready for use prior to project start-up.

.2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.

1.3 MATERIALS SOURCE SEPARATION PROGRAM (MSSP) (Cont'd)

.3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide containers to deposit reusable and recyclable materials.

.5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.

.6 Locate separated materials in areas which minimize material damage.

.7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.

1.4 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.

.2 Unless specified otherwise, materials for removal become Contractor's property.

.3 Protect, stockpile, store and catalogue salvaged items.

.4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

.5 Protect surface drainage, mechanical and electrical from damage and blockage.

.6 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
.1 On-site source separation is recommended.
.2 Remove co-mingled materials to off-site processing facility for separation.

1.5 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

1.5 DISPOSAL OF WASTES (Cont'd)

.2 Do not dispose of waste volatile materials, mineral spirits or oil paint thinner into waterways, storm, or sanitary sewers.

.3 Keep records of construction waste including:
.1 Number and size of bins.
.2 Waste type of each bin.
.3 Total tonnage generated.
.4 Tonnage reused or recycled.
.5 Reused or recycled waste destination.

1.6 SCHEDULING

.1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 APPLICATION

.1 Do Work in compliance with WRW.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

.1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

.1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.
.1 Mark containers or stockpile areas.

3.3 DIVERSION OF MATERIALS (Cont'd)

.1 (Cont'd)
.2 Provide instruction on disposal practices.

.2 On-site sale of materials is not permitted.

.3 Demolition Waste:

Material Type	Recommended Diversion %	Actual Diversion %
Metals	100	
Wood	100	

.4 Construction Waste:

Material Type	Recommended Diversion %	Actual Diversion %
Cardboard	100	
Plastic Packaging	100	
Wood (uncontaminated)	100	

3.4 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Schedule E - Government Chief Responsibility for the Environment:

Alberta Environmental Protection
9820 - 106th Street, Edmonton, AB T5K 2J6

Alberta Special Waste Management Corporation
Suite 610 - 10909 Jasper Avenue, Edmonton, AB T5J 3L9

END

PART 1 - GENERAL

1.1 REFERENCES

.1 Department of Justice Canada (Jus).
- .1 Canadian Environmental Assessment Act (CEAA), 2012.
- .2 Canadian Environmental Protection Act, 1999 (CEPA).

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

.3 Transportation of Dangerous Goods Act (TDGA), 1992.

1.2 SUBMITTALS

.1 Make submittals in accordance with Section 01 00 10 - General Instructions.

.2 Prior to beginning of Work on site submit Waste Reduction Workplan in accordance with Sections 01 74 21 - Construction/Demolition Waste Management and Disposal and indicate:
- .1 Descriptions of and anticipated quantities of materials to be salvaged, reused, recycled and landfilled.
- .2 Schedule of selective demolition.
- .3 Number and location of dumpsters.
- .4 Anticipated frequency of tippage.

1.3 QUALITY ASSURANCE

.1 Regulatory Requirements: ensure Work is performed in compliance with CEPA, TDGA, and applicable Provincial/Territorial regulations.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .1 Divert excess materials from landfill to site approved by Departmental Representative
- .2 Separate for recycling and place in designated containers Steel Metal Plastic waste in accordance with Waste Management Plan.
- .3 Place materials defined as hazardous or toxic in designated containers.

1.4 WASTE MANAGEMENT AND DISPOSAL (Cont'd)

.1 (Cont'd)
.4 Handle and dispose of hazardous materials in accordance with CEPA, and TDGA regulations.
.5 Ensure emptied containers are sealed and stored safely.
.6 Source separate for recycling materials that cannot be salvaged for reuse including wood, metal, concrete and asphalt, and gypsum.
.7 Remove materials that cannot be salvaged for reuse or recycling and dispose of in accordance with applicable codes at licensed facilities.

1.5 SITE CONDITIONS

.1 Should material resembling spray or trowel-applied asbestos or other designated substance be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.
.1 Do not proceed until written instructions have been received from Departmental Representative.

.2 Notify Departmental Representative before disrupting building access or services.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Inspect building with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

3.2 PROTECTION

.1 Prevent movement, settlement, or damage to adjacent landscaping features and to parts of building to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

.5 Do Work in accordance with Section 01 35 29.06 - Health and Safety Requirements

3.3 SALVAGE

.1 Refer to demolition drawings and specifications for items to be salvaged for reuse.

3.4 SELECTIVE DEMOLITION

.1 Remove materials indicated and as follows to permit new construction.
.1 Remove asphalt shingles and underlayments down to existing roof deck.
.2 Remove damaged and deteriorated flashings.
.3 Remove eaves troughs and downspouts.
.4 Remove attic roof vents and abandoned and non-operational mechanical vents.
.5 Cut out and remove rotting roof deck boards.
.6 Remove Christmas lights and ice melting cables.
.7 Remove fascia boards and roof edge moldings. Salvage re-usable boards and moldings for painting and reinstallation. Number and record locations of fascias and moldings for reinstallation in original locations.

.2 Sort materials into appropriate piles for recycling or disposal.

.3 Do not disturb items designated to remain in place.

.4 Turn over Christmas lights and ice melting cables to Departmental Representative.

3.5 DISPOSAL .1 Dispose of removed materials in accordance with Waste Management Plan.

3.6 CLEANING .1 Remove debris and leave work site clean each day and upon completion of Work

END

PART 1 – GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 04 04 99 Masonry for Minor Works.

1.2 DEFINITIONS

.1 Definitions:
.1 Raking: removal of loose/deteriorated mortar to a depth suitable for repointing until sound mortar, and/or 4x joint thickness and/or a specified mm depth mm is reached.
.2 Repointing: filling and finishing of masonry joints from which mortar is missing has been raked out or has been omitted.
.3 Tooling: finishing of masonry joints using tool to provide final contour.
.4 Low-pressure water cleaning: water soaking of masonry using less than 350 kPa (50 psi) water pressure, measured at nozzle tip of hose.

1.3 REFERENCES

.1 ASTM International
.1 ASTM C 144-11, Standard Specification for Aggregate for Masonry Mortar.
.2 ASTM C 207-06(2011), Standard Specification for Hydrated Lime for Masonry Purposes.

.2 CSA International
.1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
.2 CAN/CSA-A179-04(R2009), Mortar and Grout for Unit Masonry.
.3 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.5 CAN/CGSB-10.3, Air-setting

Refractory Mortar.

1.4 SUBMITTALS

.1 Submit in accordance with Section 01 00 10 – General Instructions.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for mortar and include product characteristics, performance criteria and limitations.
.2 Prior to mixing or preparation of mortars submit for review to Departmental Representative confirmation of source or product data sheet of:
.1 Aggregate.
.2 Cement.
.3 Lime.
.4 Premixed products.
.5 Pigments.

.3 Samples:
.1 Provide samples in quantity and size in accordance with CAN/CSA-A179.

.4 Test reports:
.1 Submit test results during site work as directed by Departmental Representative as follows:
.1 Sieve analysis: sand.
.2 Bulking analysis: sand.
.3 Air content: mortar mix in plastic state.
.4 Vicat cone penetration: mortar mix.
.5 Mortar compressive strength: at 7 and 28 days or otherwise required.

1.5 QUALITY ASSURANCE

.1 Qualifications
.1 Masonry Contractor:
.1 Use single Masonry Contractor for masonry work.
.2 Masonry contractor to have 10 years experience minimum in historic stone and brick masonry work on

projects of similar size and complexity to Work of this Contract.
.3 Masonry contractor to have good level of understanding of structural behaviour of masonry walls when masonry work involves replacing or repairing stones and brick which are part of structural masonry work.
.2 Masons:
.1 Mason to have certificate of qualification with 5 years minimum experience in historic stone and brick masonry work.

.2 Mock-ups:
.1 Construct mock-up in accordance with Section 01 00 10 General Instructions.
.2 Submit methods of reproducing existing mortar colour, texture and pointing types, and samples.
.3 Construct mock-up 1000 x 1000 mm.
.4 Mock-up will be used:
.1 To judge quality of work, substrate preparation, and material application.
.2 For testing to determine compliance with performance requirements.
.5 Construct mock-up to demonstrate mortar colour and texture, and raking and repointing procedures for each type of masonry material specified in locations designated by Departmental Representative.
.6 Locate as directed by Departmental Representative.
.7 Notify Departmental Representative 48 hours before commencing mock-up.
.1 Obtain approval from Departmental Representative before commencing mock-up.
.8 Allow 48 hours for inspection of mock-up before proceeding with work.
.9 When accepted, mock-up will demonstrate minimum standard for this Work. Approved mock-up will not remain as part of finished work. Remove mock-up and dispose of materials when no longer

required and when directed by Departmental Representative.
.10 Allow for 3 mock-ups to demonstrate a variety of sand and colouring mixes to achieve a match with existing mortar.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 00 10 General Instructions and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store cementitious materials and aggregates in accordance with CSA A23.1/A23.2.
.3 Protect from weather, freezing and contamination.
.4 Remove rejected or contaminated material from site.

1.7 SITE CONDITIONS

.1 Ambient Conditions:
.1 Provide weather-tight enclosure to store materials and mix mortars, maintain air temperature above 10 degrees C at all times.
.2 Maintain maximum/minimum thermometers and relative humidity gauges on site and in enclosures.
.1 Maintain a daily record of temperature and humidity.

.2 Maintain masonry temperature between 10 degrees C and 25 degrees C for duration of work.

.3 When ambient temperature is below 10

degrees C:
.1 Store mortar materials for immediate use within heated enclosure. Allow mortar materials to reach minimum temperature of 10 degrees C before use.
.2 Ensure only sand and water are heated before use:
.1 Heat and maintain sand temperature to minimum 10 degrees C and maximum 30 degrees C.
.2 Heat and maintain water temperature to minimum of 20 degrees C and maximum of 30 degrees C.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Water: potable, clean and free from contaminants.

.2 Sand: to CAN/CSA-A179.

Sieve Size	% By Weight Passing Each Sieve	% By Weight Retained on Each Sieve
No. 4 (4.75 mm)	100	0
No. 8	90	10
No. 16 (1.18 mm)	70	20
No. 30 (600 µm)	50	20
No. 50 (300 µm)	30	20
No. 100 (150 µm)	15	15
No. 200 (75 µm)	0	15

.1 Sharp, screened and washed pit sand, free of organic material, with final grading and colour to approval of Departmental Representative.
.2 Custom blend sands as necessary to

provide appropriate colour match and gradation to approval of Departmental Representative.
.3 Select and blend sands to match colour, texture and grain size of existing sand.

.3 Portland cement: to CAN/CSA-A3000, grey or white as required to achieve acceptable match with existing mortar.

.4 Lime:
.1 Hydrated Lime:
.1 Air-entrained dolomitic lime, Type "SA", to ASTM C 207.

.5 Colour:
.1 Ground coloured natural aggregates, and/or coloured sand to match existing. Use minimum amount necessary.
.2 Maximum colour: 2% of total volume of aggregate.
.3 Match core of freshly broken sample of original mortar.

2.2 MORTAR MIXES

.1 Proportion requirements:
.1 Portland cement-lime mortar:
.1 For normal exterior pointing and bedding: based on proportion specifications, consisting of 1 part Portland cement, 1.5 parts hydrated lime, and 5.5 parts sand.

.2 Make minor adjustments to proportions for each mock-up to achieve match with existing mortar. Approved mock-up will establish final mix.

PART 3 - EXECUTION

3.1 GENERAL PREPARATIONS

.1 Mortar:
.1 Prepare measuring boxes to ensure accurate proportioning of materials.
.2 Maintain separate measuring boxes for each component.

.3 Ensure sand is tested and volume corrected for bulking.
.4 Ensure air entraining agent is available together with a graduated container for accurate volume measurements.
.5 Ensure testing equipment is ready and in working order.
.6 Apply Vicat cone test to ensure desirable performance of the mortar and record results.

3.2 BULKING OF SAND

.1 Test sand for bulking:
.1 At start of work.
.2 After each new delivery of sand.
.3 After severe change in weather.

.2 Test and adjust sand quantities for bulking:
.1 Obtain sample of sand which accurately reflects average condition of pile of damp sand, as follows:
.1 Take 4 shovels full of sand, each from a different level of the pile, and mix thoroughly.
.2 Place sand in a conical pile and divide into 4 quarters with a board. Remove 2 opposite quarters from pile, and combine remaining 2 quarters and mix thoroughly.
.3 Repeat quartering and mixing procedure until a sample of size required for testing remains.
.2 Fill a 1-litre capacity jar, about two-thirds full with damp sand to be tested. Drop sand in loosely. Do not pack it in. Level off surface, measure depth of damp sand (D).
.1 Carefully empty sand into another container, and half fill first container with water.
.2 Pour back about half of test sample of sand slowly into water so it is entirely saturated. Rod it thoroughly to remove air.
.3 Add rest of sand, rodding again to remove air and level off surface. Measure depth of saturated sand (S), which will be less than depth of damp

sand.
.4 Calculate percentage bulking using formula: (D-S) x 100%/S = percentage bulking; where D = depth of damp sand, and S = depth of saturated sand.

.3 Increase volume of sand by percentage bulking shown in test.

3.3 PREPARATION OF MORTAR

.1 Lime-Cement Mortar:
.1 Prepare measuring boxes to ensure accurate proportioning of dry lime and sand.
.2 Mix dry lime and sand thoroughly in spiral- blade mechanical mixer for minimum 3 maximum 10 minutes. Do not add water. No spots or streaks of lime to remain upon completion of mixing.
.3 Add water as required.

3.4 MIXING

.1 General:
.1 Use batching box.
.2 Follow proper batching procedure.
.3 Monitor mixing time.

.2 Mortar:
.1 Mix Characteristics:
.1 Pointing mortar: slightly stiffer than bedding mortar with a consistency such that the mortar can be hand-formed into a stiff ball.
.2 Record amount of water required to reach this consistency and use for subsequent mixes.
.2 Prepare only enough mortar to be used within two hours. Do not re-temper mortar beyond this time.

.3 Follow manufacturer’s instructions when premixed mortar is used.

.4 Appoint 1 individual to mix mortar for duration of project. If this individual must be changed, mortar mixing must cease until new individual is trained, and mortar mix is tested.

3.5 CONSTRUCTION

.1 Do masonry work in accordance with Section 04 04 99 Masonry for Minor Works.

3.6 REPOINTING

.1 Report in writing to Departmental Representative areas of deteriorated masonry not previously identified.

.2 Examine mortar joints.

.1 Examine joints as well as aspects of workmanship which establish authenticity of original work. Replicate style.

.3 Test mortar joints.

.1 Procedure of testing: examine joints visually for obvious signs of deteriorated masonry.

.2 Test joints not visually deteriorated as follows:

.1 Test for voids and weakness by using hammers or other approved means.

.2 Perform testing in co-operation with Departmental Representative so that unsound joints can be marked and recorded.

.4 Rake mortar joints.

.1 Use manual tools to obtain clean masonry surfaces.

.1 Remove deteriorated and adhered mortar from masonry surfaces to full depth of deteriorated mortar but in no case less than 20 mm leaving square corners and flat surface at back of cut.

.2 Clean out voids and cavities encountered.

.4 Remove mortar without chipping, altering or damaging masonry units.

.5 Clean surfaces of joints by compressed air or with non-ferrous brush without damaging texture of exposed joints or masonry units.

.6 Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining blow clean with

compressed air.
.7 Leave no standing water.

.5 Repointing.
.1 Dampen joints and porous masonry units.
.2 Keep masonry damp while pointing is being performed.
.3 Completely fill joint with mortar.
.1 If surface of masonry units has worn rounded edges keep pointing back from surface to keep same width of joint
.2 Avoid feather edges.
.3 Pack mortar solidly into voids and joints.
.4 Build-up pointing in layers not exceeding 12 mm in depth.
.1 Allow each layer to set before applying subsequent layers.
.2 Maintain joint width.
.5 Finish joints to match existing.
.6 Remove excess mortar from masonry face before it sets.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 00 10 General Instructions.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 00 10 General Instructions.

.3 Remove droppings and splashings using clean sponge and water.

.4 Clean masonry with low pressure clean water and soft natural bristle brush.

.5 Obtain approval of Departmental Representative prior to using other cleaning methods for persistent stains.

3.8 PROTECTION OF COMPLETED WORK

.1 Cover completed and partially completed work not enclosed or sheltered at end of each work day.

.1 Membranes should extend to 0.5 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly.

.2 Cover with waterproof tarps to prevent weather from eroding recently laid material.
.1 Maintain tarps in place for minimum of 1 week after repointing.
.2 Ensure that bottoms of tarps permit airflow to reach mortar in joints.

.3 Damp cure:
.1 Provide damp cure for pointing mortars.
.2 Install and maintain wetted burlap protection during the curing process for minimum 3 days.
.3 Wet mist burlap only - ensure no direct spray reaches surface of curing mortar.
.4 Shade areas of work from direct sunlight and maintain constant dampness of burlap.

.5 Protect from drying winds. Pay particular attention at corners of structure.

.6 Maintain ambient temperature of minimum 10 degrees C after repointing masonry for:
.1 Minimum 7 days in summer.
.2 Minimum 30 days in cold weather conditions using dry heated enclosures.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 04 04 99 Masonry for Minor Works.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Conduct a pre-dismantling meeting with Departmental Representative to verify project requirements, equipment, procedures and assigned storage areas.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 00 10 – General Instructions.

.2 Site Quality Control Submittals:
.1 Provide up-to-date copies of stone location recording system chart or card index, as well as chronological information concerning each numbered unit (individual cards of units), when requested.
.2 Submit photographic record of masonry to be dismantled and rebuilt.
.3 Record drawings of layout of stored masonry.

1.4 QUALITY ASSURANCE

.1 Qualifications:
.1 Masonry Contractor:
.1 Work of this Section: executed by contractor specializing in historic masonry conservation work, using similar dismantling techniques, and with a minimum 10 year record of successful performance.
.2 Foreperson:
.1 Provide competent trade foreperson specializing in type of work required.
.2 Experience: minimum 10 years successful experience in deconstruction of historic masonry. Must be present on site throughout

Work.

.3 Dismantlers:

.1 Experience: minimum 5 year record of successful masonry dismantling.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 00 10 – General Instructions and with manufacturer's written instructions.

.2 Protect and store masonry units to facilitate their resetting.

.1 Store dismantled masonry units on wood pallets, protected from exposure to water, elements, and potential mechanical damage within a shed.

.2 Place removed masonry units on wood surfaces during handling. Prevent contact with metal.

.3 When masonry units are lowered to ground, place directly on wooden platform that will be used for transport or storage.

.4 Transport and keep masonry units on wooden platforms.

.5 Ensure that edges of masonry units do not come into contact with hard objects.

.6 Submit storage and identification system to Departmental Representative for approval.

.7 Provide weather protection to newly opened sections in assemblies.

1.6 AMBIENT CONDITIONS

.1 Loosen wet masonry only when temperature is above 5 degrees C.

.2 In temperature 5 degrees C and below:

.1 Keep masonry dry.

.2 Protect wet masonry from freezing.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verify locations and dimensions of areas of Work with Departmental Representative.

.2 Examine masonry, staging and storage areas and notify Departmental Representative in writing of conditions detrimental to acceptable and timely completion of Work.

3.2 SITE VERIFICATION OF CONDITIONS

.1 Check for evidence of repairs, cracks, moisture, soluble salts contamination and other defects not noted on drawings.

.2 Report in writing, to Departmental Representative areas of deteriorated masonry not identified in drawings. Obtain Departmental Representative's approval and instructions for repair of masonry before proceeding.

.3 Stop work in that area and report to Departmental Representative immediately evidence of hazardous materials.

3.3 PREPARATION

.1 Place safety devices and signs near work area as directed in accordance with Section 01 00 10 – General Instructions.

.2 Install and remove self-supporting scaffolding in accordance with Section 01 00 10 – General Instructions.

3.4 PROTECTION

.1 Prevent damage to building, fencing, landscaping, bench marks, pavement and utility lines which are to remain. Make good

damage incurred.

.2 Protect surrounding components from damage during work.
.1 Make good damage to historic fabric.
.2 Obtain Departmental Representative's approval for repair methodology.

.3 Cover completed and partially completed work not enclosed or sheltered at end of each work day.
.1 Tarps should extend to 0.5 m over surface area of work and be tightly installed to protect work.
.2 Ensure that bottoms of tarps permit airflow.
.3 Anchor coverings securely in position.

3.5 SPECIAL TECHNIQUES

.1 Before dismantling stones, indicate dimensions of each stone in removal area on a drawing, chart or index card.

.2 Temporary Marking and Recording:
.1 Mark stone, on face, before removal using marking product which can be completely erased when required without damaging unit:
.1 Ball-point pen on diachylon, attached to stone.
.2 Waxless chalk directly on stone.
.2 Mark/Identify:
.1 Stones and other elements or components to show identity and position.
.2 Wood platforms or other equipment used to transport and store stones.
.3 Work and storage areas.
.4 Location from which stones are removed on drawings or photographs.
.3 Stone location recording system.
.1 Prepare chart or card index to:
.1 Help locate stones or units when necessary.
.2 To manage availability of

platforms.
.3 To manage work and storage areas.
.2 Keep chart or card index up-to-date and, if required, produce copy every day.
.3 Prepare chart or card index or drawing to contain relevant information.
.4 Ensure that temporary marking will remain in use resistant to weather, handling and cleaning until final cleaning of stones.
.5 Remove markings and adhesive without damaging units:
.1 Brush with vegetable fibre brush: either dry or with water.
.2 Use no solvent, acid or other chemical product.

3.6 METHOD FOR LOOSENING BRICK AND STONE

.1 Use approved methods to loosen brick and stones which will cause no damage either to masonry or to other architectural elements.

.2 Remove brick and stone using low impact removal methods. Use hand tools only.

.3 Obtain Departmental Representative's approval for alternative methodology and tools to be employed before commencing the work.

.4 Clean masonry surface of dust and stone chips.

3.7 DISMANTLING AND MOVING BRICK AND STONE

.1 During removal, protect sound areas to remain.

.2 Avoid damaging brick and stone when removing mortar and freeing up.

.3 Remove excess mortar using hand tools.

.4 Remove adhered mortar from surface of

adjacent masonry that remains in place.

.5 Protect brick and stone from damage when lifting from position.

.6 Where damage occurs to brick and stone:
.1 Report to Departmental Representative;
.2 Make good damage incurred;
.3 Obtain approval of repaired damage from Departmental Representative.

3.8 HANDLING

.1 Place removed brick and stone on wood surfaces during handling. Prevent contact with metal.

.2 When masonry units are lowered to ground, place directly on wooden platform used for transport or storage.

3.9 TEMPORARY STORAGE STAGING AREA

.1 Place stones in designated area of site for cleaning, detailed inspection and for final marking, before storage.

.2 Carefully clean and store brick and stone for re-use.

.3 Do cleaning operations at above freezing temperature.
.1 After cleaning, protect wet masonry against freezing until dry.

.4 Clean stones by wet scrubbing with vegetable fibre brush unless otherwise instructed by Departmental Representative.
.1 Do not use high pressure water jet.

.5 Use chemical cleaning methods only with prior written approval of Departmental Representative.

3.10 FINAL MARKING

.1 Do final marking after cleaning, on surface that supports good adhesion and legibility and will not be visible after resetting.

.2 Ensure that marking product used will not affect mortar to stone adhesion when resetting.

.3 Ensure marking product used will survive storage until resetting of stone.

3.11 FINAL STORAGE

.1 When masonry is placed under shelter, design and ventilate shelter to keep condensation from forming on internal surfaces.

.2 Lay out storage so that each stone will have its numbered face visible, and be accessible or removable without having to move adjacent stones.

.3 Make stones accessible and retrievable when required.

.4 Show layout of stones to be stored on record drawing.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 04 03 10 Historic – Mortaring and Masonry Repointing.

.2 Section 04 03 45 Historic – Dismantling Brick and Stone Masonry.

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

1.2 REFERENCES

.1 ASTM International
.1 ASTM A 1064 Standard Specification for Steel Wire and Welded Wire Reinforcement, Plain, and Deformed, for Concrete.

.2 CSA International
.1 CAN/CSA-A82-06(R2011), Fired Masonry Brick Made From Clay or Shale.
.2 CAN/CSA-A179-04(R2009), Mortar and Grout for Unit Masonry.
.3 CAN/CSA A371-04(R2009), Masonry Construction for Buildings.
.4 CSA-A23.1/A23.2-[09], Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

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

1.3 SUBMITTALS

.1 Submit in accordance with Section 01 00 10 General Instructions.

.2 Samples:
.1 Submit for review and acceptance of each unit.
.2 Samples will be returned for inclusion into work.

.3 Submit duplicate full size samples of each type masonry unit.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 00 10 General Instructions and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Replace defective or damaged materials with new.

1.5 QUALITY ASSURANCE

.1 Mock-up:
.1 Construct mock-up in accordance with Section 01 00 10 General Instructions.

.2 Construct mock-up panel of portion of masonry chimney 300 mm high showing brick and stone, concrete cap, masonry colour and texture, through-wall flashing, coursing, mortar, joint finishing, cleaning and workmanship.
.3 Construct mock-up where directed by Departmental Representative.
.4 Notify Departmental Representative minimum of 48 hours prior to construction of the mock-up.
.5 Construct mock-up to demonstrate understanding of specified procedures, techniques and formulations is achieved before work commences.
.6 Work not to proceed prior to approval of mock-up. Allow 48 hours for inspection of mock-up by Departmental Representative. Accepted mock-up becomes standard for this Work.

.2 When mock-up accepted, proceed with reconstruction work. Mock-up will not remain as part of finished Work. Remove mock-up when directed.

1.6 AMBIENT CONDITIONS

.1 Maintain materials and surrounding air to minimum 10 degrees C prior to and for minimum 72 hours after completion of brick repairs.

.2 Maintain temperature of mortar materials in accordance with Section 04 03 10 - Historic – Mortaring and Masonry Repointing.

.3 Maintain masonry temperature between 10 degrees C and 25 degrees C for duration of the Work.

PART 2 - PRODUCTS

2.1 MASONRY UNITS

.1 Existing (salvaged) brick: in accordance with Section 04 03 45 Historic – Dismantling Brick and Stone Masonry.
.1 Use hard, sound, and clean old bricks salvaged on site. Use only bricks without evidence of soluble salts.

.2 New brick:
.1 Burned clay brick: to CAN/CSA-A82.
.2 Grade: EG - Exterior Grade.
.3 Type: S.
.4 Size: to match existing.
.5 Colour and texture: to match existing.

.3 Existing (salvaged) stone: in accordance with Section 04 03 45 Historic – Dismantling Brick and Stone Masonry.

2.2 REINFORCEMENT

.1 Welded steel wire fabric for chimney caps: to ASTM A 1064, 102 x 102 x MW18.7/18.7.

2.3 MORTAR AND CONCRETE

.1 Mortar: in accordance with Section 04 03 10 Historic – Mortaring and Masonry Repointing.

.2 Concrete for chimney caps:
.1 To CSA A23.1/A23.2.
.2 Cement: to CSA A3001, Type GU.
.3 Water: to CSA A23.1/A23.2.
.4 Aggregate size and colour: to match existing.
.5 Provide concrete mix to meet following hard state requirements:
.1 Durability and class of exposure: F-2.
.2 Compressive strength at 28 days age: 25 MPa minimum.

2.4 ACCESSORIES

.1 Reglets: to Section 07 62 00 Sheet Metal Flashing and Trim.

.2 Bitiminous membrane flashing: to Section 07 62 00 Sheet Metal Flashing and Trim

.3 Premoulded joint filler:
.1 Bituminous impregnated fibreboard: to ASTM D 1751.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Place safety devices and signs near work area as directed in accordance with Section 01 00 10 General Instructions.

.2 Install and remove self-supporting scaffolding in accordance with Section 01 00 10 General Instructions.

3.2 INSTALLATION

.1 Do masonry work in accordance with CAN/CSA-A371 except where specified otherwise.
.1 Bond and coursing: to match existing.
.2 Jointing: to match existing

.2 Build masonry plumb, level, and true to line.

.3 Co-ordinate bond pattern, coursing height and joint width with existing masonry.

.4 Apply mortar and lay masonry units.
.1 Lay masonry on full beds of mortar.
.2 Fill vertical spaces between face stones and back-up bricks.
.3 Lay masonry and tool joints in one operation.

.5 Finish joints to match those of existing masonry.

.6 Clean finished masonry as work progresses.
.1 Remove mortar splashings on exposed masonry.
.2 Leave no mortar on face.
.3 Remove mortar staining before it sets.
.4 Clean masonry with clean water and soft bristle brush only.

.7 Inspect finished masonry with Departmental Representative.

3.3 CONSTRUCTION

.1 Building-in:
.1 Install masonry accessories where indicated.
.2 Build-in items required to be built into masonry.
.3 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.

.2 Build-in flashings in masonry in accordance with CAN/CSA-A371.
.1 Install flashings under chimney caps.

3.4 CHIMNEY CAPS

.1 Form chimney caps to same dimensions and profiles as existing. Incorporate drip groove into underside of cap edge.

.2 Set welded wire fabric reinforcing into chimney cap form prior to placing concrete.

.3 Ensure cover to reinforcement is maintained during concrete pour.

.4 Install premoulded joint filler in expansion and isolation joints full depth of cap, flush with finished surface, to CSA A23.1/A23.2.

.5 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.

.6 Finishing:
.1 Screed to plane surfaces and use wood floats.
.2 Trowel smooth to provide finish to match existing.

3.5 SITE TOLERANCES

.1 Tolerances of CAN/CSA-A371 apply.

3.6 FIELD QUALITY CONTROL

.1 Inspection and testing will be carried out by Testing Laboratory designated by Departmental Representative.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 00 10 – General Instructions.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 00 10 – General Instructions.

3.8 PROTECTION

.1 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.

.2 Repair damage to adjacent materials caused

by masonry products installation.

.3 Cover completed and partially completed work not enclosed or sheltered at end of each work day.
.1 Tarps should extend to 0.5 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly.
.2 Maintain tarps in place for minimum of 1 week after laying.
.3 Ensure that bottoms of tarps permit airflow to reach mortar in joints.
.4 Anchor coverings securely in position.

.4 Damp cure:
.1 Provide damp cure for pointing mortars.
.2 Install and maintain wetted burlap protection during the curing process for minimum 3 days.
.3 Wet mist burlap only - ensure no direct spray reaches surface of curing mortar.
.4 Shade areas of work from direct sunlight and maintain constant dampness of burlap.

.5 Protect from drying winds. Pay particular attention at corners of structure.

.6 Maintain ambient temperature of minimum 10 degrees C after repointing masonry for:
.1 Minimum 7 days in summer.
.2 Minimum 30 days in cold weather conditions using dry heated enclosures.

.7 Protect adjacent finished work against damage which may be caused by on-going work.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 09 91 13.01 Exterior Re-painting - back-priming of wood.

.2 Section 07 72 69 Roof Anchors - reinforcing of roof structure.

.3 Section 07 31 13 Asphalt Shingles - repair of roof deck.

.4 Section 09 91 13.01 Exterior Painting - painting of wood components prior to installation.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM A 123/A 123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
.2 ASTM A 653/A 653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 Canadian Standards Association (CSA International)
.1 CSA B111, Wire Nails, Spikes and Staples.
.2 CSA O121, Douglas Fir Plywood.
.3 CSA O141, Softwood Lumber.
.4 CSA O151, Canadian Softwood Plywood.

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

.4 National Lumber Grades Authority (NLGA)
.1 Standard Grading Rules for Canadian Lumber.

1.3 SUBMITTALS

.1 Make submittals in accordance with Section 01 00 10 - General Instructions.

.2 Submit triplicate 300 mm long samples of roof edge molding.

1.4 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.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 LUMBER MATERIAL

.1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
.1 CAN/CSA-O141.
.2 NLGA Standard Grading Rules for Canadian Lumber.

.2 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
.1 Board sizes: "Standard" or better grade, except replacement roof sheathing. Replacement roof sheathing to match existing species and grade.
.2 Dimension sizes: "Standard" light framing or better grade.
.3 Post and timbers sizes: "Standard" or better grade.

2.2 PANEL MATERIALS

.1 Douglas fir plywood: to CSA O121, exterior construction grade, thickness to suit application, min. 12.5 mm.
.1 Urea-formaldehyde free.

2.3 ACCESSORIES

.1 Nails, spikes and staples: to CSA B111.

.2 Bolts: size to suit application, unless indicated otherwise, complete with nuts and washers.

2.3 ACCESSORIES (Cont'd)

.3 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

2.4 FINISHES

.1 Galvanizing: to ASTM A 653/A 653M.
.1 Use hot dip galvanized fasteners for exterior work and pressure-preservative treated lumber.

2.5 WOOD PRESERVATIVE

.1 Surface-applied wood preservative: clear or copper napthenate or 5% pentachlorophenol solution, water repellent preservative.

.2 Pentachlorophenol use is restricted to building components that are in ground contact and subject to decay or insect attack only. Where used, pentachlorophenol-treated wood must be covered with two coats of an appropriate sealer.

.3 Structures built with wood treated with pentachlorophenol and inorganic arsenicals must not be used for storing food nor should the wood come in contact with drinking water.

2.6 FABRICATION

.1 Roof Edge Molding:
.1 Use custom-machined cutter to match profile of existing roof edge molding exactly.
.2 Fabricate roof edge molding of solid clear fir.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Treat surfaces of material that will not receive a paint finish with wood preservative, before installation.

.2 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.

.3 Treat surfaces of pressure preservative treated wood exposed by cutting, trimming or

3.1 PREPARATION (Cont'd)

.3 (Cont'd)
boring with liberal brush application of preservative before installation.

.4 Treat material as follows:
.1 Wood cants, fascia backing, curbs, nailers.

3.2 PRE-PAINTING

.1 Prime and paint material that will receive a paint finish prior to installation.

.2 Back-prime sides of material that will be concealed with alkyd exterior primer.

.3 Do painting in accordance with Section 09 91 13.01 Exterior Painting.

3.3 EXAMINATION

.1 Examine wood trim and framing for defects and signs of deterioration. Report findings to Departmental Representative.

.2 Replace damaged or rotted wood with new material matching existing size, profile, species and grade.

3.4 INSTALLATION

.1 Comply with requirements of NBC, supplemented by the following paragraphs.

.2 Install removed wood fascias and roof edge moldings that are in sound condition. Install in original locations.

.3 Replace damaged or rotted wood fascias and roof edge moldings.

.4 Replace damaged or rotted wood roof boards (decking).

.5 Install furring and blocking as required to space-out and support facings, fascia, soffit, siding and other work as required.

.6 Align and plumb faces of furring and blocking to tolerance of 1:600.

.7 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

3.4 INSTALLATION (Cont'd)

.8 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.

3.5 ERECTION

.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.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 06 10 00 Rough Carpentry - repair and replacement of roof decking, fascias and trim.

.2 Section 07 62 00 Sheet Metal Flashing and Trim - diverters.

.3 Section 07 72 69 Roof Anchors.

.4 Section 23 83 13 Electric Radiant Heating - Snow Melting - electric ice melting fabric.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB).
.1 CAN/CGSB-51.32, Sheathing, Membrane, Breather Type.
.2 CAN/CGSB-51.34, Vapour Barrier Polyethylene Sheet, for Use in Building Construction.

.2 Canadian Roofing Contractors' Association (CRCA).
.1 CRCA Roofing Specification Manual.

.3 Canadian Standards Association (CSA International).
.1 CSA-A123.1/A123.5, Asphalt Shingles Made From Organic Felt and Surfaced With Mineral Granules/Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules.
.2 CAN/CSA A123.2, Asphalt-Coated Roofing Sheets.
.3 CSA-A123.3, Asphalt Saturated Organic Roofing Felt.
.4 CAN3-A123.51, Asphalt Shingle Application on Roof Slopes 1:3 and Steeper.
.5 CAN3-A123.52, Asphalt Shingle Application on Roof Slopes 1:6 to Less Than 1:3.
.6 CSA B111, Wire Nails, Spikes and Staples.

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

.5 National Research Council Canada (NRC)/Institute for Research in Construction

1.2 REFERENCES (Cont'd)

.5 (Cont'd)
(IRC) - Canadian Construction Materials Centre (CCMC).
.1 CCMC, Registry of Product Evaluations.

1.3 SUBMITTALS

.1 For products not in compliance with NBC 2010 or CSA standards, submit proof of manufacturer's CCMC Listing and listing number to Departmental Representative.

.2 Manufacturer's Instructions: Provide to indicate special handling criteria, i.stallation sequence, cleaning procedures and

.3 Submit product data in accordance with Section 01 00 10 - General Instructions.

.4 Submit product data sheets for asphalt shingles. Include:
.1 Product characteristics.
.2 Performance criteria.
.3 Installation instructions.
.4 Limitations.
.5 Colour and finish.

.5 Submit WHMIS MSDS - Material Safety Data Sheets.

.6 Closeout Submittals:
.1 Submit maintenance data for incorporation into project manual specified in Section 01 00 10 General Instructions.
.2 Submit records of products used.

1.4 SAMPLES

.1 Submit samples in accordance with Section 01 00 10 - General Instructions.

.2 Submit one (1) full bundle of each type specified shingles c/w wrappers intact & bearing lot and batch numbers. Leave bundle in storage on-site, as directed by Departmental Representative.

.3 Submit samples of underlayment, roofing accessories and vents.

1.5 QUALITY ASSURANCE

.1 Contractor Qualifications:
.1 Roofing to be applied by installer trained and approved by manufacturer for application of its products.
.2 Installers to have minimum five (5) years of proven experience.
.3 Manufacturer's representative to provide technical assistance to installer and assist where required in correct installation of shingles.
.4 Manufacturer's representative to inspect substrate prior to commencement of work, application of membrane during the work, and upon completion.

.2 Mock-up:
.1 Contruct mock-up in accordance with Section 01 00 10 - General Instructions.
.2 Provide 3000 x 3000 mm mock-up including components as follows: edge, eave, valley and wall intersection.
.3 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application.
.4 Locate where directed.
.5 Allow 48 hours for inspection of mock-up before proceeding with work.
.6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished Work.

.3 Pre-Installation Meeting:
.1 Convene pre-installation meeting one week prior to beginning work of this Section with contractor's representative and Departmental Representative to:
.1 Verify project requirements.
.2 Review installation and substrate conditions
.3 Review co-ordination with other building subtrades.

.
.4 Review manufacturer's installation instructions and warranty requirements.

.4 Schedule Work so as not to unnecessarily interfere with the operations of the building's occupants.

.5 Coordinate work with installation of metal diverters and electric ice melting system.

. (Cont'd)

.6 Commencement of roofing application indicates Contractor's acceptance of the substrate surfaces for the Work.

1.6 COMPATIBILITY

.1 Compatibility between components of roofing system is essential. Bituminous adhesives, underlayments, shingles and sealants incorporated into roofing system to be compatible with each other.

.2 Submit written declaration that supplied components of roofing system are compatible.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 00 10 - General Instructions.

.2 Provide and maintain dry, off-ground weatherproof storage. Store rolls on end.

.3 Indicate on containers or wrappings of materials, the manufacturer's name and brand, compliance with applicable standard and mass, where applicable.

.4 Deliver materials in original containers, sealed, with labels intact. Deliver fasteners in boxes or kegs and keep in protective storage until used. Do not oil or grease fasteners.

.5 Do not place materials on roof in concentrations that exceed design live loads.

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

1.8 ENVIRONMENTAL

.1 Store cold process asphalt adhesives and cements at minimum +5 deg C and heat by means other than open flame prior to and during application to maintain manufacturer's specified application temperature.

.2 Apply materials to dry surfaces and only under weather & humidity conditions which will not introduce moisture into the roofing system.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, corrugated cardboard and packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Place materials defined as hazardous or toxic in designated containers.

.5 Turn over unused asphalt shingles to Departmental Representative.

.6 Dispose of unused asphaltic cement type materials at hazardous material collections site.

.7 Fold up metal banding, flatten and place in designated area for recycling.

1.10 EXTRA MATERIALS

.1 Submit maintenance materials in accordance with Section 01 00 10 - General Instructions.

.2 All unused shingles remain property of owner.

.3 Submit 2 intact bundles of shingles from same dye lot and production run as installed shingles.

1.11 WARRANTY

.1 Submit standard warranty on workmanship stating that the contractor hereby warrants that the asphalt shingle roofing shall stay in place and remain leak proof for two (2) years and the related sheet metalwork shall stay in place and remain watertight and free from distortion for two (2) years.

.2 Submit asphalt shingle manufacturer's written warranty bearing lot & batch numbers of supplied materials.

.3 Complete one (1) annual inspection of the roof throughout the warranty period. Provide all necessary repairs and replacement of

1.11 WARRANTY (Cont'd)

.3 (Cont'd)
defective work appearing in the application as ordered by the Departmental Representative during the period of the warranty.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Asphalt shingles: to CSA A123.5.
.1 Type: high profile composition laminated fibreglass shingles, manufactured in single batch and dye lot.
.2 Mass: minimum 35.2 kg/3m^2 (240 lbs per square).
.3 Composition: fibreglass mat coated on both sides with asphalt.
.4 Colour: as selected by Departmental Representative from full range. Dark green must be an available colour.
.5 Warranty: 40 years on shingles in a commercial application, 177km/h for wind.
.6 Application condition: shingles must be permitted for use in closed-cut valley installation in manufacturer's printed instructions without warranty limitation.
.7 Acceptable products: Malarkey Legacy, IKO Cambridge, GAF Timberline Ultra HD.

.2 Starter-Strip: mineral surfaced full width starter shingle with perforated strip.
.1 As recommended by shingle manufacturer.

.3 Underlayment: SBS modified fibreglass reinforced with mineral fines surface or tear resistant woven synthetic with slip resistant surface and UV stabilizers.
.1 As recommended by shingle manufacturer.

.4 Eave, valley and intersection protection: Self-adhered SBS modified bitumen, mineral fines surface, 914 mm wide and 2 mm thick.
.1 As recommended by shingle manufacturer.

.5 Hip and Ridge Capping: Asphalt shingles from same batch & dye lot to match selected shingles.

.6 Asphaltic Cement: As recommended by shingle manufacturer.

.7 Nails: to CSA B111, of hot dipped galvanized steel, 12 gauge with min. 10 mm head, sufficient length to penetrate 19 mm into deck. Electroplated nails not accepted.

2.2 ACCESSORIES

.1 Ridge vent: rigid plastic construction with hinged design to accommodate varying roof pitches, 18 sq. in. net free ventilation area per linear foot, width to suit cap shingle dimensions.
.1 Acceptable Product: GAF Cobra Snow Country Advanced.

.2 Vent Pipe Accessories:
.1 Flashing: Domed, spun aluminum, c/w rubber grommet, to match slope of roof.
.1 Standard of Acceptance: Thaler.
.2 Extension: PVC drain, waste & vent pipe to extend existing plumbing vent stacks, dimension to suit existing pipe diameter.
.3 Accessories: PVC primer & cement, PVC connectors and sealants, to suit vent pipe materials and dimesnions.

.3 Metal flashings: in accordance with Section 07 62 00 Sheet Metal Flashing and Trim.

PART 3 - EXECUTION

3.1 PROTECTION

.1 Protect grounds at locations of hoisting, heavy equipment, vehicles, scaffolding, and foot traffic with appropriate coverings.

.2 Cover walls and adjacent work where materials hoisted or used. Clean off all marred surfaces.

.3 Maintain roof drainage. Protect building faces until drains, scuppers, eaves trough and down pipes are completely installed.

.4 Prevent traffic over completed roofing except where required for related work. Comply with precautions deemed necessary by consultant.

.5 At the end of each day's work or when stoppage occurs due to inclement weather, provide all necessary seals to protect the building and the completed work. Protect all materials out of storage.

3.2 REMOVAL OF EXISTING ROOFING

.1 Remove existing roofing, flashings and underlay, and expose roof deck.

.2 Remove only that part that can be re-covered or protected in the same day.

.3 Withdraw existing shingle and flashing nails, set those which break off. Leave surfaces free from dirt and loose material.

.4 Remove portions of decking that are damaged, wet and/or rotted, or affected by fungal or insect attack.

.5 Replace cut out portions of decking with boards of equal sectional dimensions and grade. Seat each end on rafter, with 25 mm bearing, and secure to rafter.

3.3 EXAMINATION AND PREPARATION

.1 Prior to installation, examine roof decking and all other exposed structural surfaces to determine all defects and/or damage and report all findings to the Departmental Representative.

.2 Replace all damaged or rotted existing wood blocking, rafters and/or other wood structures, as encountered during the work.

.3 All decking shall be sound, free of defects, cleaned, and dry prior to application.

3.4 APPLICATION

.1 Do asphalt shingle work in accordance with manufacturer's instructions.

.2 Shingle Application:
.1 Apply shingles to provide minimum two thicknesses of shingle coverage over the entire roof, disregarding cut-outs.
.2 Secure shingle tabs with a minimum of four 25 mm diameter spots of asphalt roofing cement applied on the underside of each shingle.

.3 Edge flashing:
.1 Install drip edge along eaves and rake edges, overhanging 25 mm, with minimum 75 mm flange extending onto roof decking. Nail to deck at 200 - 250 mm on centre. Avoid face nailing.

3.4 APPLICATION (Cont'd)

.3 Edge flashing:(Cont'd)
.2 Fabricate edge flashing of min. 0.45 mm (26 GA.) prefinished sheet steel.
.3 Close hem bottom edges of all flashing, returned to form a continuous drip edge.
.4 End laps shall be over lapped min. 100 mm and set into asphalt roofing cement.
.5 Do not nail through overlaps. Cut, notch and lock drip edges at overlaps.

.4 Flashing at Intersections:
.1 Protect base of intersection of roofs with walls, curbs and masonry chimneys with self-adhered bituminous membrane lapped minimum 150 mm onto each surface.
.2 Install step flashing interleafed between shingles at vertical junctions. Step flashing along slopes of roof to provide minimum 100 mm wide head laps.
.3 Set shingles onto flanges of sheet metal flashing, chimney saddles, attic space vents, plumbing vent flashing, mastic pans and all flanged roof-top flashing flanges with a full bed of asphalt roofing cement extending minimum 75 mm wide.
.4 Cover the upper portion and sides of flanged roof-top flashing in contact with the roof with shingles for a minimum of two thirds (2/3) of the length. The remaining one third (1/3) portion of flashing shall cover the heads of preceding shingles.
.5 Where exposed fastening is necessary, nails to penetrate through a band of asphalt roofing cement applied to the underlying surface of the shingle or flashing.

.5 Underlayment:
.1 Install underlayment on wood roof decking and apply parallel to the eaves, smoothly, evenly and overlapping minimum 75 mm at side laps and 150 mm at end laps.
.2 Fasten to hold in place with roofing nails. Provide min. 100 mm overlap onto the eaves protection.

.6 Eave and valley protection:
.1 Install continuous 150 mm wide strip of eave protection over roof edge flashing and under ice melting fabric.
.2 Install eave protection extending from the eave edge of the roof decking to a line not less than 300 mm inside the inner face of the exterior walls.

3.4 APPLICATION (Cont'd)

.6 Eave and valley protection:(Cont'd)
.3 Install parallel to the eaves, over ice melting fabric, smoothly, and evenly. Fully seal side and end laps minimum 75 mm wide.
.4 Fasten eave protection sufficiently to hold in place with roofing nails positioned not less than 450 mm above the eaves but not through ice melting fabric.
.5 Install valley protection full length of valley, smoothly and evenly, minimum 460 mm on each slope. Fully seal end laps minimum 75 mm wide.

.7 Valleys:
.1 Install shingles in closed cut valley style following manufacturer's instructions.

.8 Hips and Ridges:
.1 Extend shingle capping on hips and ridges min. 100 mm on either side of the hip or ridge and lap not less than 150 mm.
.2 Apply capping without exposed nail heads and cut at an angle so that no part of the head-lap is visible beyond the edges of the shingle butts.
.3 Apply all ridge capping in the direction opposite to prevailing winds.

.9 Vents:
.1 Install continuous ridge vent in locations indicated following manufacturer's instructions.
.2 Install new plumbing vent flashing to all vent locations.
.3 Clean and prime metal flanges of chimneys and vents prior to application of shingles.

3.5 CLEAN UP

.1 Remove all nails and scraps from grounds. Use bar magnet and rake in grassed areas, plant beds, and uneven turf.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 04 04 99 Masonry for Minor Works - installation of reglets.

.2 Section 07 31 13 Asphalt Shingles.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
- .1 ASTM A 653/A 653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM A 792/A 792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .3 ASTM B 32, Standard Specification for Solder Metal.
- .4 ASTM D 523, Standard Test Method for Specular Gloss.

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

.3 Canadian Sheet Steel Building Institute (CSSBI)
- .1 S8-2001 Quality and Performance Specification for Prefinished Sheet Steel Used for Building Products.

.4 Canadian Standards Association (CSA International)
- .1 CSA A123.3, Asphalt Saturated Organic Roofing Felt.
- .2 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

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

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 00 10 - General Instructions.

.2 Product Data:
- .1 Submit manufacturer's printed product literature for sheet metal flashing systems

1.3 SUBMITTALS (Cont'd)

.2 Product Data:(Cont'd)
.1 (Cont'd)
materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit two copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.3 Shop Drawings
.1 Submit shop drawings in accordance with Section 01 00 10 - General Instructions.
.2 Indicate layouts and locations of eavetroughs, down pipes, diverters and chimney caps.
.3 Indicate profiles, shapes, materials, core thicknesses, finishes, connections, fasteners, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

.4 Samples:
.1 Submit triplicate 200 x 200 mm samples of each type of sheet metal material, finishes and colours.
.2 Submit triplicate 300 mm long samples of eavetrough, down pipe and diverter.

.5 Closeout Submittals:
.1 Provide maintenance data for incorporation into manual specified in Section 01 00 10 General Instructions.
.2 Provide records of products used.

1.4 QUALITY ASSURANCE

.1 Pre-Installation Meeting:
.1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with contractor's representative and Departmental Representative to:
.1 Verify project requirements.
.2 Review installation and substrate conditions.
.3 Review co-ordination with other building subtrades.
.4 Review manufacturer's installation instructions and warranty requirements.

.2 Mock-up:
.1 Contruct mock-up in accordance with Section 01 00 10 - General Instructions.

1.4 QUALITY ASSURANCE (Cont'd)

.2 Mock-up:(Cont'd)
.2 Provide 3000 x 3000 mm mock-up including components as follows: edge, eave, valley and wall intersection.
.3 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application.
.4 Locate where directed.
.5 Allow 48 hours for inspection of mock-up before proceeding with work.
.6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished Work.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 00 10 - General Instructions.

.2 Waste Management and Disposal:
.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 WARRANTY

.1 Submit standard warranty on workmanship stating that the sheet metalwork shall stay in place and remain watertight and free from distortion for two (2) years.

.2 Complete one (1) annual inspection of the roof throughout the warranty period. Provide all necessary repairs and replacement of defective work appearing in the application as ordered by the Departmental Representative during the period of the warranty.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

.1 Zinc coated steel sheet: to ASTM A 653/A 653M, Commercial quality (CS), Type A, grade 33, with Z275 designation zinc coating, base metal thickness as indicated.
.1 Recycled content: 30%.

2.2 PREFINISHED STEEL SHEET

.1 Prefinished steel with factory applied two coat silicone modified polyester.
.1 Colour selected by Departmental Representative from manufacturer's full range.
.2 Specular gloss: 30 units +/- 5 in accordance with ASTM D 523.
.3 Coating thickness: not less than 25 micrometres.
.4 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D 822 as follows:
.1 Outdoor exposure period 1000 hours.
.2 Humidity resistance exposure period 1000 hours.
.5 Standard of Acceptance: Perspectra. For pricing assume QC8307 Melcher's Green.

2.3 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Plastic cement: to CAN/CGSB 37.5.

.3 Underlay for metal flashing: dry sheathing to CAN/CGSB-51.32 or No. 15 perforated asphalt felt to CSA A123.3.

.4 Waterproof base flashing: self-adhered SBS modified bituminous membrane, 2 mm thick.

.5 Sealants: in accordance with Section 07 92 00 Joint Sealants.
.1 For metal to metal joints: One part neutral cure silicone.
.2 For metal to masonry: One part neutral cure silicone.
.3 Colours selected by Departmental Representative from manufacturer's standard range.
.4 Acceptable product: Dow Corning 795.

2.3 ACCESSORIES (Cont'd)

.6 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

.7 Fasteners: of same material as sheet metal, to CSA B111 for nails and CSA B35.3 for screws, of length and thickness suitable for application.
.1 Hex-head, self-tapping screws: 300 series stainless steel, hexagon head. Min. 9 mm head. Washers min. 1 mm thick, same type of metal c/w rubber packings. Colour to match sheet metal.
.1 Standard of Acceptance: Teks c/w Climaseal washers.
.2 Sheet metal screws: Self-tapping screws, 300 series stainless steel, rounded head, Robertson. Min. size No. 8.
.3 Rivets: 300 series stainless steel pop rivets. Min. size No. 8.

.8 Solder: to ASTM B 32, alloy composition to suit sheet metal composition.

.9 Flux: commercial preparation suitable for materials to be soldered.

.10 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

.1 Fabricate metal flashings and other sheet metal work as indicated.

.2 Form pieces in 2400 mm maximum lengths.
.1 Make allowance for expansion at joints.

.3 Hem exposed edges on underside 12 mm.

.4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

.1 Form flashings, drip edges, etc. to profiles indicated of 0.45 mm (26 gauge) thick prefinished sheet steel.

2.6 REGLETS AND CAP FLASHINGS

.1 Form recessed reglets of 0.45 mm (26 gauge) thick prefinished steel sheet metal to be built-in to masonry work for counter flashings as detailed.

2.7 EAVES TROUGHS, DIVERTERS AND DOWNPIPES

.1 Form eaves troughs, diverters and downpipes from 0.76 mm (22 gauge) thick prefinished steel sheet metal, longest practical lengths.
.1 Sizes and profiles as indicated.

.2 Solder corners of eaves troughs and diverters.

.3 Provide goosenecks, outlets, strainer baskets and necessary fastenings.

.4 Eave trough brackets, diverter brackets and downpipe support straps: of same material and temper, min. 25 mm wide, 2.28 mm (13 ga.) thick.

2.8 CHIMNEY CAPS

.1 Form chimney caps of 0.76 mm (22 gauge) thick prefinished steel sheet metal.

.2 Fabricate support brackets of 0.76 mm (22 gauge) thick galvanized steel sheet metal.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Install sheet metal work as detailed and in accordance with CRCA FL series details.

.2 Use concealed fastenings except where approved before installation.

.3 Provide underlay under sheet metal.
.1 Secure in place and lap joints 100 mm.

3.2 INSTALLATION (Cont'd)

.4 Counterflash flashings at intersections of roof with vertical surfaces and curbs.
.1 Flash joints using S-lock forming tight fit over hook strips.

.5 Lock end joints and caulk with sealant.

.6 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.

.7 Caulk flashing at reglet with sealant.

3.3 EAVES TROUGHS, DIVERTERS AND DOWNPIPES

.1 Install eaves troughs and secure to building at max. 600 mm on centre with 25 mm wide brackets.
.1 Slope eaves troughs to downpipes as indicated.
.2 Pop rivet and seal joints watertight.

.2 Install diverters at roof edges as indicated and secure at max. 600 mm on centre with 25 mm wide brackets.
.1 Pop rivet and seal joints watertight.

.3 Install downpipes and provide goosenecks back to wall.
.1 Secure downpipes to wall with straps at max. 1800 mm on centre; minimum two straps per downpipe.
.2 Direct downpipes to drainage system as directed by Departmental Representative.

3.4 CLEANING

.1 Proceed in accordance with Section 01 00 10 General Instructions.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Leave work areas clean, free from grease, finger marks and stains.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 06 10 00 Rough Carpentry - reinforcing of roof framing.

.2 Section 07 31 13 Asphalt Shingles.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
.1 ASTM A 167 Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.2 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.3 Canadian Standards Association (CSA).
.1 CAN/CSA Z259.15-12 Anchorage Connectors.
.2 CSA Z259.16-04(2009) Design of Active Fall-Protection Systems.

.4 Province of Alberta
.1 Occupational Health and Safety Act and Occupational Health and Safety Code.

1.3 SYSTEM DESCRIPTION

.1 Proprietary Personal Restraint Roof Anchors: Anchors to resist lateral forces of 22.2 kN per worker attached at any point and in all directions, without damage or permanent set.

.2 Design system to requirements of applicable legislation and CSA standards.

1.4 SUBMITTALS

.1 Submit manufacturer's test results in accordance with Section 01 00 10 General Instructions.

.2 Submit certification signed by professional engineer licensed in the province of Alberta stating that installed system has been designed and installed in compliance with applicable codes and standards.

1.5 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 00 10 General Instructions.

.2 Indicate component profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include location drawings, elevations, and details where applicable.

.3 Submit engineered layout drawings sealed by a professional engineer licensed in the Province of Alberta. Drawings to indicate placement and size of anchors required to provide compliant coverage.

.4 Submit engineered roof reinforcement drawings sealed by a professional engineer registered in the Province of Alberta. Drawings to indicate required reinforcement for existing wood roof framing. If existing roof framing has adequate strength, submit letter sealed by a professional engineer registered in the Province of Alberta stating such.

1.6 QUALITY ASSURANCE

.1 Submit design data in accordance with Section 01 00 10 General Instructions.

.2 Submit Test Reports and substantiating engineering data and test results of previous tests by independent laboratory which purport to meet performance criteria, and other supportive data.

.3 Design fall arrest anchor system and structural roof support framing components, and site inspect their installation under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the Province of Alberta.

.4 Pre-Installation Meeting: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.5 Co-ordinate Work with installation of roofing assembly and sheet metal work.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal, and with Waste Reduction Workplan.

.2 Place materials defined as hazardous or toxic waste in designated containers.

1.8 SITE CONDITIONS

.1 Prior to start of work verify existing site conditions in accordance with Section 01 00 10 General Instructions.

.2 Verify dimensions, tolerances, and method of attachment with other work.

1.9 MAINTENANCE

.1 Submit design, product and maintenance data for incorporation into manual specified in Section 01 00 10 General Instructions.

.2 Submit manufacturer's printed product literature, specifications and data sheets.

.3 Submit inspection and maintenance information.

.4 Submit sealed and reviewed shop drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Stainless steel sheet: No. 302 alloy, minimum 20 gauge thickness.

.2 Steel D-Rings: forged steel, di-chromate plated, ring thickness determined by imposed loads.

.3 Screws: stainless steel, No. 12 hex head, minimum 73 mm long.

.4 Nails: spiral stainless steel, minimum 83 mm long.

.5 Gaskets under anchors: neoprene pads, compatible with roof membrane, cut to size.

2.2 FABRICATION

.1 Anchors:
.1 Straps consisting of two layers of 20 ga. stainless steel with attached proof-loaded D-ring. Length of strap to suit application and loading requirements.
.2 Standard of Acceptance: Super Anchor Safety RS-10 and RS-20, Miller RA41 or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verify dimensions, tolerances, and method of attachment with other work.

3.2 PREPARATION

.1 Reinforce wood roof framing as determined by engineered layout drawings.

3.3 INSTALLATION

.1 Install anchors in accordance with engineered shop drawings and following manufacturer's instrcutions.

.2 Coordinate work with asphalt shingle work.

3.4 INSPECTION

.1 Design engineer to review installation of anchors and reinforcing of roof structure.

.2 Submit certification signed by professional engineer licensed in the province of Alberta stating that installed system has been designed and installed in compliance with applicable codes and standards.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 07 62 00 Sheet Metal Flashing and Trim.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
.1 ASTM C 920, Standard Specification for Elastomeric Joint Sealants.

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

1.3 SUBMITTALS

.1 Submit product data in accordance with Section 01 00 10 General Instructions.

.2 Manufacturer's product to describe.
.1 Caulking compound.
.2 Primers.
.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

.3 Submit samples in accordance with Section 01 00 10 General Instructions.

.4 Submit duplicate samples of each type of material and colour.

.5 Cured samples of exposed sealants for each color where required to match adjacent material.

.6 Submit manufacturer's instructions in accordance with Section 01 00 10 General Instructions.
.1 Instructions to include installation instructions for each product used.

.7 Closeout Submittals:
.1 Provide maintenance data for incorporation into manual specified in Section 01 00 10 General Instructions.
.2 Provide records of products used. List products in relation to application condition and include following:
.1 Product name, type and use (i.e. materials and location).

1.3 SUBMITTALS (Cont'd)

.7 Closeout Submittals:(Cont'd)
.2 (Cont'd)
.2 Manufacturer's product number.
.3 Colour code numbers.
.4 Manufacturer's Material Safety Data Sheets.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 00 10 General Instructions.

.2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels intact. Protect from freezing, moisture, water and contact with ground or floor.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.2 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.3 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Departmental Representative.

.4 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.

1.6 PROJECT CONDITIONS

.1 Environmental Limitations:

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

.2 Joint-Width Conditions:
.1 Do not proceed with installation of joint sealants where joint widths are less

1.6 PROJECT CONDITIONS (Cont'd)

.2 Joint-Width Conditions:(Cont'd)
.1 (Cont'd)
than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:
.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.7 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

PART 2 - PRODUCTS

2.1 SEALANT MATERIALS

.1 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Silicones One Part.
.1 To ASTM C920, Type S, Grade NS, Class 50, Uses NT, G, A and O.
.2 Acceptable material: Dow Corning 795.
.3 Colour(s) selected from manufacturer's full range.

.2 Preformed Compressible and Non-Compressible back-up materials.
.1 As recommended by sealant manufacturer:
.1 Size: oversize minimum 25%.

.3 Bond Breaker Tape.
.1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 JOINT CLEANER

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

.2 Primer: as recommended by manufacturer.

PART 3 - EXECUTION

3.1 PROTECTION

.1 Protect installed Work of other trades from staining or contamination.

3.2 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 APPLICATION

.1 Sealant.

.1 Apply sealant in accordance with manufacturer's written instructions.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.3 Apply sealant in continuous beads.

.4 Apply sealant using gun with proper size nozzle.

.5 Use sufficient pressure to fill voids and joints solid.

.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 Tool exposed surfaces before skinning begins to give slightly concave shape.

.8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing.

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

.3 Cleanup.

.1 Clean adjacent surfaces immediately and leave Work neat and clean.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 06 10 00 Rough Carpentry - pre-painting wood components

1.1 REFERENCES

.1 The Master Painters Institute (MPI) Canada
  .1 Maintenance Repainting Manual, Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List.

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

.3 National Fire Code of Canada, 2010.

.4 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).

1.2 QUALITY ASSURANCE

.1 Qualifications:
  .1 Contractor: to have a minimum of five years proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
  .2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
  .3 Apprentices: may be employed provided they work under direct supervision of qualified journeypersons in accordance with applicable trade regulations.

.2 Conform to latest MPI requirements for exterior repainting work including cleaning, preparation and priming.

.3 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, and solvents) to be in accordance with the latest edition of the MPI Approved Product List and to be from a single manufacturer for each system used.

1.2 QUALITY ASSURANCE (Cont'd)

.4 Paint materials such as linseed oil, shellac, and turpentine, to be the highest quality product of an approved manufacturer listed in MPI Maintenance Repainting Manual and shall be compatible with other coating materials as required.

.5 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative.

.6 Mock-ups:
.1 Provide a mock-up in accordance with requirements of Section 01 00 10 General Instructions to Departmental Representative.
.2 Prepare and repaint designated exterior surface or item to requirements specified herein, with specified paint or coating showing selected colours, number of coats, gloss/sheen, textures and workmanship to MPI Maintenance Repainting Manual standards for review and approval.
.3 When approved, repainted surface and/or item shall become acceptable standard of finish quality and workmanship for similar on-site exterior repainting work.

1.3 PERFORMANCE REQUIREMENTS

.1 Environmental Performance Requirements:
.1 Provide paint products meeting MPI "Environmentally Friendly" E1 E2 and E3 ratings based on VOC (EPA Method 24) content levels.

1.4 SCHEDULING

.1 Submit work schedule for various stages of painting to Departmental Representative for approval. Submit schedule minimum of 1 week in advance of proposed operations.

.2 Paint occupied facilities in accordance with approved schedule. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

.3 Obtain written authorization from Departmental Representative for changes in work schedule.

1.4 SCHEDULING (Cont'd)

.4 Schedule repainting operations to prevent disruption by other trades if applicable and by occupants in and about building.

1.5 SUBMITTALS

.1 Make submittals in accordance with Section 01 00 10 General Instructions.

.2 Submit samples in accordance with Section 01 00 10 General Instructions.
.1 Submit duplicate 300 x 300 mm samples on 3 mm hardboard for review and acceptance.
.2 Samples to indicate colour and gloss for each coating type specified.

.3 Submit product data and manufacturer's installation/application instructions for paints and coating products to be used.

.4 Submit WHMIS Material Safety Data Sheets (MSDS) in accordance with Section 01 35 29.06 - Health and Safety Requirements for paints and coating materials to be used.

.5 Closeout Submittals:
.1 Submit maintenance data for incorporation into project manual specified in Section. 01 00 10 General Instructions.
.2 Submit records of products used. List products in relation to finish system and include following:
.1 Product name, type and use (i.e. materials and location).
.2 Manufacturer's product number.
.3 Colour code numbers.
.4 MPI Environmentally Friendly classification system rating.
.5 Manufacturer's Material Safety Data Sheets.

1.6 MAINTENANCE

.1 Extra Materials:
.1 Submit maintenance materials in accordance with Section 01 00 10 General Instructions.
.2 Submit one - four litre can of each type and colour of finish coating. Identify type and colour in relation to established colour schedule and finish system.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle materials in accordance with Section 01 00 10 General Instructions, supplemented as follows:

.1 Deliver and store materials in original containers, sealed, with labels intact.

.2 Labels to indicate:

.1 Manufacturer's name and address.

.2 Type of paint or coating.

.3 Compliance with applicable standard.

.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 Store and handle in accordance with manufacturer's recommendations.

.5 Store materials and equipment in secure, dry, well-ventilated area with temperature range between 7 degrees C to 30 degrees C. Store materials and supplies away from heat generating devices and sensitive products above minimum temperature as recommended by manufacturer.

.6 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Departmental Representative. Upon completion of operations, return areas to clean condition to approval of Departmental Representative.

.7 Remove paint materials from storage in quantities required for same day use.

.8 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.9 Fire Safety Requirements:

.1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site daily.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada.

1.7 DELIVERY, STORAGE AND HANDLING (Cont'd)

.2 Waste Management and Disposal:

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.3 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.

.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.

.5 Empty paint cans are to be dry prior to disposal or recycling (where available).

.6 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

.4 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

1.8 AMBIENT CONDITIONS

.1 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Do not perform repainting work when:

.1 Ambient air and substrate temperatures are below 10 degrees C.

.2 Substrate temperature is over 32 degrees C unless paint is specifically formulated for application at high temperatures.

.3 Substrate and ambient air temperatures are expected to fall outside MPI paint manufacturer's prescribed limits.

1.8 AMBIENT CONDITIONS (Cont'd)

.1 (Cont'd)

.1 (Cont'd)

.4 Relative humidity is above 85 % or when dew point is less than 3 degrees C variance between air/surface temperature.

.5 Rain or snow is forecast to occur before paint has thoroughly cured.

.6 It is foggy, misty, raining or snowing at site.

.2 Conduct moisture tests using properly calibrated electronic Moisture Meter, except test existing painted concrete floors for moisture using simple "cover patch test" on failed areas.

.3 Do not perform repainting work when maximum moisture content of substrate exceeds:

.1 12 % for concrete and masonry (clay and concrete brick/block).

.2 15 % for wood.

.3 12 % for stucco.

.4 Test painted concrete, masonry and plaster surfaces for alkalinity as required.

.2 Application Requirements:

.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind conditions are such that airborne particles will affect quality of finished surface.

.2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted.

.3 Apply paint when previous coat of paint is dry or adequately cured, unless otherwise pre-approved by specific coating manufacturer.

.4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.

.5 Do not apply paint when:

.1 Temperature is expected to drop below 10 degrees C before paint has thoroughly cured.

.2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.

.3 Surface to be painted is wet, damp or frosted.

.6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.

.7 Schedule repainting operations such that surfaces exposed to direct, intense sunlight

1.8 AMBIENT CONDITIONS (Cont'd)

.2 Application Requirements:(Cont'd)
.7 (Cont'd)
are scheduled for completion during early morning.
.8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Paint materials listed in latest edition of MPI Approved Product List (APL) are acceptable for use on this project.

.2 Paint materials for repaint systems: products of single manufacturer.

.3 Only qualified products with E1 E2 or E3 MPI "Environmentally Friendly" rating are acceptable for use on this project.
.1 Primers to have maximum E1 rating.
.2 Top coats to have maximum E3 rating.

2.2 COLOURS

.1 Departmental Representative will provide Colour Schedule.

.2 First coat in two coat (Premium) repaint system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site.

.2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.

.3 Where thinner is used, addition not to exceed paint manufacturer's recommendations. Do not use kerosene or such organic solvents to thin water-based paints.

.4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

.1 Paint gloss: defined as sheen rating of applied paint, in accordance with following MPI gloss/sheen standard values:

Gloss Level Category	Units @ 60 Degrees	Units @ 85 Degrees
G1 - matte finish	0 to 5	maximum 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	minimum 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	

.2 Gloss level ratings of repainted surfaces as specified.

2.5 EXTERIOR PAINTING SYSTEMS

.1 REX 5.3 - Galvanized Metal: High Contact/High Traffic Areas (Doors, Frames, Railings, Pipes, and Handrail. Low Contact/Low Traffic Areas (Overhead Decking, Eavestrough (Gutters), Downpipes, and Ducts.
.1 REX 5.3G - High Performance Acrylic gloss level 5.

.2 REX 5.4 - Aluminum: (sash, sills and frames, flashing, posts and railings, and downpipes).
.1 REX 5.4A - Alkyd (for exposed aluminum) gloss level 5.

.3 REX 6.2 - Dimension Lumber: (columns, beams, exposed joists, underside of decking, siding, and fencing).
.1 REX 6.2H - High Performance Acrylic gloss level 5.

.4 REX 6.3 - Dressed Lumber: (doors, door and window frames, casings, battens, and smooth fascias).
.1 REX 6.3A - High Performance Acrylic gloss level 5.

2.5 EXTERIOR PAINTING SYSTEMS (Cont'd)

.5 REX 6.4 - Wood Panelling: (plywood siding, fascias, and soffits).
.1 REX 6.4G - Latex gloss level 5.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 EXAMINATION

.1 Exterior surfaces requiring repainting: inspected by painting contractor who will notify Departmental Representative in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.

.2 Where an assessed degree of surface degradation of DSD-1 to DSD-3 before preparation of surfaces for repainting is revealed to be DSD-4 after preparation, repair or replacement of such unforeseen defects discovered are to be corrected, as mutually agreed, before repainting is started.

.3 Where "special" repainting or recoating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer to provide as part of work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Departmental Representative.

3.3 PREPARATION

.1 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting requirements except where specified otherwise.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

.3 Clean and prepare exterior surfaces to be repainted in accordance with MPI Maintenance

3.3 PREPARATION (Cont'd)

.3 (Cont'd)
Repainting Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
.1 Remove dust, dirt, and surface debris by brushing, wiping with dry, clean cloths or compressed air.
.2 Wash surfaces with a biodegradable detergent (and bleach where applicable) and clean warm water using a stiff bristle brush to remove dirt, oil and surface contaminants.
.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
.4 Use trigger operated spray nozzles for water hoses.
.5 Allow surfaces to drain completely and to dry thoroughly.
.6 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.
.7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or such organic solvents to clean up water-based paints.

.4 Pressure washing not permitted.

.5 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminates from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.

.6 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.

.7 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

.8 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects from previously painting (e.g. runs, and sags) that are visible from distance up to 1000 mm.

3.4 EXISTING CONDITIONS

.1 Prior to commencing work, examine site conditions and existing exterior substrates to be repainted and report in writing to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions of surfaces that will adversely affect this work.

.2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Departmental Representative. Maximum moisture content not to exceed specified limits.

.3 No repainting work to commence until such adverse conditions and defects have been corrected and surfaces and conditions are acceptable to Painting Subcontractor.

.4 Degree of surface deterioration (DSD) to be assessed using MPI Identifiers and Assessment criteria indicated in the MPI Maintenance Repainting Manual. MPI DSD ratings and descriptions are as follows:

Condition	Description
DSD-0	Sound Surface (includes visual (aesthetic) defects that do not affect film's protective properties).
DSD-1	Slightly Deteriorated Surface (indicating fading; gloss reduction, slight surface contamination, minor pin holes and scratches).
DSD-2	Moderately Deteriorated Surface (small areas of peeling, flaking, slight cracking, and staining).
DSD-3	Severely Deteriorated Surface (heavy peeling, flaking, cracking, checking, scratches, scuffs, abrasion, small holes and gouges).
DSD-4	Substrate Damage (repair or replacement of surface required).

3.5 PROTECTION

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged,

3.5 PROTECTION (Cont'd)

.1 (Cont'd)
clean and restore such surfaces as directed by Departmental Representative.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.4 Protect general public and building occupants in and about the building.

.5 Removal of light fixtures, surface hardware on doors, and surface mounted equipment, fittings and fastenings to be done prior to undertaking painting operations. Store items and re-install after painting is completed.

.6 Move and cover exterior furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.7 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas to approval of Departmental Representative.

3.6 APPLICATION

.1 Apply primer and paint in accordance with MPI Maintenance Repainting Manual Premium Grade finish requirements.

.2 Apply paint by method that is best suited for substrate being repainted using brush or roller. Conform to manufacturer's application instructions unless specified otherwise. In each case method of application to be as pre-approved by Departmental Representative before commencing work.

.3 Brush and Roller Application:
.1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
.2 Work paint into cracks, crevices and corners.
.3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.

3.6 APPLICATION (Cont'd)

.3 Brush and Roller Application:(Cont'd)
.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces to be free of roller tracking and heavy stipple unless approved by Departmental Representative.
.5 Remove runs, sags and brush marks from finished work and repaint.

.4 Spray application is not permitted.

.5 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Departmental Representative.

.6 Apply paint coats in a continuous manner and allow surfaces to dry and cure between coats for minimum time period as recommended by manufacturer. Minimum dry film thickness of coats not less than that recommended by manufacturer. Repaint thin spots or bare areas before next coat of paint is applied.

.7 Sand and dust between coats to remove visible defects.

.8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.

.9 Finish to doors include all edges including top and bottom edges. Surfaces concealed by door hardware be repainted unless otherwise pre-approved.

.10 Standard of Acceptance: when viewed using natural prevailing sunlight at peak period of the day (mid-day) on surface viewed, surfaces to indicate following:
.1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
.2 Soffits: no defects visible from grade at 45 degrees to surface.
.3 Final coat to exhibit uniformity of colour and sheen across full surface area.

3.7 MECHANICAL / ELECTRICAL EQUIPMENT

.1 Unless otherwise noted, repainting to include exposed to view/previously painted exterior mechanical and electrical equipment and components (panels, conduits, piping, hangers, and ductwork).

3.7 MECHANICAL / ELECTRICAL EQUIPMENT (Cont'd)

.2 Touch up scratches and marks and repaint such mechanical and electrical equipment and components with colour and finish to match existing finish unless otherwise noted or scheduled.

.3 Do not paint over name plates or instruction labels.

3.8 FIELD QUALITY CONTROL

.1 Advise Departmental Representative when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.2 Manufacturer's Field Services:
.1 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.

3.9 CLEANING

.1 Proceed in accordance with Section 01 00 10 General Instructions.

.2 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

.3 Keep work area free from unnecessary accumulation of tools, equipment, surplus materials and debris.

.4 Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.

.5 Clean equipment and dispose of wash water used for water borne materials, solvents used for oil based materials as well as cleaning and protective materials (e.g. rags, drop cloths, and masking papers), paints, thinners, paint removers/strippers in accordance with the safety requirements of authorities having jurisdiction and as specified.

.6 Clean painting equipment in leak-proof containers that will permit particulate matter to settle out and be collected. Sediment remaining from cleaning operations to be

3.9 CLEANING (Cont'd)

.6 (Cont'd) disposed of in manner acceptable to authorities having jurisdiction.

.7 Recycle paint and coatings in excess of repainting requirements as specified.

3.10 RESTORATION

.1 Clean and re-install hardware items removed before undertaken painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on affected exposed surfaces. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative . Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END

PART 1 - GENERAL

1.1 SUMMARY

.1 Section includes:
.1 Snow melting elements, accessories, controls, and installation.

1.2 SYSTEM DESCRIPTION

.1 A fully integrated and automated snow and ice melting system for roof installation.

.2 Operation by moisture and temperature sensors that are responsive to conditions on both sides of the building's roof.

1.3 RELATED SECTIONS

.3 Section 07 31 13 Asphalt Shingles.

.4 Section 07 62 00 Sheet Metal Flashing and Trim - eavetroughs and downspouts.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CAN/CSA C22.2 No. 130-03 (R2008), Requirements for Electrical Resistance Heating Cables and Heating Device Sets.

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

1.4 SUBMITTALS

.1 Submittals: in accordance with Section 01 00 10 - General Instructions.

.2 Product Data:
.1 Submit manufacturer's printed product literature, specifications and datasheets. Include product characteristics, performance criteria, and limitations.

.3 Material Safety Data Sheets:
.1 Submit Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).

.4 Shop Drawings:

1.4 SUBMITTALS (Cont'd)

.4 Shop Drawings:(Cont'd)
.1 Submit drawings stamped and signed by professional engineer licensed in Province of Alberta, Canada.
.2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, and other items that must be shown to ensure co-ordinated installation.
.3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.

.5 Quality Assurance:
.1 Submit drawings and product data to authority having jurisdiction.
.2 If changes are required, notify Departmental Representative of these changes before they are made.
.3 Instructions: submit manufacturer's installation instructions.

.6 Closeout Submittals:
.1 Submit operation and maintenance data for heating systems in accordance with Section 01 00 10 - General Instructions for incorporation into project manual.
.2 Record on drawings, layout of snow melting systems.

1.5 QUALITY ASSURANCE

.1 Health and Safety:
.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 Health and Safety Requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:
.1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 01 00 10 - General Instructions.

.2 Waste Management and Disposal:
.1 Construction/Demolition Waste Management and Disposal: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.7 WARRANTY

.1 For work of this Section, the 12 month warranty period prescribed in subsection GC 32.1 of General Conditions "C" is extended to 24 months for entire snow melting system.

.2 Contractor hereby warrants that snow melting heating cables will operate as specified in accordance with GC 32.1, but for 10 years.

.3 Contractor hereby warrants that snow melting heating mesh will operate as specified in accordance with GC 32.1, but for 25 years.

.4 Contractor hereby warrants that transformers will operate as specified in accordance with GC 32.1, but for 5 years.

PART 2 - PRODUCTS

2.1 SNOW MELTING CABLES

.1 Line voltage heating cables: to CAN/CSA C22.2 No. 130-03 (R2008).
.1 Two 16 AWG nickel-copper bus wires embedded in parallel in a self-regulating polymer core that varies its power output to respond to temperature all along its length, and allowing the heating cable to be cut to length in the field.
.2 Jacket: radiation-cross-linked, modified polyolefin dielectric.
.3 Grounding path: braid of tinned copper.
.4 Grounding braid over-jacket: ultraviolet stabilized, weatherproof, composed of modified polyolefin.
.5 Nominal rating: in correlation with selection of the heating cable, of 5, 9, or 12 watts per lineal foot in ice water at 0° C.
.6 Cold leads: factory sealed and spliced.

.2 Standard of Acceptance: Heatizon Guttermelt SR.

2.2 SNOW MELTING MESH

.1 Low-voltage screen heating element:
.1 Bright bronze woven metal fabric screen.
.2 Screen element dimensions: 229 mm wide, maximum 0.5 mm thick, in continuous lengths.
.3 Rated for installation on wood roof sheathing.
.4 Rated for operating at variable output of 0 to 12 watts per linear foot.

2.2 SNOW MELTING MESH (Cont'd)

.1 (Cont'd)
.5 Maximum Operating Voltage: 0.1262 volts per linear foot of heating element.
.6 Maximum Secondary Voltage: 32.0 volts.
.7 Maximum Heating Element Operating Temperature: 5° C.
.8 Heating element shall allow for penetrations by screws, nails and staples as long as they do not contact any other metallic objects.

.2 Standard of Acceptance: Heatizon Z-Mesh.

2.3 TRANSFORMERS

.1 Transformers:
.1 Sized to limit heating element operation to less than 96 amps.
.2 Multi-tapped on primary side to allow for operation on supply of 120, 208, 240, and/or 277 volts.
.3 Multi-tapped on secondary side to allow proper operating range of heating element lengths.

2.4 ACCESSORIES

.1 Transition plates, splice plates and end plates: shaped copper sheet, to manufacturer's standard.

.2 Cold leads and jumper cables: manufacturer's standard, rated for application.

.3 Edge protector: purpose-made separator strip to isolate heating mesh from metal eave drip edge, manufacturer's standard.

.4 Hangers: to secure cables inside downspouts.

2.5 CONTROLLERS

.1 Control Unit:
.1 Operation:
.1 Starting: soft-start circuitry to turn transfomers on without a high in-rush current or power surge.
.2 Interfaces with activation devices.
.3 System monitoring for fault detection and fault status: safety circuits monitor for shorting and arcing, transformer over temperature, over current and under current, and power problems.
.4 Shuts system off in event of fault.

2.5 CONTROLLERS (Cont'd)

.1 Control Unit:(Cont'd)
.1 Operation:(Cont'd)
.5 System status indicator: LED that indicates when the system is energized and working, off, or in need of attention.
.2 Fit Control Unit with power service disconnect rated for system operating range.

.2 Selector Box:
.1 Operation:
.1 System activation: permit up to twelve Control Units to be activated by one activation device.
.2 Starting: protect master breaker by staggering the start of each Control Unit.
.3 Switching: Manual/Off/Auto toggle switches for each Control Unit.
.4 Status lights: independent LED for each zone.

.3 Relay Panel:
.1 Operation:
.1 Controls up to four line-voltage heating element zones manually or by activation device or by Selector Box.
.2 Contains four relays, master rocker switch, and four Auto/Manual zone rocker switches.
.3 Relay activation: individually or all at the same time by rocker switches, by activation device, or by Selector Box.

2.6 MOISTURE AND SNOW SENSING CONTROLS

.1 Eavetrough and downspout system (cables):
.1 Snow Switch Control: Automatic snow/ice sensor which detects precipitation occurring at temperatures below 3° C and activates system when both conditions are present.

.2 Roof eave system (mesh):
.1 Snow Switch Control: Automatic snow/ice sensor which detects precipitation occurring at temperatures below 3° C and activates system when both conditions are present.
.2 Gutter Controller: turns gutter/downspout system on whenever roof system is on.

.3 Design systems to shut off when temperature is 3 degress C or higher. System remains on for pre-set (adjustable) time after moisture

2.6 MOISTURE AND SNOW SENSING CONTROLS (Cont'd)

.3 (Cont'd) stops but temperature remains below 3 degrees C.

.4 Provide manual timer overide.

.5 Provide sensors on both sides of the building's roof.

2.7 PRODUCT COMPATIBILITY

.1 System components to be product of a single manufacturer.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

.1 Install system components in accordance with manufacturer's instructions.

.2 Coordinate work with that of roofing trade.

.3 Install heating mesh in two rows parallel to eaves. Install heating cable in eavetroughs and downspouts. Cut heating cable and mesh to length.

.4 Ensure heating elements do not bunch or cross.

.5 Make power and control connections.

.6 Protection: protect heating circuits with a ground-fault device for equipment protection, rated at 30-mA trip.

3.3 FIELD QUALITY CONTROL

.1 Tests:

.1 Perform tests in accordance with Section 26 05 00 Common Work Results for Electrical.

3.3 FIELD QUALITY CONTROL (Cont'd)

.1 Tests:(Cont'd)

.2 Use 500 V Megger to test cables for continuity and insulation value and record readings as follows:

.1 Prior to installation.

.2 After installation to roof deck and gutters.

.3 After installation of ice and water shield membrane.

.4 Prior to installation of control units.

.5 Prior to energizing.

.3 Where resistance of 50 megohms or less is measured, stop work and advise Departmental Representative.

3.4 CLEANING

.1 Proceed in accordance with Section 01 00 10 - General Instructions.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA C22.1, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
.2 CAN3-C235-83(R2010), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

1.2 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.

.3 Language operating requirements: provide identification nameplates and labels for control items in English and French.

.4 Use one nameplate or label for both languages.

1.3 SUBMITTALS

.1 Submittals: in accordance with Section 01 00 10 General Instructions.

.2 Product Data: submit WHMIS MSDS.

.3 Shop drawings:
.1 Submit drawings stamped and signed by professional engineer licensed in Province of Alberta, Canada.
.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 co-ordinated 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 Submit drawings and product data to authority having jurisdiction.

1.3 SUBMITTALS (Cont'd)

.3 Shop drawings:(Cont'd)
.5 If changes are required, notify Departmental Representative of these changes before they are made.

.4 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 for 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 3.5.1 - LOAD BALANCE.
.6 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.

1.4 QUALITY ASSURANCE

.1 Qualifications: electrical Work to be carried out by qualified, licensed electricians or apprentices in accordance with authorities having jurisdiction and 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.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 Health and Safety Requirements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for recycling in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.

1.6 OPERATING INSTRUCTIONS

.1 Instruct Departmental Representative and operating personnel in operation, care and maintenance of systems, system equipment and components.

.2 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.

.3 Operating instructions to include following:
.1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
.2 Safety precautions.
.3 Other items of instruction as recommended by manufacturer of each system or item of equipment.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

.1 Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain approval from authority having jurisdiction before delivery to site and submit such approval as described in 1.3 Submittals.

.2 Factory assemble control panels and component assemblies.

2.2 WARNING SIGNS

.1 Warning Signs: in accordance with requirements of authority having jurisdiction.

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 , black face, white core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.

2.4 EQUIPMENT IDENTIFICATION (Cont'd)

.1 (Cont'd)
.2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.

.2 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

.3 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

.4 Terminal cabinets and pull boxes: indicate system and voltage.

.5 Transformers: indicate capacity, primary and secondary voltages.

2.5 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings 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.

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.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication	Green	Blue

2.6 CONDUIT AND CABLE IDENTIFICATION (Cont'd)

.3 Colours:(Cont'd)

	Prime	Auxiliary
Systems		
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	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.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

.2 Do overhead and underground systems in accordance with CSA C22.3 No.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 MOUNTING HEIGHTS

.1 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

.2 Install electrical equipment at following heights unless indicated otherwise.
.1 Local switches: 1400 mm.
.2 Panelboards: as required by Code or as indicated.

3.4 CO-ORDINATION OF PROTECTIVE DEVICES

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

3.5 FIELD QUALITY CONTROL

.1 Load Balance:

.1 Measure phase current to panelboards with normal loads operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
.3 Provide upon completion of work, load balance report as directed in 1.3 Submittals: phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.

.2 Conduct following tests.
.1 Circuits originating from branch distribution panels.
.2 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
.3 Insulation resistance testing:
.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
.2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
.3 Check resistance to ground before energizing.

.3 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

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