SPECIFICATIONS

Fort Henry National Historic Site of Canada
Parks Canada Agency

Redoubt Block 1, 2 & 11
2023 Masonry Rehabilitation

Project No. 2261
SEPTEMBER 2022

ISSUED FOR TENDER

Prepared By

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JCAL Project No. 22216

DRAWINGS:

Part 1 General

1.1 SUMMARY

.1 Requirements Included

.1 This section outlines the General Requirements that shall be administered by the Contractor. While the specification section establishes the requirements for each trade, the Contractor shall directly supervise and administer all contract requirements to ensure the provision of materials, labour and equipment necessary to complete the work on time and to the quality specified.

.2 Title and description of work: Fort Henry National Historic Site of Canada, Redoubt Block 1, 2 & 11-2023 Rehabilitation, 1 Fort Henry Drive, Kingston, Ontario.

.3 The Saint Lawrence Parks Commission (SLPC) operating season extends from May to September (Victoria Day to Labour Day). During the operating season, the Fort is open to the public (weekdays and weekends) from 9:30 am to 5:00 pm, and regular programs and events are run throughout the operating hours.

.4 During Fall and Winter work in the lower Fort, The Contractor can begin minor mobilization activities in October, of any given year, after the Fort operation season and at the direction of the Departmental Representative. These activities during minor mobilization must not interfere with SLPC Pumpkin inferno set-up and tear down. Full mobilization and construction activities cannot begin in the lower Fort before November 7th of any given year.

.5 SLPC anticipates carrying out an evening event each winter lasting multiple weeks. During the daytime setup, evening operation and teardown of these events, Contractor must minimize equipment and material storage to designated areas and must keep the lower Fort ‘parade” area in an accessible and organized manner to facilitate the event.

.6 During the operating season, it is common for multiple construction sites to be operating simultaneously. Co-ordinate use of premises under direction of Departmental Representative. Contractors will be assigned to their own specific work area, and within that boundary, they may conduct their work. No one is to be granted access to the job site without the contractor’s knowledge and permission. Parks Canada representatives and Consultants require access in order to conduct reviews of work.

.7 While Fort Henry National Historic Site is open to the public, Contractor work should give the right of way to all pedestrians and group tours. The public and re-enactor staff of SLPC have first priority and are to be given right of way.

.8 Federal contractors are not to conduct any communications, business or work arrangements with SLPC.

.9 Fort Henry National Historic Site is open to the public, and as such, no profound language or offensive behaviour will be permitted on site. Failure to comply with this rule may result in removal of the individual from site.

.10 The Contractor shall be responsible for snow clearing options as described in the Contract Documents. There shall be no claims or delays submitted by the Contractor as a result of snow clearing operations required to carry out the work.

.11 The Contractor is responsible for verifying all physical access restrictions inside and outside of the Fort, this includes but is not limited to widths, heights, bridges, arched entrances etc.

.2 Scope of Work

.1 The general scope of work shall include but not be limited to the following:

.1 Provide scaffolding and site protection as necessary to perform work of this Contract. Erect temporary bracing as required to perform the work in a safe manner and conforming with the requirements of Section 01 35 30 – Health and Safety Requirements.

.2 Provide protective barricades to the work site to prevent public access to the work area.

.3 Take all necessary precautions to reduce impact on natural environment and waterway adjacent the site.

.4 Provide enclosure and heating as required.

.5 Rake out and remove all loose and deteriorated mortar to the extent noted on the drawings.

.6 Repoint as noted on the drawings.

.7 Repair/replace quantities of existing stone as necessary.

.8 Remove and reset stone at locations noted on drawings.

.9 Install specified anchors, as required and as noted on drawings.

.10 Remove deteriorated concrete and provide concrete repairs as noted on drawings.

.11 Grout voids in centre core of walls, as noted on the drawing.

.12 Remove existing caulking and recaulk around all windows and doors.

.13 Remove, clean and repaint windows and doors. Repair woodwork as required.

.14 Restore, modify as required and paint all metal bars, shutters, hinges and railing as noted on drawings.

.15 Restore landscaping to original condition, upon completion of project. Re-sod where required.

.2 Sequence of Work

.1 Commence work immediately upon notification of acceptance of offer and complete the work within the following schedule:

.1 Construction – Year 1 (Jan 2023- Apr 2023):
Phase 1 (Block 2 Interior)

.2 Construction – Year 2 (May- Sept 2023):
Phase 2 (Block 2 Exterior)

.3 Construction – Year 3 (Oct 2023- Apr 2024):
Phase 3 (Blocks 11 & 1 Interior)

.4 Construction – Year 4 (May - Sept 2024):
Phase 4 (Blocks 11 & 1 Exterior)

.3 Site Information

.1 Cannons are fired at the site during the operating seasons (approximate times are 12 noon, 3:10 pm and 4:50 pm). The Contractor must follow

SLPC safety requirements during cannon firing including vacating the East portion of the dry ditch outside of Block 3.

.2 Muskets are fired at the site during the operating seasons at regular intervals.

.3 Obtain confirmation of schedule of firing times from SLPC, on a daily basis. Communicate this information to site personnel.

1.2 PROJECT COORDINATION

.1 Coordination

.1 Coordinate all work between sub-trades and own forces to ensure that the complete scope of work detailed in the Contract Documents is completed.

.2 Coordinate progress of the Work, progress schedules, submittals, use of site, temporary utilities, construction facilities, with the Departmental Representative.

.3 Execute the Work to cause minimum interference to occupants of the existing building and personal effects.

.4 Maintain access to the facility at all times.

.5 Take reasonable measures to control noise during construction. Activities expected to generate high volumes of noise (jackhammers, saws, powered tools etc.) must be restricted to the periods from 7:30 am to 9:30 am and 5:00 pm to 9:00 pm during the operating season. Otherwise, there are no restrictions outside of local by-law restrictions.

.6 Working hours other than normal business hours shall be subject to the approval of the Departmental Representative. Coordinate work with the Departmental Representative.

.7 Maintain one copy of each of the following at the job site for reference purposes:

.1 Drawings

.2 Specifications

.3 Addenda (if applicable)

.4 Change Orders

.5 Reviewed Shop Drawings

.6 Reports from Independent Inspection/Testing Agencies

.7 Health and Safety Standards

.8 Schedule

.2 Hours of Operation

.1 Work is restricted to non-operational hours, unless otherwise approved by the Departmental Representative.

.2 Work cannot be performed at any other time, unless approved in advance by Departmental Representative.

.3 During the off-season, work can be performed between 7:30 am and 5:00 pm, Monday to Friday.

.4 Vehicle access to the site is not permitted after 10:00 am, unless otherwise authorized by Departmental Representative. All vehicles must be removed from the lower and upper Fort by 10:00am during operating season.

.1 Access routes to the work site (roads and grounds) are shared with SLPC, the Public and Parks Canada. In sharing the access routes, all movements

are to be conducted safely, cordially, and cooperatively. Contractor vehicles must yield the right of way to all pedestrian vehicles and to all SLPC maintenance vehicles.

.5 Work must be suspended during show times. Coordinate with the Departmental Representative on a weekly basis, to identify all show times during that week and schedule work around the show times.

.3 Noise Control

.1 Noise pollution generating activities are to be restricted to non-operational hours.

.2 Adhere to local noise by-laws and as noted under 1.2.1 Coordination; notify residents of planned activities that may cause disturbance.

.3 Portable music devices will not be allowed on site.

.4 Health and Safety

.1 Refer to Section 01 35 30 Health and Safety Requirements.

.5 Hazardous Materials Abatement and Protection Requirements

.1 Provide all measures and procedures for hazardous materials abatement in accordance with the Departmental Representative's recommendations.

.2 Dispose of all hazardous materials, including all effluence, in conformance with Ministry of Environment and Ministry of Labour guidelines.

.3 Provide all equipment required to clean the Work and access stage/platform in conformance with all applicable statutes and guidelines.

.6 Taxes

.1 Pay all taxes properly levied by law (including Federal, Provincial and Municipal).

.7 Fees, Permits and Certificates

.1 Pay all fees and obtain all permits. Provide authorities with plans and information for acceptance certificates. Provide inspection certificates as evidence that work conforms to requirements of Authority having jurisdiction.

.8 Communications Protocol

.1 All Contractor correspondence and communication to be through the Departmental Representative only. Communication with the St Lawrence Parks Commission or their on-site staff is strictly prohibited.

1.3 CUTTING AND PATCHING

.1 Approvals

.1 Submit written request in advance of cutting or alteration which affects:
- .1 Structural integrity of any element of the Project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of any operational element.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Departmental Representative or separate contractor.

.2 Inspection

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of work.

.3 Inspect and record photographically, condition of existing landscaping prior to commencement work on site and submit a detailed list of noted defects to the Departmental Representative. On completion of project, ensure the site is returned to a condition which is the same or better than existing condition, prior to start of project.

.4 Beginning of cutting or patching means acceptance of existing conditions.

.3 Execution

.1 Execute cutting, fitting, and patching to complete the Work.
.2 Remove and replace defective and non-conforming work.
.3 Execute Work to avoid damage to other work.
.4 Prepare proper surfaces to receive patching and finishing.
.5 Restore work with new products in accordance with Contract Documents.
.6 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
.7 Refinish surfaces to match adjacent finishes; for continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.
.8 Welding is not permitted on site without the express permission of the Project Manager. In the event that welding is permitted, provide a two hour fire watch and have fire extinguisher on site. A Hot Work Permit must be obtained from the Departmental Representative, on a daily basis, prior to commencing this work, or any work that generates sparks, high temperatures or requires an open flame.

.4 Protection

.1 Provide adequate protection to the public and property.

.2 Protect existing building, furnishing and equipment from any damages resulting from performing work on this Contract. This includes protection to existing floor finishes while doors and windows are removed. Incurred damages to be repaired, without cost to the Departmental Representative.

.3 Tarp all interior furnishings, exhibits and objects sensitive to dust to the satisfaction of Departmental Representative.

.4 Protect new work from damages from any cause. All finished surfaces must be protected so that marks or scratches do not mar the finished surfaces prior to acceptance of work.

.5 Protect and be responsible for all new finished and unfinished work which is exposed and susceptible to vandalism or theft.

.6 Where security has been reduced by work of this Contract, provide temporary means to maintain security.

.7 Seal all openings to prevent dust infiltration of any kind into the interior of the building. Any dust infiltration must be cleaned to the acceptance of the Departmental Representative.

.8 Carry out work to cause minimum interference to pedestrian traffic within and adjacent to the Fort complex.

.9 Where windows and doors are removed, protect all exposed interior floor finishes from damage due to construction or weather.

1.4 EXAMINATION

.1 The Drawings are, in part, diagrammatic and are intended to convey the scope of work and indicate general and approximate locations and arrangement of the Work.

.2 Obtain more accurate information from measurements made at the site in conjunction with the Drawings and become familiar with all site conditions before proceeding with the Work. Notify the Departmental Representative immediately, should any discrepancy be discovered. No allowances will be made later for any expense incurred by the Contractor through their failure to make this examination.

1.5 PROJECT MEETINGS

.1 Administrative

.1 The Departmental Representative will schedule and administer biweekly project progress meetings. More frequent meetings will be scheduled, in the event the schedule is not being adhered to.

.2 The Departmental Representative will prepare a template for agenda and minutes.

.3 The Departmental Representative will record minutes. Include significant proceedings and decisions. Identify "Action By" parties.

.4 The Departmental Representative will reproduce and distribute copies of minutes within three days after each meeting and transmit to meeting participants and affected parties not in attendance.

.5 Record the minutes, when the Departmental Representative is not present. Include significant proceedings and decisions. Identify "Action By" parties.

1.6 SUBMITTALS

.1 Administrative

.1 Submit to Departmental Representative submittals listed for review, refer to Section 01 33 00 Submittal Procedures.

.2 Do not proceed with Work affected by the submittal until review is complete.

.3 Verify field measurements and coordinate affected adjacent Work.

.4 Prior to beginning work, submit to the Departmental Representative for approval, proposed pedestrian and vehicular control measures, signing, site security and dust control measures. Do not proceed until written approval is given. Modify procedures when required by the Departmental Representative and at no cost to the Departmental Representative.

.5 Keep record of all HST paid on Labour and Materials. Submit information to Departmental Representative monthly.

.2 Shop Drawing and Product Data

.1 Refer to Section 01 33 00 - Submittal Procedures.

.3 Samples

.1 Samples: examples of materials, equipment, quality, finishes, workmanship. Refer to Section 01 33 00 – Submittal Procedures.

.2 Submit for review, samples as requested in respective Specification Sections.

.3 Deliver samples prepaid to Departmental Representative's business address.

.4 Reviewed and accepted samples will become standard of workmanship and material quality, against which installed work will be verified.

.4 Photographs

.1 Submit to the Departmental Representative, colour digital photography in jpg format, fine resolution, detailing the as found condition of the building prior to start of construction. Also submit colour hard copy of same.

.2 Submit progress photographs to Departmental Representative bi-weekly at progress meeting.

.5 Record Drawings

.1 Accurately and neatly record deviations from Contract Documents caused by site conditions and changes ordered by the Departmental Representative.

.2 Identify drawings as "Project Record Copy." Maintain in new condition and make available for inspection on site by the Departmental Representative.

.3 On completion of Work and prior to final inspection, submit record documents to the Departmental Representative.

1.7 SCHEDULE

.1 Schedules Required

.1 Construction Progress Schedule, in Gantt Chart format. Indicate Critical Path on Schedule. Summarize work activities into work packages and highlight key milestones to satisfaction of Departmental Representative. Incorporate items into schedule, as requested by Departmental Representative.

.2 Monthly Cash Flow Document: Submit to Departmental Representative, a breakdown on the Contract Amount in detail as directed by the Departmental Representative and aggregating the total amount of the Contract Price, so as to facilitate evaluation of application for payment.

.2 Submission

.1 Submit initial schedules within 10 working days after award of Contract, indicating the timing of the work, including the sequence of all operations involved therein, in order to meet the completion date. Work on site cannot commence until schedule is approved.

.2 Submit updated Project Schedule at minimum two days prior to the site meeting, or at shorter intervals as changes to schedule dictate.

.3 Submit initial Cash Flow Document within 10 working days after award of Contract. Progress Claims cannot be authorized until this document has been approved by the Departmental Representative.

1.8 SITE INSTRUCTION

.1 When a clarification or modification of the work is required which does not require an adjustment of the contract price or contract time, the Departmental Representative will issue a Site Instruction.

.2 Upon receipt of a Site Instruction, proceed promptly with the work.

1.9 QUALITY CONTROL

.1 Provide sufficient, safe and proper facilities at all times for review of the Work by the Departmental Representative.

.2 Independent Inspection Agencies

.1 Independent Inspection/Testing Agencies will be engaged by the Departmental Representative for the purpose of inspecting and/or testing portions of Work, as identified in the Specifications. Cost of such services will be borne by the Departmental Representative.

.2 Provide equipment, samples of materials, design mix, tools, storage, safe access and assistance as required for executing inspection and testing by the appointed agencies.

.3 Cost of re-inspection of unacceptable work to be borne by Contractor.

.3 Reports

.1 Submit one copy of inspection and test reports promptly to the Departmental Representative.

1.10 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

.1 Installation/Removal

.1 Provide construction facilities and temporary controls in order to execute the work expeditiously.

.2 Prior to substantial performance, remove from site all such work.

.3 Make good any damage to, or disturbance of existing property caused by such work.

.2 Site Office

.1 Position temporary site office/trailer at location designated by Departmental Representative.

.2 Maintain facility in clean and tidy condition.

.3 Keep access doors closed at all times.

.4 Provide heating. Arrange Hydro hook-up under separate meter.

.3 Site Storage/Loading

.1 Do not load or permit to be loaded, any part of the Work with a weight or force that will endanger the safety of the Work.

.2 Space on site is limited to the boundaries set out by the Departmental Representative. Keep storage requirements to a minimum.

.3 Store products, materials, equipment in locations indicated by the Departmental Representative. All construction material and equipment must be stored inside the fenced area.

.4 Maintain equipment to avoid leakage of fuels and liquids. Ensure measures are in place to minimize impacts of accidental spills. Keep an emergency spill kit at the site and deploy immediately, should a spill occur. In the case of a spill contact Departmental Representative and notify Ontario Spill Action Center immediately

at 1-800-268-6060. All provincial and federal regulations are to be adhered to. Maintain an adequate supply of clean up materials on-site.

.5 Store all oils, lubricants, fuels and chemicals in secure areas on impermeable pads.

.6 Grass in the storage area to be cut regularly.

.4 Protection and Maintenance of Traffic

.1 Provide access and temporary relocated roads as necessary to maintain traffic.

.2 Maintain and protect traffic on affected roads during construction period.

.3 Provide measures for protection and diversion of traffic when required, including provision of watch-persons and flag-persons, erection of barricades, placing lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs.

.4 Protect travelling public from damage to person and property.

.5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor shall be responsible for repair of damage to roads caused by construction operations. Access to the site during inclement weather and icy conditions can vary, 4x4 vehicle and AWD trucks are recommended during these conditions.

.7 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.8 Dust control: adequate to ensure safe operation at all times.

.9 Lightning: to assure full and clear visibility for full width of haul road and work areas during night work operations.

.5 Sanitary Facilities

.1 Provide sufficient sanitary facilities for construction personnel in accordance with governing regulations and ordinances. Place this facility in a location where public access is prohibited and ensure concealment from public view. Departmental Representative to approve location.

.2 Post notices and take precautions as required by local health authorities. Maintain the facilities in clean and sanitary condition.

.3 Provide hand sanitation station.

.4 Do not use public washrooms.

.6 Water Supply

.1 There is no potable water on site. Provide water as required to complete the Work.

.7 Temporary Power/Energy

.1 There is limited power source on site.

.2 Natural Gas for heating is not available on site.

.3 Propane can be used for heating, except do not store propane adjacent to the mezzanine at Block 2. Heat this area using electricity.

.8 Communication Facilities

.1 Provide Site Superintendent with a cell phone, to ensure he/she can contact or be contacted by the Departmental Representative at all times during working hours.

.2 Provide a means of communication on site in the form of a computer with printer or tablet, in order to facilitate the dispatch of Construction Review Reports and Site Instructions directly to the site office.

.9 Project Cleanliness

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

.2 Remove waste material and debris from the site and deposit in waste container at the end of each working day. Do not burn waste materials on site.

.10 Dust Control

.1 Take every precaution to control dust.

.2 Keep the surface area damp to minimize dust where removals are in progress.

.3 Due to group tours and tourists, restrict dust generation activities to non-operating hours, unless otherwise authorized by the Departmental Representative.

.4 Contain dust to Work area by screening, to prevent migration of dust to non-work areas.

.5 Protect the rooms inside the Redoubt by sealing all openings to prevent dust infiltration, using closed cell gaskets to compress against the masonry. Should dust infiltration occur, it must be cleaned to the acceptance of the Departmental Representative. Installation of additional tarping and protection of all interior spaces (tarping furniture, exhibits and other fixtures in rooms) is required.

.6 All loops holes on the exterior Redoubt to be sealed during the Work.

.11 No Smoking Environment

.1 Fort Henry National Historic Site has a zero tolerance no smoking policy. Individuals who fail to comply may be removed from site.

.12 Parking

.1 Parking will not be permitted within Fort Henry outside of the contractor staging and area as depicted on the Contract Drawings. The Contractor may use the public parking on the east side, gravel parking, of the Fort.

.13 Loading/Unloading and Garbage Container

.1 Do not use the Departmental Representative's garbage container to store or dispose of contract waste.

.2 Provide garbage container, sufficient to accommodate contract waste. Locate where directed by Departmental Representative in Laydown Area.

.14 Snow Clearance

.1 St. Lawrence Parks Commission provides snow clearing services including sand/salt placement across certain areas of Fort Henry including the advanced battery, parking lot and east access road. The services described above are only offered on weekdays. There is no guaranteed time at which snow removal services will begin, as such the Contractor should be prepared to provide snow removal services as required to carry out the work without delay.

.1 The Contractor shall be responsible for snow clearing and salting within the staging and storage areas.

1.11 MATERIAL AND EQUIPMENT

.1 Product and Material Quality

.1 Unless otherwise specified in the Contract Documents, products provided shall be new. Products which are not specified, will be of a quality consistent with those specified, and their use acceptable to the Departmental Representative.

.2 Storage, Handling and Protection

.1 Do not unreasonably encumber site with materials or equipment. Move stored materials or equipment when directed by the Departmental Representative.

.2 Handle and store Products in a manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.3 Store packaged or bundled Products in original and undamaged condition with manufacturer's seals and labels intact.

.4 Store loose granular materials on solid flat surfaces, in a well drained area. Prevent mixing with foreign matter.

.5 Store products subject to damage from weather in weatherproof enclosures.

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

.7 Provide trailer for duration of project to be used as meeting room and lunch room for workers. The trailer can be located as noted on Drawings.

.8 Store products in a heated facility, trailer or container to maintain manufacturer’s temperature requirements.

.3 Manufacturer’s Instructions

.1 Unless otherwise indicated in the specifications, install or erect Products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with Products. Obtain written instructions directly from manufacturers.

.2 Notify the Departmental Representative in writing, of conflicts between the specifications and manufacturer's instructions, so that the Departmental Representative may establish the course of action.

.3 Improper installation or erection of Products, due to failure in complying with these requirements, authorizes the Departmental Representative to require removal and re-installation at no increase in Contract Price.

.4 Workmanship

.1 Ensure workmanship is of the best quality, executed by workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Decisions as to the quality or fitness of workmanship in cases of dispute rest solely with the Departmental Representative, whose decision is final.

1.12 PROJECT CLOSEOUT

.1 Final Cleaning

.1 Remove stains, dirt and smudges from finished surfaces.

.2 Clean exposed, finished surfaces in accordance with respective material manufacturers' recommendations.

.3 Broom clean and wash pathways and surfaces affected by the work.

.4 When work is substantially performed, remove surplus products, tools, construction machinery and equipment. Remove waste products and debris.

.5 Restore landscaping to as found condition. Re-sod damaged areas, including re-watering until grass has been cut twice. Replace all damaged shrubs, with shrubs of equal or better quality.

.2 Documents

.1 Collect reviewed submittals and assemble documents executed by Subcontractors, suppliers, and manufacturers.

.2 Submit material prior to final Application for Payment.

.3 Submit operation and maintenance data, record (as-built) drawings.

.4 Provide guarantees, warranties, and bonds where requested, fully executed and notarized.

.5 Departmental Representative will issue a final Change Order, reflecting approved adjustments to Contract Price for agreed measured quantities for all unit rate items.

.3 Inspection/Takeover Procedures

.1 Prior to application for certificate of Substantial Performance, carefully inspect the Work and ensure it is complete, that major and minor construction deficiencies are complete, defects are corrected and the site is in clean condition. Notify the Departmental Representative in writing, of satisfactory completion of the Work and request an inspection.

.2 During the Departmental Representative inspection, a list of deficiencies and defects will be tabulated. Correct same.

.3 When the Departmental Representative considers deficiencies and defects have been corrected and it appears requirements of the Contract have been substantially performed, make application for certificate of Substantial Performance.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.1 Submit Schedule and Cash Flow Document within 10 working days of Contract award.

.2 Submit all other required submittals within the first 30 days of Contract award.

.2 Prepare submittals log, listing all shop drawings, samples and product data sheet submittals required as part of the contract. List status of each submittal, from submission to final approval. Submit updated submittals log at each progress meeting.

.3 Do not proceed with Work affected by submittal until review is complete.

.4 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.5 Where items or information is not produced in SI Metric units converted values are acceptable.

.6 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.7 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.8 Verify field measurements are coordinated with affected adjacent Work.

.9 Coordinate each submission with requirements of work and contract documents. Individual shop drawings will not be reviewed until all related drawings are available.

.10 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.11 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review, unless Departmental Representative gives written acceptance of specified deviations.

.12 Keep one reviewed copy of each submission on site.

.13 Arrange and pay for all deliveries and pick-ups to and from the office of the Departmental Representative.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 A list of all required shop drawings will be provided to the Contractor at the start of the Project. This list will be used to monitor the status of Submittals.

.2 Provide shop drawings to the Departmental Representative to review in orderly sequence and sufficiently in advance, so as to cause no delay in the Work.

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

.4 Prepare shop drawings using a computer aided drafting program.

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

.6 Submit drawings stamped and signed by a Professional Engineer registered or licensed in Province of Ontario, where requested.

.7 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.8 Allow three days for Departmental Representative's review of each submission.

.9 Make changes to shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.10 Accompany submissions with transmittal letter, containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.11 Submissions include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Contractor
  - .2 Subcontractor.
  - .3 Supplier.
  - .4 Manufacturer.
  - .5 Separate detailer when pertinent.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Identification of product or material.
- .6 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Relationship to adjacent work.

.7 Where Departmental Representative's drawings are used as the base for the shop drawings, delete the Departmental Representative's title block and stamp. Failure to do so will mean that the drawings will be returned without review.

.12 After Departmental Representative's review, distribute copies.

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

.14 Submit one electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.15 Submit one electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within 1 year of date of contract award for project.

.16 Submit one electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.17 Submit one electronic copy of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.18 Submit one electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.19 Submit documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.20 Submit one electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.21 Delete information not applicable to project.

.22 Supplement standard information to provide details applicable to project.

.23 If upon upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.24 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that the Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 SAMPLES

.1 A list of all required samples will be provided to the Contractor at the start of the Project. This list will be used to monitor the status of Submittals.

.2 Submit for review samples in duplicate, or as requested in respective specification Sections. Label samples with origin and intended use.

.3 Deliver samples prepaid to Departmental Representative's business address.

.4 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.5 Where colour, pattern or texture is criterion, submit full range of samples.

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

.7 Make changes to samples which Departmental Representative may require, consistent with Contract Documents.

.8 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 MOCK-UPS

.1 Erect mock-ups at locations acceptable to the Departmental Representative.

.2 Construct field samples and mock-ups at locations acceptable to the Departmental Representative.

.3 Construct each mock-up complete, including work of all trades required to finish work.

.4 Reviewed mock-ups will become standard of workmanship and material quality, against which installed work will be verified.

1.5 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic digital photography in jpg format, fine resolution, as directed by Departmental Representative.

.2 Project identification: name and number of project and date of exposure indicated.

.3 Submit photographs of as-found condition prior to commencement of the project.

.4 Submit progress photographs to Departmental Representative, bi-weekly at progress meeting, to document advancement of project.

1.6 CERTIFICATES AND TRANSCRIPTS

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

.2 Submit transcription of insurance immediately after award of Contract.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

.2 Province of Ontario

.1 Occupational Health and Safety Act and Regulations 213/91 for Construction Projects, latest edition.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Complete Parks Canada site-specific Health and Safety Plan Template and submit within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation.

.3 Complete and submit Parks Canada Form, attestation and proof of compliance with occupational Health and Safety.

.3 Contractor may use own plan format, provided it includes at minimum, the contents of Parks Canada Plan template.

.4 Submit 1 copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly.

.5 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.

.6 Submit copies of incident and accident reports.

.7 Submit Material Safety Data Sheets (MSDS) to Departmental Representative.

.8 Personnel training requirements including as follows:

.1 Names of personnel and alternates responsible for site safety and health, hazards present on site, and use of personal protective equipment.

.9 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 2 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 2 days after receipt of comments from Departmental Representative.

.10 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.

.11 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 any new site personnel to Departmental Representative.

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

1.3 SAFETY ASSESSMENT

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

1.4 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Fall Hazards

.1 Redoubt walls are considered a fall hazard. Ensure workers are aware of safety regulations.

1.5 MEETINGS

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

.2 Schedule and administer weekly Health and Safety Toolbox Meetings with workers. Submit minutes of meetings to Departmental Representative at Progress Meetings.

1.6 GENERAL REQUIREMENTS

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

.2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.7 ENVIRONMENTAL REQUIREMENTS

.1 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding the use, handling, storage and disposal of hazardous materials and regarding the labelling and provision of MSDS data sheets.

1.8 RESPONSIBILITY

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

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

1.9 COMPLIANCE REQUIREMENTS

.1 Comply with Ontario Health and Safety Act and Regulations for Construction Projects.

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

1.10 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 identified health and safety issues.

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

1.11 UNFORSEEN HAZARDS

.1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, suspend work and follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of the Province of Ontario. Advise Departmental Representative verbally and in writing.

1.12 HEALTH AND SAFETY CO-ORDINATOR

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

.1 Have working knowledge of occupational safety and health regulations.

.2 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.3 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.4 Be on site during execution of Work and report directly to and be under direction of site supervisor.

.2 Provide the name of this individual to the Departmental Representative.

.3 Ensure at least one of the site personnel is trained in CPR, in the event it is required.

1.13 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 the Province of Ontario and in consultation with the Departmental Representative.

1.14 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.

.2 Assign responsibility and obligation to Health and Safety Officer to stop or start work when, at Health and Safety Officer’s Discretion, it is necessary or advisable for reasons of Health and Safety. Departmental Representative may also stop work for Health and Safety considerations.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 32 92 23 – Sodding.

1.2 REFERENCES

.1 Definitions:

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.

.3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction and the methods of mitigation as well as how compliance will be measured.

.4 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.5 Include in Environmental Protection Plan:

.1 Name of person responsible for ensuring adherence to Environmental Protection Plan.

.2 Name and qualifications of person responsible for training site personnel.

.3 Descriptions of environmental protection personnel training program.

.4 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.5 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material and fuel storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

.6 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.

.1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.

.7 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.8 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.9 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.10 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.11 Waste Water Management Plan identifying methods and procedures for management of discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

.12 Historical, archaeological, cultural resources, biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands. Should any suspected species at risk be encountered or if there is potential to negatively impact species at risk, or wild life in general, contact PCA Environmental Assessment staff at 705-750-4931, for guidelines on how to proceed.

.13 Pesticide treatment plan to be included and updated, as required.

.14 Plan which demonstrates procedures for avoiding disturbance/harm to wildlife.

1.4 FIRES

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

1.5 DRAINAGE

.1 Provide temporary drainage and pumping required to keep excavations and site free from water.

.2 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.

.2 Protect roots of designated trees to dripline (outer perimeter of branches) during excavation and site grading to prevent disturbance or damage.

.1 Avoid unnecessary traffic, dumping and storage of materials over root zones.

.3 Minimize stripping of topsoil and vegetation.

.4 Reduce soil displacement and compaction by using equipment of low bearing weight and low psi tires, wherever possible. Replace damaged areas to pre-construction state with topsoil and vegetation.

.5 Avoid activity during wet weather conditions (rainfall amounts greater than 20 mm predicted) and ensure that a consistent access route is used and maintained throughout vegetation clearing.

1.7 OPERATION, MAINTENANCE AND CLEANING OF EQUIPMENT

.1 Provide drip trays to prevent the discharge of oil, grease, antifreeze or any other deleterious materials into the ground.

.2 Equipment and heavy machinery to meet or exceed all applicable emission requirements.

.3 Leave machinery running only when in actual use, except where extreme temperatures prohibit shutting machinery down.

.4 Use trigger operated spray nozzles for water hoses when cleaning concrete equipment.

.5 Equipment and tools are to be cleaned in the designated area only, as approved by the Departmental Representative, or off-site.

1.8 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this Contract.

.2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.

.3 Spills

.1 Report all spills immediately to the Ontario Spill Action Centre (1-800-268-6060) and the Departmental Representative.

.2 Using appropriate safety precautions, collect liquid or solidify liquid with an inert, non-combustible material and remove for disposal.

.3 Be responsible for all costs of cleaning up any spills, to the satisfaction of the Departmental Representative.

.4 Ensure an environmental emergency response plan is in place and a spill kit is readily available. Note location of spill kit on the Site Plan.

.4 Prevent sandblasting and other extraneous materials from contaminating beyond application area.

.1 Provide temporary enclosures where indicated by Departmental Representative.

.5 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.9 HISTORICAL/ARCHAEOLOGICAL CONTROL

.1 Submit historical, archaeological, cultural and biological resources plan to Departmental Representative for approval.

.2 Contents of Plan:

.1 Procedures for identifying and protecting historical, archaeological, cultural and biological resources known to be on project site.

.2 Procedures to be followed if historical, archaeological, cultural and biological resources, not previously known to be on project site or in the area, are discovered during the work.

.3 Procedures to assure protection of known or discovered resources.

.4 Procedures for communication between Contractor's personnel and Departmental Representative.

.3 Minimum Procedures:

.1 Obtain diagrams and maps of previously disturbed areas and areas of concern from Departmental Representative.

.2 Confine heavy machinery to a minimal area, to mitigate impact on potential archaeological structures.

.3 Relics and antiquities such as cornerstones and their contents, commemorative plaques, the remains and evidence of ancient persons and peoples, and other objects of historic value and worth will remain the property of the Department. When found, protect such articles and request direction from the Departmental Representative.

.4 Should historic objects be uncovered during the work, stop work immediately and notify the Departmental Representative. Do not resume work until such time as directed by the Departmental Representative.

1.10 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

.2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.1 Take action only after receipt of written approval by Departmental Representative.

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

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 CLEANING

.1 Clean up work area as work progresses. Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment from the site.

.3 Landscaping on site must be returned to its former condition. Regrade and resod damaged areas as per Section 32 92 23 – Sodding.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 05 00 – Common Work Results for Masonry.

1.2 REFERENCES

.1 Definitions

.1 Housing: Enclosure placed around work or around scaffolding and work, to provide either protection for the work taking place, or to provide a micro-climate more suitable to the work than ambient atmospheric conditions, or both.

1.3 PRICE AND PAYMENT PROCEDURES

.1 Provide lump sum price to include all costs for labour, materials and equipment necessary to complete the work of installing and removing insulated housing for the work, as well as for all hook-ups/metering (if required) and heater(s).

.2 Watchperson: No measurement for payment will be made for the work of providing a Watchperson, if required. Include all costs for the provision of a watchperson in the tendered prices for the above lump sum items.

1.4 REGULATORY REQUIREMENTS

.1 Design and construct temporary housing to resist the snow and wind loads (including uplift), in accordance with the 2020 National Building Code.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings

.1 Submit shop drawings for temporary housing and fuel sources. Indicate material specification and all details and information necessary for assembly and erection.

.2 Shop drawings for housing to be stamped and signed by a qualified Professional Engineer registered in the Province of Ontario.

.3 Provide schedule of heater numbers, types, locations and capacities.

.4 Indicate number and location of fire extinguishers associated with heating equipment.

1.6 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.7 TEMPORARY HOUSING

.1 Provide weather tight housing for the portions of the Work which must be protected, heated and/or ventilated during the work.

1.8 TEMPORARY HEATING AND VENTILATION

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

.2 Construction heaters used inside housing enclosure must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.

.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 regulations for safe working environment.

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

.5 Ventilating:

- .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
- .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
- .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
- .4 Ventilate storage spaces containing hazardous or volatile materials.
- .5 Ventilate temporary sanitary facilities.
- .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.6 Maintain strict supervision of operation of temporary heating and ventilating equipment to:

- .1 Conform with applicable Codes and Standards.
- .2 Enforce safe practices.
- .3 Prevent abuse of services.
- .4 Prevent damage to finishes.
- .5 Vent direct-fired combustion units to outside.

.7 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

.8 Appoint a Watchperson to be in attendance, when workers are not present, to ensure temperatures are maintained and heating equipment is operating safely.

1.9 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

1.10 DELIVERY, STORAGE AND HANDLING

.1 Store heating fuels and gas to the requirements of the Departmental Representative and in accordance with Section 01 35 43 – Environmental Procedures.

.2 Storage of propane tanks in Block 2 of the Redoubt is strictly prohibited, due to its proximity to the explosives mezzanine.

Part 2 Products

2.1 MATERIALS

.1 Use only new materials, unless approved otherwise by the Departmental Representative.

.2 Materials must comply with the requirements of the 2020 National Building Code.

Part 3 Execution

3.1 TEMPORARY HOUSING

.1 Install housing enclosure in the area of the Contract. Location as noted on the Drawings.

.2 Prior to commencing heating, inform Departmental Representative of the intent and obtain approval prior to starting. The Departmental Representative will make periodic inspections of the housing and heating works throughout the duration of construction. Cooperate with and make adjustments/changes as directed.

.3 Maintain housing in satisfactory condition for the duration of construction.

.4 Remove structure on completion of construction and restore areas disturbed during removal.

.5 Remove all anchors from masonry or concrete. Repair stone or mortar as required.

3.2 HEATING EQUIPMENT

.1 Use only heating equipment types which conform to applicable codes and standards.

.2 Ensure all installation and removals of meters and/or piping is performed by a Fitter/Installer CSA certified for the type of fuel being used. Be responsible to maintain piping and associated heating systems at no additional cost to the Departmental Representative.

.3 Ensure that the heating requirements are met by providing, at optimum efficiency of the equipment, a capacity of 125% of the heat requirement and a sufficient number of standby heaters ready for use at the site.

.4 Heating Fuels

.1 Use electricity, gas, diesel oil or other fuels approved by the Departmental Representative. Be responsible for all arrangements and paying of accounts with Hydro, if this is the selected method of heating.

.2 Fuel storage to the requirements of the Fire Commissioner of Canada.

.3 Where heating fuel is supplied by the Departmental Representative, such fuel usage quantities will be recorded monthly and the Contractor will be billed at cost. Monthly cost shall equal total consumption times the effective volume times rate for the given month, as dictated by the heating fuel provider.

.5 Provide and maintain temporary fire protection equipment during performance of work, commensurate with fuel source selected.

3.3 REMOVAL OF HEATING AND VENTILATING EQUIPMENT

.1 Upon receipt of Departmental Representative's approval:

.1 Discontinue heating operations.

.2 Remove housing and heating equipment from the site.

3.4 FIELD QUALITY CONTROL

.1 Provide acceptable maximum-minimum thermometers and relative humidity gauges inside the housing and maintain to the satisfaction of the Departmental Representative, and in accordance with Section 04 05 00 – Common Work Results for Masonry. Locate thermometers at lowest and highest level of scaffold.

.2 Ensure continuity of protection by posting a Watchperson at Contractor's discretion, when work is not in progress.

.3 The Watchperson's qualifications must be sufficient to perform, on heating equipment, such duties as:

.1 Preventative maintenance and refueling, normally performed during any shift.

.2 Emergency repairs of minor complexity.

.3 Place standby items in service.

.4 Record maximum and minimum temperature at each thermometer on a daily basis and reset the thermometers when requested by the Departmental Representative, or at prescribed intervals.

.5 Provide temperature records on a daily basis and certified written records on a weekly basis to the Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 03 05.21 – Period Masonry Repointing.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM A123-2013, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 Canadian Standards Association (CSA International)

.1 CSA Z797-09 (R2014), Code of Practice for Access Scaffold.

.2 Occupational Health and Safety Act Ontario Regulations 213/91 for Construction Projects, latest edition.

1.3 DESIGN REQUIREMENTS

.1 Maximum allowable scaffold load on existing roof structure is 2.4 kPa.

.2 Design storage platform for a uniform distributed load of 7.2 kPa, and each working platform for a uniform distributed load of 2.4 kPa. Scaffold Design Engineer to specify the maximum number of working platforms to be loaded simultaneously.

.3 Design scaffolding to support loading from material hoist attached to scaffold frames. Maximum weight of material to be lifted by the hoist is 6 kN.

.4 Design bridging to ensure adequate distribution of scaffold loads over roof structure to prevent overloading of structural members.

.5 Design adequate connections to building elevation to resist lateral loads from scaffolding.

.6 Design for wind loading in compliance with Occupational Health and Safety Act, Ontario Regulation for Construction Projects.

.7 Design scaffolding to support loading from enclosure attached to scaffold frames and resist applicable wind loads for fully enclosed scaffolding.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 When scaffolding is higher than 15.25m for arch frame and system scaffolding or 10 m for tube and clamp scaffolding, submit shop drawings. Shop drawings to be stamped by a qualified Professional Engineer registered in the Province of Ontario.

.3 Shop Drawings

.1 Indicate material specifications, and all details and information necessary for assembly and erection of scaffolding, including anchorage to the existing structure.

.2 Enclosure fabric with fastening and support system.

.3 Show all superimposed service dead, live and lateral loads, for which the scaffolding is designed.

.4 Show hoarding carpentry details.

1.5 REGULATORY REQUIREMENTS

.1 Design and construct scaffolding in accordance with:

.1 CSA Z797.

.2 Occupational Health and Safety Act Ontario Regulations 213/91 for Construction Projects.

1.6 SITE CONDITIONS

.1 Erect or dismantle as the case may be, scaffolding, within a 5 day period after notification from the Departmental Representative.

.2 Maintain access to the building for all entrances where scaffolding is erected, providing all necessary enclosures, bridging, etc. to protect the building occupants, and public in general.

.3 When the scaffold is in place, locate existing ventilation openings/louvres within the scaffold area, prior to the start of the masonry work. Extend ventilation shaft outside the enclosure, in order to prevent dust entering adjacent areas.

.4 Provide lighting for all public areas covered by the scaffolding.

Part 2 Products

2.1 SCAFFOLDING

.1 Scaffolding in accordance with CSA Z797.

.1 System scaffold with standing head clearance of a minimum of 1900mm, and side brackets. Welded arched steel frames are acceptable.

.2 Access ladders and platforms.

.3 Light Duty Enclosure

.1 High density green polyethylene knotted knit construction. U.V. stabilized, with vertical rows of strong polyester ribbons down the middle and along both sides of the netting, minimum weight 1185 gram/sq metre. This netting is not to be used as a human safety net. It's function is to guard against wind blown and falling debris.

.4 Heavy Duty Enclosure

.1 Heavy duty construction tarps, fire retardant, of a minimum of 8mm in thickness and a minimum of 155kg in tensile strength, and low temperature bond to -55ºC.

2.2 HOISTING

.1 Hoists for moving of workers, materials and equipment.

2.3 FINISHES

.1 Galvanizing to ASTM A123. Use galvanized fasteners for all work.

Part 3 Execution

3.1 SCAFFOLDING ERECTION

.1 Supply and install scaffolding sufficient to carry out the scope of work identified on the drawings.

.2 Set scaffold anchors in horizontal masonry joints only. DRILLING INTO THE FACE STONE IS NOT PERMITTED. Repointing of masonry joints, as scaffold anchors are removed, will be carried out as part of the Masonry Contract.

.3 Provide scaffolding with approved configuration for free access of workers, including side brackets at each lift. Install tie-backs at same level as side brackets. Tie-backs must be installed such that they do not create a tripping or other form of hazard to workers using the scaffold.

.4 Supply and install full width, continuous platform and side brackets, planking, braces, (cross and horizontal), jacks and base plates (with special attention for safety on the adjustable jacks), hangers, guardrails, guardrail posts, coupling pins, safety clips and all clamps for safe installation. Number of fully planked decks required to be determined by Scaffold Design Engineer.

.5 At designated entrances to building, at grade level, bridge scaffolding and provide hoarding to allow continual pedestrian access for the doors on each entrance.

.6 Do not bear any part of the scaffolding, hoist or construction plant directly against the masonry. Provide isolating material, lumber or plywood with additional padding as required to prevent damage to the existing masonry.

.7 Provide, operate and maintain hoists and equipment required for moving of workers, materials and equipment.

.8 Provide two stairs, minimum, securely erected, to service each area of scaffolding. Locate as approved by the Departmental Representative.

.9 Provide safety handrails and fencing as required for safe working conditions.

.10 Prior to use, provide proof of review and approval of scaffolding erection by a Professional Engineer licensed in the Province of Ontario.

.11 Maintain the scaffolding in satisfactory condition for the duration of the work.

.12 Provide security fencing, around scaffolding to prevent access to scaffolding by the public, refer to Section 01 56 00 - Temporary Barrier and Enclosures. Be responsible to maintain security on the scaffold.

3.2 SCAFFOLD ENCLOSURE

.1 Install scaffold enclosure as per manufacturer’s instructions. All connections to the scaffolding must be capable of resisting applicable wind loads as specified in the Ontario Building Code.

.2 From April to mid-October, provide Light Duty Fabric enclosure. In mid-October, replace light duty fabric enclosure with heavy duty fabric enclosure to protect all outstanding masonry work, or areas of masonry where required curing has not been achieved.

.3 Provide continuous heating, ventilation and humidity control within the fabric enclosure during the period mid-October to April.

.4 Seal all gaps in the scaffold in such a way to shield the interior from precipitation, wind and cold air. Temporary openings for the purpose of passing material and providing natural ventilation are permitted, but must not compromise the scaffold and fabric's capacity to withstand loads as defined above.

3.3 SCAFFOLD DISMANTLING

.1 Prior to removal of scaffold anchors from masonry walls, see Section 04 03 05.21 – Period Masonry Repointing for procedure.

.2 After repointing has been allowed to cure for a minimum of seven days, relocate all scaffold anchors into fresh horizontal mortar joints. Rake out and repoint all existing mortar at original scaffold anchor locations as specified.

.3 Work to be reviewed by Departmental Representative prior to removal of scaffold.

.4 When removing scaffolding at completion of project, remove all scaffold anchors from masonry joints and repair mortar joints.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA O86-14, Engineering Design in Wood.

.2 CSA O141-05 (R2014), Softwood Lumber.

.3 CSA O151-09 (R2014), Canadian Softwood Plywood.

.2 National Lumber Grades Authority (NLGA)

.1 NLGA Standard Grading Rules for Canadian Lumber, Latest Edition.

.3 Master Painters Institute (MPI)

.1 MPI #5, Primer, Alkyd/Oil for Exterior Wood.

.2 MPI #94, Alkyd, Exterior, Semi-Gloss.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings

.1 Submit shop drawings for temporary barriers and enclosures. Indicate material specification and all details and information necessary for assembly and erection of fencing and enclosures.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Phasing

.1 Submit detailed schedule related to phasing of work, installation and removals.

.2 General phasing sequence is indicated on the drawings. The phasing sequence is to be followed. The phasing description may only be adjusted with the approval of the Departmental Representative.

.3 Coordinate additional sub-phasing for the work to the approval of the Departmental Representative.

.4 Subsequent phases may not be started until the preceding phase is complete, defects rectified and building is operational.

1.4 SITE CONDITIONS

.1 Public Traffic Flow

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

.2 Maintain access to the building for all entrances where hoarding is erected, providing all necessary enclosures, bridging, etc. to protect the building occupants, and public in general.

.3 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

.4 Perform work such that public access to the property is not impeded at any time.

.5 Design hoarding to accommodate barrier free access at grade.

.2 Signage

.1 Provide common use signs related to traffic control, information, instruction, use of equipment, public safety devices, warning signs and other signage as directed by Departmental Representative, in both official languages or by use of commonly understood graphic symbols to approval of Departmental Representative.

.2 Maintain approved signs and notices in good condition for duration of project.

.3 Signage for contractor advertising, beyond emergency contact details, is not allowed on any element of this project. Size of lettering on emergency contact notice to be approved by Departmental Representative, prior to display of such notice.

.4 Provide signage inside all exits from the building affected by this work. Maintain signage for the duration of the project.

.5 Advertising is not permitted on this project. Immediately remove handbills, flyers, stickers, graffiti, etc. which may be placed on the hoarding by others.

.3 Fire Routes

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

.4 Protection

.1 Provide adjacent private and public property from damage during performance of Work.

.2 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.3 Provide necessary screens, covers, and hoardings.

.4 Be responsible for damage incurred due to lack of, or improper protection.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with local Waste Management policies.

Part 2 Products

2.1 MATERIALS

.1 Construction Fence

.1 2300 mm high modular steel construction fence. Provide fence bases that will not present a tripping hazard for the public.

.2 Hoarding Materials

.1 Timber Studs: grade marked to conform to CAN/CSA O141, grade SPF #2 or better. Lumber to be grade stamped according to NLGA grading rules; kiln dried.

.2 Plywood: to CSA O151, Canadian Softwood Plywood.

.3 Paint

.1 Exterior alkyd primer to MPI #5.

.2 Alkyd exterior semi-gloss enamel paint to MPI #94. Colour to be selected by Departmental Representative.

.3 Weather Enclosure

.1 Design enclosure to withstand wind pressure and snow loading, in accordance with the 2020 National Building Code.

Part 3 Execution

3.1 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

.3 Install temporary barriers and enclosures as per manufacturer's recommendations.

3.2 CONSTRUCTION FENCE

.1 Erect and maintain secure construction fence around perimeter of the work area. Fence must be secure at all intersection points with the existing structure.

.2 Install lockable access gate on secure hinges to provide access for all equipment and personnel to the work area.

.3 Install fence in accordance with manufacturer's recommendations.

3.3 HOARDING

.1 Construct hoarding in accordance with CSA O86.

.2 Provide hoarding around the entire perimeter of the scaffolding. Hoarding height to be 3.6 m above grade.

.3 Erect temporary site enclosures using 38 x 89 mm construction grade lumber framing at 600 mm centres and 1200 x 2400 x 13 mm exterior grade softwood plywood to CSA O151.

.4 Erect and maintain pedestrian walkways including roof and side covers, complete with signage and electrical lighting as required by law, including at all entrances accessible to the public.

.5 Extend hoarding for a height of 3.6m above the roof level of any access being provided

.6 Apply plywood panels vertically flush and butt jointed. Install quarter rounds at all exposed corners. Ensure there is no visibility through the hoarding.

.7 Provide one lockable pedestrian door as directed.

.8 Install hoarding fastening devices in such a way where clamps or wire ends cannot cause damage to the workers/general public.

.9 Paint public side of site enclosure in selected colours with one coat primer to MPI #5 and one coat exterior paint to MPI #94. Maintain public side of enclosure in clean condition.

3.4 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around steep changes in grade.

.2 Provide barriers around vegetation designated to remain. Protect from damage by equipment and construction procedures.

3.5 WEATHER ENCLOSURES

.1 Provide weather tight enclosure to accommodate winter work, in accordance with Section 01 51 23 – Temporary Heating, Cooling and Ventilating.

.2 Construct mortar mixing shelter in accordance with CSA O86.1, of sufficient size to house all mortar materials and mixer in a dry environment.

.1 Maintain public side of enclosure in clean condition.

.2 Install fastening devices in such a way where clamps or wire ends cannot cause damages to the workers.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Definitions

.1 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, include but not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or materials that endanger human health or environment if handled improperly.

.2 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as co-ordinating related, required submittal and reporting requirements.

.3 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill.

.4 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.

.5 Integrated Pest Management Program (IPM): is a pest control strategy which implements environmental health and safety approaches to minimize the use of toxic pesticides and minimize their exposure to humans and the environment.

.6 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form.

.1 Recycling does not include burning, incinerating, or thermally destroying waste.

.7 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from remodeling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

.2 Returning reusable items including pallets or unused products to vendors.

.8 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.9 Source Separation: acts of keeping different types of waste materials separate, beginning from first time they became waste.

.2 Reference Standards:

.1 Canadian Council of Ministers of the Environment (CCME)

.1 CCME PN 1299-Canadian Environmental Quality Guidelines.

.2 Canadian Standards Association (CSA) International

.1 CSA G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

.3 Dangerous Goods Transportation Act (DGTA), R.S.O. 1990, c. D.1.

.4 Department of Justice Canada (Jus)

.1 Canadian Environmental Assessment Act (CEAA), 2012.

.2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.

.2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.

.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.5 Ontario Regulation 260/08: Performance Standards, relating to construction and demolition of a building.

.6 Underwriters' Laboratories of Canada (ULC)

.1 ULC/ORD-C58.15-(1992), Overfill Protection Devices for Flammable Liquid Storage Tanks.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Convene pre-installation meeting 1 week prior to beginning work of this Section. Departmental Representative to:

.1 Verify project requirements.

.2 Verify existing site conditions adjacent to demolition work.

.3 Co-ordination with other construction subtrades.

.4 Verify locations where temporary shoring is required, prior to start of demolition in these locations.

.2 Hold project meetings every week.

.3 Ensure key personnel attend.

.4 WMC must provide written report on status of waste diversion activity at each meeting.

.5 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.

.2 Scheduling:

.1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.

.1 In event of unforeseen delay notify Departmental Representative in writing.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 WMC is responsible for fulfilment of reporting requirements.

.3 Prior to beginning of Work on site submit detailed Waste Reduction Workplan and indicate:

.1 Descriptions of and anticipated quantities, in percentages 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.

.5 Name and address of haulers and waste receiving organizations.

.4 Submit copies of certified weigh bills, bills of lading or receipts from authorized disposal sites and reuse and recycling facilities for material removed from site on a weekly basis, or upon request of Departmental Representative.

.1 Written authorization from Departmental Representative is required to deviate from haulers and receiving organizations listed in Waste Reduction Workplan.

.5 Shop Drawings:

.1 Submit for review and approval demolition drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning.

.2 Indicate material specifications, details and information necessary for assembly and erection of temporary shoring, including anchorage to existing building.

.3 Show superimposed service dead, live and lateral loads for which the temporary shoring is designed.

.4 Submit demolition drawings stamped and signed by Professional Engineer registered or licensed in Province of Ontario.

.5 Provide proof and review of approval of shoring erection by a Professional Engineer, licensed in the Province of Ontario. Maintain the shoring in a satisfactory condition for the duration of the work.

.6 Prior to removal of metal flashings/decorative details or items of historical significance, record existing profiles and details accurately. Provide a copy of these measurements to the Departmental Representative.

.7 Prior to start of demolition, where required, submit for review and approval, a protection plan and methodology to protect adjacent elements designated to remain, from weather related damage, until such time as these elements are permanently protected from weather related damage.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements: Ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable Provincial and Municipal regulations.

1.5 SITE CONDITIONS

.1 Environmental Protection:

.1 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.2 Fires and burning of waste or materials is not permitted on site.

.3 Do not bury rubbish waste materials.

.4 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.

.1 Ensure proper disposal procedures are maintained throughout project.

.5 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.

.6 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction.

.7 Protect trees, plants and foliage on site and adjacent properties where indicated.

.8 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

.9 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

1.6 EXISTING CONDITIONS

.1 If material resembling spray or trowel applied asbestos or other designated substance be encountered in course of demolition, suspend work, take preventative measures, and notify Departmental Representative immediately. Proceed only after written instructions have been received from Departmental Representative.

.2 Structures to be demolished are based on their condition, at time of examination prior to tendering.

.1 Remove, protect and store salvaged items as directed by Departmental Representative. Deliver to Departmental Representative as directed.

Part 2 Products

2.1 EQUIPMENT

.1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

.2 Shoring materials to CSA G40.20/G40.21, Grade 300.

.3 Limit loads imparted on all existing structural slabs by equipment and machinery as follows:

.1 Concentrated loads on structural slabs shall not exceed 5.0 kN and shall be spaced not less than 1.2 m apart.

.2 Uniform area loads cannot exceed 2.4 kPa on all floor loads.

.4 All equipment to be brought on existing structural slabs must be checked for conformance with the load limits by a Professional Engineer licensed in the Province of Ontario, prior to use or installation on site.

.5 Equipment or machinery that will apply loads to any elements other than existing structural slabs must be reviewed by a Professional Engineer licensed in the Province of Ontario prior to use or installation on site.

.6 Demonstrate that tools are being used in manner which allows for salvage of materials in best condition possible.

.7 Temporary Shoring: All materials used for temporary shoring must meet the material standards noted in the reviewed shoring drawings. Substitutions will not be accepted without the stamped approval of the Engineer who prepared the shoring drawings.

Part 3 Execution

3.1 PREPARATION

.1 Protection of in-place conditions:

.1 Prevent movement, settlement or damage of adjacent structures, services, paving, landscaping, adjacent grades and parts of existing building to remain.

.1 Provide bracing, shoring and underpinning as required.

.2 Repair damage caused by demolition as directed by Departmental Representative.

.2 Support affected structures using temporary shoring as per reviewed shop drawings. If safety of structure being demolished, adjacent structures or services appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.

.3 Prevent debris from blocking surface drainage system, mechanical and electrical systems which must remain in operation.

.4 Protect existing building structure, systems, windows, services and equipment, which are to remain.

.5 Verify the location of utilities and services designated to remain intact, locations of utility caps to be installed, or designated for removal during demolition in coordination with the Departmental Representative. Allow sufficient time and effort to coordinate with the Departmental Representative to identify such systems and properly trace and label in order to protect and preserve systems during and post demolition process. Repair and make good any damage to any utilities, infrastructures, mechanical and electrical systems designated to remain intact, at the cost of the Departmental Representative.

.6 Keep noise, dust, and inconvenience to occupants to a minimum.

.7 Provide 48 hours notification to Departmental Representative in the event that a disruption in power may occur.

.2 Surface Preparation:

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

.2 Do not disrupt active or energized utilities designated to remain undisturbed. Where applicable utilize demolition activities to expose but not damage utility and service lines.

.3 Remove all loose building materials and contents.

3.2 SHORING ERECTION

.1 Supply and install the shoring sufficient to carry out the scope of work identified on the drawings.

.2 Set shoring anchors in horizontal masonry joints only. NO DRILLING INTO THE FACE STONE/CLAY BRICK IS PERMITTED. Repointing of masonry joints as shoring is removed will be carried out as part of the masonry contract.

.3 Provide proof of review and approval of shoring erection by a Professional Engineer, licensed in the Province of Ontario.

.4 Maintain the shoring in a satisfactory condition for the duration of the work.

3.3 DISASSEMBLY

.1 Prior to start of Work remove contaminated or hazardous materials as directed by Departmental Representative from site and dispose of at designated disposal facilities in safe manner and in accordance with TDGA and other applicable requirements.

.2 Remove all utilities, piping, mechanical and electrical equipment/systems and associated structures completely from areas and assemblies designated to be demolished unless otherwise noted. If hazardous materials are confirmed within the pipe systems, removed and dispose of in a safe manner, at no additional costs to the contract.

.3 Systematically remove any finishes and furnishings of value and for which suitable reuse and recycling opportunities exist.

.4 Carefully remove windows and doors from structure.

.5 Temporary shoring must be approved in writing by the Engineer who prepared the reviewed shoring drawings, prior to proceeding with the demolition, at the location of the temporary shoring.

.6 Remove and store materials to be salvaged, in manner to prevent damage.

.1 Store and protect in accordance with requirements for maximum preservation of material.

.7 Use natural lighting to do Work where possible.

.1 Shut off lighting except those required for security purposes at end of each day.

.8 Where existing materials are to be re-used in Work, use special care in removal, handling, storage and re-installation to assure proper function in completed work.

.9 broken or decayed wood components, and corroded steel structural members which Departmental Representative deems to require replacement.

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

.11 Throughout course of deconstruction, pay close attention to connections and material assemblies. Employ workmanship procedures which minimize damage to decorative features and materials.

.12 Project supervisor with previous deconstruction experience must be present on site throughout demolition procedure.

.13 Maintain structural integrity of structure designated to remain.

.14 Deconstruct to minimize dusting. Keep materials wetted as directed by Departmental Representative.

.15 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.

3.4 CLEANING

.1 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

.1 Label stockpiles, indicating material type and quantity.

.2 Keep processing area clean and free of excess debris.

.3 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project construction.

.4 Upon completion of project, remove debris, trim surfaces and leave work site clean.

END OF SECTION

Part 1 General

1.1 PRICE AND PAYMENT PROCEDURES

.1 Provide unit prices for each repair application as follows:

.1 Shallow surface repair.

.2 Payment for this work will include all costs associated with supplying materials, and executing work as described herein and reflected in the contract.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)
.1 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate plastic, paper packaging and corrugated cardboard for recycling in accordance with Waste Management Plan.

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

.3 Ensure emptied containers are sealed and stored safely.

.4 Use trigger operated spray nozzles for water hoses.

.5 Designate cleaning area for tools to limit water use and runoff.

1.4 ENVIRONMENTAL

.1 Maintain repaired concrete above 5°C and below 30°C for a minimum of three days after placing.

Part 2 Products

2.1 MATERIALS

.1 Repair Mortar: Two-component, polymer-modified, cementitious, trowel grade, prepackaged; suited for repair of concrete sills; to CSA A23.1.

2.2 BONDING AGENT

.1 Bonding agent: three-component, water based epoxy resin/cement bonding agent suited for the proposed application.

Part 3 Execution

3.1 PREPARATION

.1 Prepare surface for repair. Provide 13mm deep straight edge around perimeter of area to be removed, unless noted otherwise on Drawings.

.2 Clean all surface rust from exposed reinforcing.

.3 Immediately after cleaning of exposed reinforcing is completed, the surface will be checked by the Departmental Representative for fractured concrete, or loose aggregate. This material shall be removed using hand tools.

3.2 APPLICATION

.1 Repairs to slab surface:

.1 Do not place repair mortar when temperature is below 10ºC.

.2 Remove all dust and loose material from the prepared surface of the existing repair mortar by oil free compressed air before the application of bonding grout.

.3 Wet down area to be repaired for a period of twelve (12) hours and again, one (1) hour before placing repair mortar.

.4 Remove excess water from the surface using oil free compressed air, immediately prior to application of the bonding agent.

.5 Brush bonding agent onto the wetted, prepared surface, as per manufacturer's instructions. Ensure that the surface receives a thorough even coating and that the rate of progress is sufficient so that the slurry does not dry up before repair mortar is placed.

.6 Apply repair mortar or polymer modified mortar as soon after application of bonding agent as recommended by the manufacturer.

.7 Apply repair mortar to build repair mortar surface to finished lines. Acceptable minus tolerance of finished surfaces is 1.5 mm.

.8 Finish repair mortar in accordance with CSA A23.1. Provide positive drainage. Surface should be wood floated only. The use of power and steel trowels is not permitted.

.9 Place one layer of wet burlap on the surface of the repair mortar repair as soon as the surface will support it without deformation. Overlap strips of burlap by at least 75 mm. Thoroughly soak burlap for 24 hours prior to placing. Place a layer of polyethylene film immediately on the wet burlap. Lap the polyethylene film a minimum of 150 mm and securely hold in place against displacement.

.10 Wet cure repair mortar for three (3) days.

3.3 FINISHES

.1 Formed surfaces exposed to view: sack rubbed finish in accordance with CSA A23.1.

3.4 CURING

.1 Cure and protect concrete in accordance with CSA A23.1.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 03 05.21 - Period Masonry Repointing.

.2 Section 04 05 00 - Common Work Results for Masonry.

1.2 ALTERNATES

.1 Obtain Departmental Representative's approval before changing manufacturer's brands or sources of supply of mortar materials during entire contract or other methods of mixing mortar specified elsewhere in this specification. This criterion will apply for the duration of the contract.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C109/C109M-13, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm Cube Specimens).

.2 ASTM C144-11, Standard Specification for Aggregate for Masonry Mortar.

.3 ASTM C185-08, Standard Test Method for Air Content of Hydraulic Cement Mortar.

.4 ASTM C207-06 (2011), Standard Specification for Hydrated Lime for Masonry Purposes.

.5 ASTM C270-14a, Standard Specification for Mortar for Unit Masonry.

.6 ASTM C780-14b, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.

.7 ASTM C940-10a, Test Method for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced-Aggregate Concrete in the Laboratory.

.2 Canadian Standards Association (CSA)

.1 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction.

.2 CSA A179-2014, Mortar and Grout for Unit Masonry.

.3 CAN/CSA A3000-2013, Cementitious Materials Compendium.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings

.1 Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.2 Scheduling of Work

.1 Submit work schedule indicating anticipated progress stages within time of final completion shown in bid document.

.2 Take measures necessary to complete work within approved schedule time. Schedule may not be changed without approval of Departmental Representative.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations for:

.1 Aggregate. Include identification of aggregate source.

.2 Cement.

.3 Lime.

.4 Premixed products.

.5 Additives.

.3 Samples:

.1 Provide samples in accordance with CSA A179.

.2 Submit two 50 mm x 50 mm size samples of mortar to demonstrate colour and texture.

.3 Submit sample of sand to demonstrate colour and gradation.

.4 Action Submittals:

.1 Submit recordings of temperature and humidity weekly.

1.6 QUALITY ASSURANCE

.1 Qualifications:

.1 Mortar to be mixed by same workers throughout project.

.2 Certificates

.1 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Testing Standards

.1 Conduct the required testing in accordance with the following standards:

.1 Flow and cube strength: to ASTM C 270.

.2 Vicat cone test: to ASTM C780.

.3 Cube strength: to CSA A179, Annex B.

.4 Flexural bond strength: to CSA A179.

.4 Test reports:

.1 Submit test results during site work as directed by Departmental Representative as follows:

.1 Sieve analysis: sand, in accordance with CSA A179.

.2 Bulking analysis: sand in condition as delivered to site.

.3 Air content: mortar mix in plastic state.

.4 Vicat cone penetration: mortar mix.

.5 Mortar compressive strength: at 7, 28 and 56 days or otherwise required.

.6 Flexural bond strength: test during mock-up using masonry units on site.

.7 Lime grout compressive strength: at 28, 56 and 112 days, or otherwise required.

.5 Mock-ups:

.1 Construct mock-up in accordance with Section 04 05 00 – Common Work Results for Masonry.

.2 For mortar colour, include five 500 mm long mock-ups of different mortar colours. Departmental Representative to select the colour to be used for the project.

1.7 DELIVERY, STORAGE AND HANDLING

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

.2 Storage and Handling Requirements:

.1 Store materials off ground 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.

.3 Waste Management and Disposal

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

.2 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material for recycling in accordance with local collection services.

1.8 SITE CONDITIONS

.1 Ambient Conditions:

.1 Execute work to CSA A179.

.2 Provide weather-tight enclosure to store materials and mix mortars, maintain air temperature above 10ºC at all times.

.3 Maintain maximum/minimum thermometers and relative humidity gauges on site and in enclosures.

.1 Maintain a daily record of temperature and humidity.

.2 Locate gauges at upper reaches of enclosure, and within 600 mm of floor level at base of enclosure.

.4 Execute work when ambient temperature is above 5° Celsius. When ambient temperature is below 5° Celsius, cover and heat Work as directed by Departmental Representative.

.5 Prepare and maintain temperature of mortar between 5° Celsius and 30° Celsius until used.

Part 2 Products

2.1 MATERIALS

.1 Use same brands of materials and source of aggregate for entire project.

.2 Mortar and grout: to CSA A179.

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

.4 Sand: to CSA A179; Gradation to ASTM C144. Use well graded sand passing 4.75 mm down to 150 micron sieve where joints are greater than 6 mm. Use sand passing 1.18 mm down to 300 micron sieve where 6mm thick joints or less are indicated. In the event that the sand does not meet the gradation requirements, carry out additional sieving to meet requirements or provide alternate sand. Provide dry aggregate to CSA A179, Clause 5.3.6.

.1 Sharp, screened and washed pit sand, free of organic material, with final grading and colour to approval of Departmental Representative.

.5 Colour: inorganic oxide pigments only. Colour of sand to match existing shades and tones.

.6 Portland cement: to CAN/CSA A3000, non-staining, type GU.

.7 Lime:

.1 Hydrated Lime:

.1 Hydrated, high calcium, Type "SA" to ASTM C207.

.8 Casein Additive: Protein polymer to provide fluidity in grout.

.9 Calcium chloride is not to be used for any mortar.

.10 Chinking: flexible, textured acrylic product which seals the open gaps in skyward facing joints.

.11 Bond breaker tape to be used with the chinking.

2.2 MORTAR MIXES

.1 Proportion requirements:

.1 Bedding, backpointing and facepointing mortar for stonework: type O based on proportion specifications. Range of compressive strength: 5.0 MPa to 9.0 MPa at 56 days.

.1 Limestone: 1:2:9 cement: lime: aggregate mix for all joints.

.2 Mortar between wood frames and masonry, where detailed on drawings: 1:2:9 cement: lime: aggregate mix.

.2 Vicat Cone Penetration for Stonework: to ASTM C780.

.1 Finishpointing Mortar: 15-20mm.

.2 Bedding and Backpointing Mortar: 20-30mm.

.3 Allowable air content for all Lime Mortars: 7% to 15%.

.4 Pointing mortar: prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour and not more than 2 hours, then remix with sufficient water to produce mortar of proper consistency for pointing.

.5 Do not add air entraining admixture to mortar mix.

.6 Grout mix

.1 Add casein to the specified mortar mix (1:3:7) at the following ratio: between 0.5 – 2% casein by weight of binder, to increase fluidity of grout.

.2 Range of compressive strength at 112 days is 3.0 MPa to 5.5 MPa.

2.3 ALLOWABLE TOLERANCES

.1 If mortar fails to meet 60% of the specified mortar strength range at 7 days, but meets the 28 day compressive strength requirement, it is acceptable. If mortar fails to meet the 7 day compressive strength requirement, but its strength at 7 days exceeds two thirds of the value required for the 7 day strength, contractor may elect to continue work at his own risk while awaiting the results of the 28 day tests, or to take down the work affected.

.2 The Departmental Representative reserves the right to reject mortar which falls more than 20% outside of the 56-day compressive strength range required, and to have the contractor remove it from the wall.

Part 3 Execution

3.1 GENERAL PREPARATIONS

.1 Traditional 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. To avoid bulking, use dry sand.

.4 Ensure testing equipment is ready and in working order.

.5 Apply Vicat cone test to ensure desirable performance of the mortar and record results.

.2 Premixed Mortar:

.1 Follow manufacturer's written instructions.

.2 Prepare entire contents of bag. Mortar prepared using a portion of a bag will be rejected.

.3 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 Verify moisture content in sand conforms to CSA A179.

.3 The Departmental Representative reserves the right to reject sand if bulked volumes are excessive.

.4 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 MIXING

.1 Prepare measuring boxes to ensure accurate proportioning of mortar ingredients. Each box to contain exact volume proportion for each specific mix ingredient.

.2 Introduce approximately 75% of the total volume of water into the mixer, followed by 50% of the sand and all of the dry hydrated lime and any pigment. Mix for approximately 3 minutes or until the materials are thoroughly blended and no particles of white lime are apparent in the mix.

.3 Allow to stand for 5 minutes.

.4 Add the full volume of Portland cement, the remainder of the sand and water. Mix for further 3-5 minutes until thoroughly blended and mortar has reached consistency determined by Vicat Cone penetration testing.

.5 Add just sufficient water to obtain workable consistency for setting units. Avoid too wet a mix which stains the face of the work. Vicat Cone penetration may be slightly greater for bedding mixes, but should not exceed maximum value specified by more than 20%.

.6 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.

.7 Adjust mix proportions based on percentage bulking shown in the test.

.8 Mortar for reconstruction of dismantled masonry, or new construction, can be mixed using a regular paddle mixer. Only electric motor mixers are permissible. Mixers run on hydrocarbons are not permitted, due to fumes.

.9 Mixing by hand for repointing mortars must be pre-approved by Departmental Representative as follows:

.1 Hand mixing must be carried out using high speed, 2500 Rpm drill, with paddle mixer attachment. Mixing to be completed in sufficiently small container so as to allow full contact of the paddle with the mortar during the mixing process, thus ensuring thorough incorporation of ingredients and air entrainment.

.2 Submit masonry tools and container for approval prior to starting pointing work.

.10 Prepare only enough mortar to be used within two hours. Do not re-temper mortar beyond this time.

.11 Follow manufacturer instructions when premixed mortar is used.

.12 Appoint one individual to mix mortar for duration of project. If this individual must be replaced, mortar mixing must cease until replacement individual is trained, and mortar mix is tested.

.13 Ensure mortar does not contain elements detrimental to the original masonry or surrounding materials.

.14 Provide a mortar mixing log and record type of mortar, time of mix, air temperature, location where installed in wall, Vicat Cone result, and tests taken by independent testing agency, where applicable.

3.4 CONSTRUCTION

.1 Do masonry mortar and grout work in accordance with CSA A179 except where specified otherwise.

.2 Apply bond breaker tape to skyward facing joints, when mortar is sufficiently cured. Install chinking as noted on Drawings.

3.5 CLEANING

.1 Progress Cleaning

.1 Leave work area clean at the end of each day.

.2 Upon completion, remove surplus materials, rubbish, tools, equipment and barriers.

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

.4 Clean masonry with low pressure clean water and soft natural bristle brush. For limestone, pressure should be between 276 kPa and 410 kPa. See Section 04 03 05.21- Period Masonry Repointing.

3.6 PROTECTION OF COMPLETED WORK

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

.2 Enclose and protect work using wetted burlap.

.3 Cover with waterproof tarps to prevent weather from eroding recently laid material.

.1 Maintain tarps in place for minimum of 1 week after laying.

.2 Ensure that bottoms of tarps permit airflow to reach mortar in joints.

.4 Anchor coverings securely in position.

3.7 FIELD QUALITY CONTROL

.1 Inspection and testing of mortar will be carried out by a Testing Laboratory designated by the Departmental Representative, to CSA A179. The mortar testing company should have the capacity to provide Vicat Cone testing and test the air with a mortar test apparatus. A concrete test apparatus must not be used to test the air, as it is unsuitable for this application.

.2 Departmental Representative will pay for cost of initial inspections and tests. Contractor will pay cost of re-inspecting and re-testing necessitated by failure to meet specification requirement on initial inspection/test.

.3 Frequency of mortar testing will be specified by Departmental Representative.

.4 Air content to ASTM C185, and penetration using Vicat Cone to ASTM C780 for mortars used in stonework, must be tested at the same frequency as strength tests to ASTM C109. Contractor to own and have on site, a fully functioning and well maintained Vicat penetrometer throughout the duration of the project work. Contractor to test every mix and record results in log.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 03 05.13 –Period Masonry Mortaring

.2 Section 04 05 00 – Common Work Results for Masonry

.3 Section 04 05 19 – Masonry Anchorage and Reinforcing

1.2 PRICE AND PAYMENT PROCEDURES

.1 Unit Prices

.1 Provide unit rates for each of the masonry repairs identified on the drawings, including grouting work. The unit cost for repair, includes all costs necessary to complete the specific repair, including additional scaffold, where required.

1.3 REFERENCES

.1 Definitions:

.1 Sawcutting: the careful use of a power tool with a fine blade to cut the middle third of the mortar joint, in order to break the surface tension of hard mortar and facilitate the raking out process, without damaging the stone.

.2 Raking: removal of loose/deteriorated mortar to a depth suitable for repointing until sound mortar, but not less than a depth of 30 mm. It is assumed that the outer 60 mm of mortar consists of a very hard cementitious mortar, however, it may extend deeper in some areas.

.3 Backpointing: filling of masonry joints from which mortar is has been raked out to a point 30 mm from the stone face.

.4 Finishpointing: filling of masonry joints from which mortar has been raked out for a depth of 30 mm.

.5 Tooling: finishing of masonry joints using tool to provide final contour.

.6 Repair: use of adhesives to re-bond sections of fractured masonry.

.7 Consolidation: strengthening masonry units to prevent deterioration (spalling).

.8 Descaling: the removal of loose portions of the masonry (usually spalled area) through impact with a bush hammer or similar device.

.9 Resurfacing: tooling and polishing of stone surface to renew it’s texture and finish.

.10 Low-pressure water cleaning: water soaking of masonry using less than 350 kPa (50 psi) water pressure, measured at nozzle tip of hose.

.2 Canadian Standards Association (CSA) International

.1 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction.

.2 CSA A179-2014, Mortar and Grout for Unit Masonry.

.3 CAN/CSA A371-2014, Masonry Construction for Buildings.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures and Section 04 05 00 – Common Work Results for Masonry.

.2 Samples:

.1 Provide labelled samples of materials used on project for approval before work commences.

.3 Test and Evaluation Reports:

.1 Provide laboratory test reports certifying compliance of mortar ingredients with specifications requirements.

.4 Record Drawings:

.1 Upon completion of project, submit the following:

.1 Grout Records: Elevation drawings, recording grout tube numbers, and quantity of grout used in each elevation.

1.5 QUALITY ASSURANCE

.1 Masonry Contractor:

.1 Use single Masonry Contractor for masonry work.

.2 Masonry contractor to have good level of understanding of structural behaviour of masonry walls when masonry work involves replacing or repairing stones which are part of structural masonry work.

.2 Appoint one thoroughly experienced, reliable and competent worker to be in charge of all mortar mixing for the duration of the project. The experience must include mixing mortar for projects similar to this project.

.3 Mortar grouting: grouting activities should be undertaken by workers experienced in manipulation and mortar grouting methods.

.4 Obtain approval from Departmental Representative for changes to qualified personnel.

.5 Mock-ups:

.1 Construct mock-up in accordance with Section 04 05 00 – Common Work Results for Masonry.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.2 Store cementitious materials and aggregates in accordance with CSA A23.1. Keep sand dry, in conformance with CSA A179, Clause 5.3.6. Sand that does not conform will be rejected.

.3 Keep material dry. Protect from weather, freezing and contamination.

.4 Ensure that manufacturer's labels and seals are intact upon delivery.

.5 Remove rejected or contaminated material from site.

.2 Packaging Waste Management: remove for reuse, in accordance with local Waste Management laws.

1.7 AMBIENT CONDITIONS

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

.2 When ambient temperature is below 5 degrees C:

.1 Store mortar materials for immediate use within heated enclosure in accordance with Section 04 03 005.13 – Period Masonry Mortaring. Allow mortar materials to reach minimum temperature of 5 degrees C before use.

.2 Heat water to minimum 20 degrees C and maximum 30 degrees C.

.1 At time of use, temperature of mortar to be minimum of 15 degrees C and maximum of 30 degrees C.

.2 At time of repointing, surface temperature of stone to be a minimum of 10 degrees C.

.3 Maintain sand temperature between 10 degrees C and 30 degrees.

.4 Do not mix cement/lime with water or with aggregate or with water-aggregate mixtures having higher temperature than 30 degrees C.

.5 Maintain mortar mix temperature between 10 degrees C and 30 degrees C.

1.8 SITE CONDITIONS

.1 Existing Conditions

.1 Report in writing, to Departmental Representative, areas of deteriorated masonry revealed during work. Obtain Departmental Representative's approval and instructions for repair and replacement of masonry units before proceeding with repair work.

.2 Protection

.1 At end of each working day, cover unprotected work with waterproof membranes. Extend membranes to 0.5 m beyond the perimeter of the work area and install securely to prevent finished work from drying out too rapidly.

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

.3 Cover all sills and projecting courses with rigid protection, secured into joints, for the duration of the work.

.4 Protect all exposed window/door frames, wall fixtures and any other existing surfaces which may be damaged by mortar stains. Damaged or stained material to be replaced at Contractor's cost.

.5 All methods of enclosure and protection to be approved by the Departmental Representative.

.6 Protect newly laid mortar from excessive exposure to rain and full sunlight until the surface is thumb-print hardened.

.7 Provide and maintain protection for masonry walls at all times when work is suspended, to prevent water from entering partially repointed masonry.

.8 Protection to consist of non-staining 6 mil polyethylene sheets, or tarpaulins over burlap, secured to prevent lifting in high winds.

.9 Provide protection boards to exposed corners and all openings such as doors and windows which may be damaged by construction activities. Maintain protection for the duration of operations. Remove and dispose of protective materials as directed by the Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Mortar: in accordance with Section 04 03 05.21 – Period Masonry Mortaring.

.2 Proportions: in accordance with Section 04 03 05.21 – Period Masonry Mortaring.

.3 Anchorage and Reinforcing: comply with Section 04 05 19 – Masonry Anchorage and Reinforcing.

Part 3 Execution

3.1 GENERAL

.1 Perform work in accordance with CAN/CSA A371. Extent of raking out and repointing is as noted on the Drawings.

.2 Work from the top of wall down, unless noted otherwise, or approved by the Departmental Representative.

.3 Use manual raking tool unless otherwise specified, to remove deteriorated mortar and ensure that no masonry units are chipped/altered/damaged by work to remove mortar. Tools for cutting out must be narrower than the joint.

.4 Tool and compact using jointing tool to force mortar into joint.

.5 For backpointing in deep, narrow joints, fabricate long stainless steel packing tools, to force mortar into the joints and provide compaction.

.6 Finish joints to follow profile of existing joints, except where specified otherwise.

.7 Use suitable approved jointing tool to form compacted tooled joints, as detailed. Tool length for finishpointing not to exceed 50 mm.

.8 Do not sawcut or rake out mortar joints where ambient temperature is below 5°C in the Springtime or 0°C in the Fall, as the mortar in the joints may be frozen. Any attempt to remove frozen mortar will result in damage to the masonry. Damaged masonry resulting from removal of frozen mortar must be replaced at Contractor's cost.

3.2 REPOINTING

.1 Procedure for testing: inspect joints visually for obvious signs of deteriorated masonry. Test deteriorated joints not visually observed 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 joints

with unsound mortar can be marked and recorded.

.2 Raking Joints

.1 Rake out all joints as noted on drawings.

.2 Rake unsound joints free of deteriorated and loose mortar, dirt and other undesirable material.

.3 Cutting out of joints is to be done with hammer and chisel, unless otherwise specified. Take great care so as not to damage masonry units adjacent to joints. Cut away from the arrises to prevent spalling of the masonry. The use of power tools is only permitted, as noted.

.4 Permission to use power tools will be based on the Contractor's ability to comply with the conditions noted below (sub-paragraph 6), as observed in the mock-up.

.5 If these requirements are not complied with, the Contractor will be required to remove all mortar by use of hand tools, at no extra cost to the Departmental Representative.

.6 Where the use of power tools is permitted to remove existing mortar, proceed as follows:

.1 Grind the centre of the joint only, to a maximum width of half of the joint width. Mortar must remain on each side of the cut. The grinders must not touch the stone.

.2 For vertical joints, and discontinuous horizontal joints, stop sawcut 50 to 75mm from end of joint. Do not sawcut stone.

.3 Notify the Departmental Representative to inspect the grinding, prior to removing the remaining mortar.

.4 Remove the remaining mortar with hand tools.

.7 Include removal of all existing excess mortar that may have been applied to stone face due to overpointing. Do not damage arris or finish on stone face.

.8 Include removal of all existing high strength cementitious mortar from the joints and where the mortar is adhered to the stone face.

.9 Clean joints to full depth of deteriorated mortar, but in no case to less than 30 mm. Clean out voids and cavities encountered.

.10 Clean surfaces of joints by compressed air, without damaging texture of exposed joints or masonry units.

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

.12 Fine joints (less than 6 mm) need not be raked out more than 10mm, in order to reduce the danger of chipping the masonry edges. Provide "relief" cut using a special rotary grinding tool, equipped with a diamond sawcutting blade of small diameter (86 mm). When saw cutting vertical joints, stop sawcut 50 to 75mm from end of joint. Do not saw cut stone. Use flat-bladed quirks and light hammers, hack-saw blades or similar tools to rake out joints.

.13 Leave no standing water.

.14 Damaged stone includes widening of existing joints, nicks, gouges and chipped or scratched surfaces from cutting out tools, resulting from improper

workmanship. Stone damaged as a result of careless raking, or saw cutting, shall be replaced at no cost to the Departmental Representative.

.15 Do not rake joints for more than three levels of scaffold in height, prior to backpointing, unless approved by the Departmental Representative.

.16 If masonry unseats or bond is broken, remove unit, consolidate the back-up masonry, and reset.

.3 Backpointing

.1 Prior to commencing backpointing, notify Departmental Representative to review masonry, make adjustments to stone repair requirements, identify all Dutchman repairs, stone replacement and stone removals.

.2 Where cut out joints are deeper than minimum raking out depths specified above, backpoint joints to bring mortar face to specified depth for raked out joints, in preparation for finishpointing. Where voids exist that conventional backpointing cannot fill, notify Departmental Representative for direction.

.3 Immediately prior to pointing, thoroughly wet joints in order to control absorption.

.4 Allow water to soak into masonry and mortar, leaving no standing water, but remaining wet.

.5 For backpointing, fill all joints full with mortar, compacting firmly into joints to ensure positive adhesion to all inner surfaces. Place mortar in layers, maximum 50 mm thick, minimum 15 mm thick, allowing each layer to set to thumb print hardness before placing next layer. Fill joints to full depth of removals. Bring face of mortar in backpointed joint to specified minimum depth for raked out joints, measured from the arris of the masonry unit. Leave ready for final pointing.

.6 Form mortar square to stone face, and leave exposed stone each side of joint clean of mortar prior to mortar setting.

.7 For deep joints, provide stainless steel packing tools manufactured to permit the mason to compact mortar deep into the joints.

.8 In the event that the vertical joints are too deep to install mortar full depth, install mortar to minimum 400 deep, and install grout tube in order to grout deep voids.

.9 Prevent mortar from being placed or smeared onto face of stone. Avoid mortar staining of masonry faces during backpointing.

.4 Finishpointing

.1 When all required repair and replacement work is complete, carry out finishpointing.

.2 Before finishpointing, wash walls to be finishpointed and allow to dry to damp-dry condition. Ensure that all dust, mortar particles, and other debris is removed from joints and wall surfaces before finishpointing.

.3 Dampen joints and completely fill with mortar. Fill the joints to approximately 1 mm behind arrises. Avoid feathered edges. Pack mortar solidly into voids and joints, to ensure positive adhesion to all inner surfaces.

.4 Where stone units have worn rounded edges, keep pointing back from face of stone, as detailed on drawings. If the width of the mortar joint will exceed 20 mm, stop work and notify the Departmental Representative for direction.

.5 Keep masonry damp while pointing is being performed.

.6 Do no pointing in freezing weather.

.7 Build up pointing in layers not exceeding 30 mm in depth. Allow inner layers to become thumbprint hard before applying subsequent layers. Pack and compress mortar into voids to fit approximately, but no less than 15mm thick. Maintain joint width.

.8 Remove excess mortar from masonry face before it sets. Finish jointing neatly as detailed.

.9 Allow mortar to set so that there is no excess water which will cause run off on stone faces, then tool to match approved mock-up joints. Tool head joints, followed by horizontal joints. Do not overwork the face of the joints. Ensure joints are uniform in appearance. Tool joints with one final pressing, once mortar is set, to thumb-pressed firmness. Final finish to expose aggregate texture will be completed using a stiff bristle brush which is gently struck, not wiped, against the surface of the finished joint.

.10 When mortar is thumbprint hard, tool joints behind masonry face with tools specifically crafted to replicate weathered joints.

.11 Retempering of Mortar

.1 Portland cement-hydrated lime mortars should only be retempered once, and should be used within 2 hours of adding water to the mix when the air temperature is less than 25 degrees C. (1½ hours for higher temperatures).

.2 Do not retemper pointing mortars by adding water. Retempering of mortar is only allowed by means of rewhipping it with a highspeed paddle mixer sufficiently to replasticize the mix.

.5 Chinking: install as per manufacturer's instructions in skyward facing joints as noted on drawings.

.6 Curing

.1 Moist cure freshly pointed joints by spraying at intervals and covering with moist burlap enclosure and polyethylene sheeting for minimum of 7 days after finishpointing. Keep wall and burlap misted.

.7 Protection

.1 Protect newly laid mortar from frost, rainfall or rapid drying conditions for 7 days.

3.3 RESETTING

.1 Prepare slot to receive stones. Clean back all loose and deteriorated core to sound material.

.2 Repoint all void joints in back-up masonry. Replace deteriorated masonry as directed by Departmental Representative. Shave back-up masonry as necessary to reset stone.

.3 Build up core where more than 50 mm wide void exists behind stones to be reset. Build up in traditional manner with new stone offsets in mortar. Allow mortar to fully set up.

.4 Install new stainless steel cramp anchors as detailed on drawings; two anchors per stone, top and bottom.

.5 Install mortar on face of back-up masonry to form continuous collar joint, just prior to resetting stone.

.6 Arrange dislodged masonry units in same location and orientation as originally set with water soaked hardwood wedges. Reset level, true and square with even mortar joints to exact original thickness.

.7 Insert and compress firm mortar to within 30 mm of finishpointing surface. Allow mortar to set 24 hours.

.8 Pull out wood wedges when dried and shrunken.

.9 Backpoint in layers and leave ready for finishpointing.

3.4 GROUTING

.1 Where it is determined that there are voids in the centre core of the wall, or vertical joints are void to a depth of 400 mm or greater, install specified grout.

.2 Clean out void with water until water runs clear. Ensure ambient temperature is to remain above 5˚C for at least 24 hours after voids are cleaned out.

.3 Fill joints and cracks with mortar set back 50 mm from final mortar surface.

.4 Install grouting tubes spaced at 600 mm on centre horizontally and vertically in joints, as backpointing proceeds.

.5 Pour specified grout, with casein additive through mortar cup until void is full.

.6 Grout from the bottom of the wall to the top.

.7 Do not exceed lifts of 600mm. Allow grout to set for 24 hours, prior to proceeding.

.8 Take great care not to allow the grout, and/or water, to seep inside the wall and damage the interior finishes. Damage to the interior finishes caused by undue care must be repaired at the Contractors expense.

.9 Remove grout tubes after initial set of grout has occurred. Fill holes with backpointing mortar.

.10 Proceed with finishpointing only after all grouting is complete.

3.5 FIELD QUALITY CONTROL

.1 The Departmental Representative will inspect the quality of the work on a regular basis.

.2 Notify Departmental Representative prior to sawcutting joints, so that the stone masonry can be recorded photographically. Provide clear access to all points of stone masonry to permit this photography to occur.

.3 Provide Departmental Representative with a minimum of 48 hours of notice for required inspection.

.4 Approval of raked out condition of joints, and approval of backpointing mortar after installation of first 75 mm of mortar for joints requiring backpointing to a depth of 200 mm or greater, and on completion of backpointing, must be received in writing by the contractor before the next procedure can proceed.

.5 Where work proceeds to the next phase, without the approval of the Departmental Representative, all unapproved mortar will be removed at contractor cost.

3.6 SCAFFOLDING ANCHORAGE

.1 As each level of work is completed and cured for a minimum of seven days, remove embedded scaffold anchors.

.2 Reinstall anchors into alternate masonry joints adjacent to existing anchorage location, until scaffold removal is required.

.3 Rake out and repoint joints affected by anchors, as detailed.

.4 Repointed joints must be inspected by Departmental Representative, prior to removal of scaffold deck.

.5 Upon final removal of anchors, repoint the joints where the anchor has been removed. Ensure mortar colour is uniform with previously repointed joints.

3.7 CLEANING

.1 Clean surfaces of mortar droppings, stains and other blemishes resulting from work of this contract as work progresses and at the end of each working day.

.2 Remove droppings and splashes using clean sponge and water. Vinegar or chemicals are not to be used unless instructed in writing by Departmental Representative.

.3 Do further cleaning, using stiff natural bristle brushes after mortar has attained its initial set and has not fully cured.

.4 Remove all debris from stone faces, ledges and sills, as scaffolding is being removed.

.5 Clean masonry with stiff natural bristle brushes and plain water only if mortar has fully cured.

.6 Clean stone surface behind scaffold tie-backs, as they are removed.

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

.8 After final cleaning, notify Departmental Representative to complete a final inspection of the wall. Repair all noted deficiencies before dismantling scaffolding.

3.8 PROTECTION OF COMPLETED WORK

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 03 05.13 –Period Masonry Mortaring.

.2 Section 04 03 05.21 – Period Masonry Repointing.

.3 Section 04 03 43.16 –Period Stone Replacing.

.4 Section 04 05 00 – Common Work Results for Masonry.

1.2 PRICE AND PAYMENT PROCEDURES

.1 Unit Prices

.1 Provide unit prices for each of the repairs identified on the drawings. The unit price for each repair will include all costs necessary to complete the specific repair, including additional shoring and scaffolding, removal and reinstatement of existing stone, all anchorage, mortar and grout work necessary to stabilize adjacent masonry.

.2 Allow for waste required to achieve desired size of Dutchman repairs.

1.3 ALTERNATES

.1 Obtain Departmental Representative's written approval before changing procedures, manufacturer's brands, sources of supply of materials during entire contract.

1.4 REFERENCES

.1 Definitions:

.1 Repair of Stone: mechanical or plastic repair, done to restore original appearance and function of partly deteriorated stones. Repairs include crack repair, Dutchman repair, fracture repairs and descaling.

.2 Restoration Mortar: material used to rebuild broken or deteriorated part of stone.

.3 Adhesive: material used to fasten broken/fractured stone elements by direct application at fracture interface and/or by application to added reinforcing elements such as dowels.

.4 Mortar: material used to re-bed the stone element being repaired and to repoint adjacent mortar joints.

.2 Reference Standards:

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C144-11, Standard Specification for Aggregate for Masonry Mortar.

.2 ASTM A276-15, Standard Specification for Stainless Steel Bars and Shapes.

.2 Canadian Standards Association (CSA)

.1 CAN/CSA A3000-13, Cementitious Materials Compendium.

.2 CSA A179-2014, Mortar and Grout for Unit Masonry.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Provide manufacturer's printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations. Include:

.1 Application/installation instructions.

.2 Laboratory test reports certifying compliance of products with specification requirements.

.3 Manufacturer's material safety data sheets (MSDS) for safe handling of specified materials and products, in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.

.3 Samples:

.1 Submit adhesive and mortar samples for testing.

.2 Submit (3) 250 mm x 250 mm x 50 mm stone units, representative of proposed units for work. (This is only necessary, if samples not submitted for replacement stone).

.1 New Stone:

.1 Departmental Representative reserves the right to request results from tests by an independent testing agency to verify mechanical, physical and aesthetic properties of stone, at no additional cost to Contract.

.3 Submit (1) 300 mm x 300 mm x 100 mm stone sample, representing each stone repair type, for review by Departmental Representative. Samples to be completed within six weeks of award of Contract and once approved, to remain in site office for duration of project.

.4 Certificates:

.1 Submit upon request by Departmental Representative purchase orders, invoices, suppliers test certificates and documents to prove materials used in contract meet requirements of specification. Allow free access to sources where materials were procured.

1.6 CLOSEOUT SUBMITTALS

.1 Record Documentation:

.1 Provide marked up set of drawings to provide referencing system identifying locations of stone repairs.

.2 Provide photographic record of dismantle and rebuilt stonework.

1.7 QUALITY ASSURANCE

.1 Qualifications:

.1 Foreperson:

.1 Provide competent trade foreperson specializing in type of work required.

.2 Masons:

.1 All masons employed on this project throughout course of project must meet requirements. Where, during course of project, masons leave work force, replacement masons must also meet requirements.

.2 Apprentices from a recognized Masonry Program, may work under the direction of a mason as noted above.

.2 Mock-ups:

.1 Construct mock-up in accordance with Section 04 05 00 – Common Work Results for Masonry.

.2 Construct mock-up where directed by Departmental Representative.

.3 Prepare one mock-up in wall, and one mock-up in sample stone, as noted under Sub-article 1.5.3.3, for each stone repair type.

.4 Construct the following stone repair mock-ups:

.1 Crack repair

.2 Restoration Mortar repair

.3 Dutchman repair (carved)

.4 Dutchman repair

.5 Fracture repair

.6 In-situ fracture repair

.7 Stone reset

.5 Select locations of mock-ups in consultation with Departmental Representative.

.6 Clean mock-up to demonstrate cleaning operations to Departmental Representative.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements:

.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.1 Identification with grade, batch and production date shown on container or packaging.

.2 Store materials in a clean, dry enclosed area and supported free of ground. Maintain a minimum ambient temperature of 10 degrees C in storage area.

.3 Packaging Waste Management: remove for reuse and return in accordance with Waste Management plan.

1.9 SITE CONDITIONS

.1 Ambient Conditions

.1 Maintain a minimum temperature of 10 degrees C during and 48 hours after repair, throughout thickness of stone.

.2 Allow materials to reach minimum temperature of 10 degrees C prior to use.

.3 Provide temporary enclosures to maintain specified temperatures. Take precautions to avoid overheating masonry.

.4 Remove work exposed to lower temperatures as directed by Departmental Representative.

.5 Refer to manufacturer's instructions for environmental requirements of products.

.6 Hot Weather Requirement

.1 Shade stones from direct sunlight with temporary cover.

.2 Record and report to Departmental Representative, site conditions non-conforming to those specified before beginning work.

Part 2 Products

2.1 MATERIALS

.1 Use materials from same manufacturer throughout the Work.

.2 Portland cement: to CAN/CSA A3000.

.3 Sand: cleaned and graded in accordance with ASTM C144.

.4 Water: clean and free of deleterious materials such as acid, alkali and organic material in accordance to CSA A179.

.5 Dowels: stainless steel to ASTM A276, Type 304.

.1 Diameter: dependent on size and weight of each new stone insert and as noted on Drawings.

.6 Deformed wire: 2 mm diameter, stainless steel Type 304.

.7 New stone:

.1 Similar mechanical, physical and aesthetic properties to existing stone. See Section 04 03 43.16 – Period Stone Replacing.

.2 To approval of Departmental Representative.

.8 Hairline Crack Filling: Dispersed Hydrated Lime (DHL) grout and shelter coat, pigmented to match stone colour to approval of Departmental Representative.

2.2 MORTAR MIXES

.1 Mortar: in accordance with Section 04 03 05.13- Period Masonry Mortaring.

.2 Restoration Mortar: for patching of stone; proprietary mix, pre-mixed, pre-bagged. Properties to be compatible with existing stone.

2.3 ADHESIVE MIXES

.1 Proprietary stone adhesive:

.1 Specially formulated for repair of broken stone units.

.2 Adhesive mix: NHL Hydraulic Lime and Casein. Mix proportions as recommended by manufacturer to obtain specified results.

.1 Submit samples for testing.

Part 3 Execution

3.1 SITE VERIFICATION OF CONDITIONS

.1 Report in writing, to Departmental Representative, areas of deteriorated stone not identified in the documents.

.2 Notify Departmental Representative to inspect the masonry and mark all Dutchman, new stone and stone removals on the masonry, prior to commencing backpointing of joints.

.3 Obtain Departmental Representative's approval and instructions for repair and replacement of masonry units before proceeding with repair work.

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

3.2 PREPARATION

.1 Obtain Departmental Representative's approval for repair methodology and tools to be employed prior to commencing work.

3.3 SPECIAL TECHNIQUES

.1 Temporary Marking and Recording:

.1 Mark stone, on face, before removal using marking product which can be completely erased when required without damaging masonry unit. Confirm with Departmental Representative as to the following preferred methods:

.1 Ball-point pen on diachylon, attached to stone.

.2 Waxless chalk directly on stone.

.3 Waterproof information card, securely tied to stone.

.2 Use numbering, marking, and positioning system shown on drawing or chart specifically prepared for accurate recording of stone location.

.3 Ensure that temporary marking will remain in use: resistant to weather, handling and cleaning until final marking of stones.

.4 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.

3.4 PROTECTION

.1 Prevent damage to stone surfaces, mortar joints, and natural features which are to remain. Make good damage incurred.

.2 Protect surrounding components from damage during work.

.3 Take utmost care not to damage historic fabric. Make good damage incurred.

.4 Obtain Departmental Representative's approval for repair technology.

3.5 CRACK REPAIR

.1 Drill 5 mm diameter injection ports as per injection adhesive manufacturer's specifications.

.2 Clean out void with compressed air and potable water until water runs clear. Final flushing to be with 10% ethyl alcohol solution.

.3 Seal joints and cracks to manufacturer's specifications.

.4 Complete injection procedure as per manufacturer's instructions. Keep surface of stone clean of spills. Clean off as work progresses.

.5 Allow adhesive to harden.

.6 Prepare DHL shelter coat using compatible pigments with the DHL grout. Pigment must match stone colour.

.7 Inject shelter coat over crack fills. Apply in thin layers to build up to surface.

.8 If the crack is wider than 3 mm, use repair mortar to fill and seal the opening or any voids along the crack length.

3.6 REPAIR OF A FRACTURED STONE

.1 Remove deteriorated portions of stones using low impact removal methods until sound surface is reached.

.2 Remove elements which require minor repair, without losing pieces or worsening damage. Do not damage existing Work.

.3 Drill 13 mm diameter holes, 60 mm long in each section at fracture, maximum spacing at 300 mm on centre. Provide minimum two holes per stone. Clean dust out of holes using acetone and cotton swabs.

.1 Fractures over 300 mm in length: require additional dowels per 200 mm length of fracture.

.4 Align holes on each side of fracture.

.5 Use minimum 2 dowels per fracture, for stones less than 600 mm high and one additional anchor for every 200 mm extra height.

.6 Dampen stone surfaces prior to application of adhesive and ensure humidity, temperature, cleanliness and finish condition of stone is in accordance with adhesive manufacturer's instructions.

.7 Insert 12 mm diameter dowels, 100 mm long, and apply specified adhesive to holes and interface. Clamp two parts of stone together. Allow adhesive to cure in accordance with manufacturer's instructions for 24 hours minimum.

.8 Reinstate consolidated element into work and repoint using specified mortar, in accordance with Section 04 03 05.21 - Period Masonry Repointing. Joint profiles to match existing. If fracture lines up with vertical mortar joints above and below the fractured stone, rotate the stone 180°, if pattern on stone permits, and reinsert.

.9 Repair surface of fracture to match the surrounding stone, as per Article 3.5 – Crack Repair.

.10 Finish surface of fracture to match colour and profile of existing stone.

3.7 REPAIR OF FRACTURED STONE IN-SITU

.1 Drill 11 or 13 mm diameter holes, extend 60 mm beyond fracture, spaced at 300 o/c maximum. Minimum 2 per stone. Provide additional dowels per 200 mm length of fracture. Minimum length of hole to be 140 mm. Confirm dowel size with Departmental Representative, prior to drilling hole.

.2 Clean dust out of hole with acetone and cotton swabs.

.3 Dampen stone surfaces prior to application of adhesive. Insert 10 or 12 mm diameter stainless steel dowels, 100 mm long and apply anchor setting mortar to holes and joints. Confer with Departmental Representative to determine diameter of dowels. Allow to set for 24 hours minimum.

.4 Drill injection ports and seal fracture as per Article 3.5 – Crack Repair.

.5 Repair fracture as per Article 3.6 – Repair of a Fractured Stone.

.6 Finish surface of fracture to match existing stone.

3.8 REFACING PARTLY DETERIORATED STONE WITH STONE SLAB (DUTCHMAN REPAIR)

.1 Remove decayed stone until sound surface is reached. Cut existing stone to achieve a square void in stone as much as possible, with minimum depth 65 mm.

.2 Where Dutchman size exceeds 40% of the failed stone size, proceed to do full face Dutchman, unless noted otherwise by Departmental Representative. Where there is more than one Dutchman repair required on any single stone, proceed to do full face Dutchman, unless noted otherwise by Departmental Representative.

.3 Select new stone to match surrounding stone of geological type and colour, free from defects and with bedding to match adjacent work. Where possible, salvage from existing weathered stone on site.

.4 Cut new stone insert to exactly fit the cut in existing stone.

.1 Allow for thickness of stone adhesive.

.2 Allow for finished surface slightly projecting from existing masonry face.

.5 Cutting tolerance for new stone: Allow 1 mm maximum joint tolerance on all sides, between the new stone section and the parent stone.

.6 Dowels as mechanical fasteners:

.1 Drill 11mm diameter holes, 60mm long at interface of existing and new stone slabs. Where stone depth on either side of the interface is less than 100mm, length of hole to be 60% of stone thickness.

.2 Saturate stone surface, prior to application of adhesive.

.3 Insert 10mm diameter dowels, 100mm long into existing stone and apply specified adhesive to holes and interface. Allow to set for 24 hours minimum.

.4 Where new or existing stone is less than 100 mm thick, length of dowel to be 50% of the thickness of stone on each side of the interface.

.7 Dovetailed grooves as mechanical fasteners:

.1 Cut horizontal dovetailed grooves 12mm deep at interface of existing and new stone slabs. Cut stone shape by hand using tempered chisels ensuring that the edges are not plucked or spalled.

.2 Saturate stone surface, prior to application of adhesive.

.3 Apply specified adhesive to dovetailed grooves and interface of existing stone.

.8 Dampen stone surfaces and fill dowel holes and/or dovetailed grooves of new stone slab with specified adhesive. Erect new stone slab into position. Secure stone temporarily to allow adhesive to set. Ensure joint between new and existing stone is filled solid and finished to match existing stone face.

.9 Position face of Dutchman slightly proud and finish to original profile by rubbing back or tooling as required. Resurface new slab insert as required to make patch unobtrusive. Refer to Drawing for required tooling and finishing. Rubbing back marks on existing stone are not permitted.

.10 Insert Date Stamp into stone, as detailed.

.11 Repoint with specified mortar. Profile of joints to match existing.

3.9 REFACING PARTLY DETERIORATED STONE WITH RESTORATION MORTAR (INCLUDING VOIDS, CHIPS, OLD PATCHES)

.1 Prepare and repair eroded or damaged stone using the specified restoration mortar. Perform work in strict accordance with manufacturer's directions which must be on hand during work and shall supplement and take precedence over this specification. Repairs to match existing stone in colour and profile. The purpose of such work is required to improve water-shedding and to prevent further damage or erosion. Exact location and dimensions of repair will be chalked on stone by Departmental Representative.

.2 Remove decayed stone until sound surface is reached. Cut out areas to be repaired using a toothed chisel so that back surfaces are grooved and a square connection is made between restoration mortar and sound stone. Feathering of mortar is not acceptable. Cut away spalled and loose stone to a minimum depth of 6mm, and minimum 12 mm or greater for the remainder, as per manufacturer's instructions.

.3 After cutting, remove loose particles and clean space to be filled using water and brush so that all dust is removed. If surfaces to be restored, chalk or become powdery, remove dust using a vacuum cleaner.

.4 Remove dust and thoroughly moisten surfaces, such that the surface retains humidity but with no standing water. Use only enough water to prevent the natural stone from extracting mixing water from the restoration mortar. Adjust amount of moisture to suit hardness and porosity of stone to be restored.

.5 Mix restoration mortar in a plastic tub using a hand mixer. Wear a dust mask. Put water in tub first before adding dry material. The ratio of water to dry material will be as per manufacturer's directions.

.6 Apply mortar to suit nature of stone being restored. Restore stone surfaces to match existing and bring to the same plane as adjacent existing stone surfaces that are not eroded.

.7 Gradually build up new segment in layers, not exceeding 15 mm thickness. Fill in one lift without overworking with application tool.

.8 Use quality art tools such as various sized spatulas and avoid excessive trowelling to prevent crazing.

.9 Clean filling mortar residue from area surrounding patch: sponge as many times as necessary with clean water. Do this before patching material sets. Normal timing to cut and profile the repair mortar is when the fill is just resistant to finger pressure.

.10 Undercut sound existing stone to provide keyed edge by drilling. Provide keys in back of cavity.

.11 Remove laitance with stiff, near-dry fibre brush.

.12 Form mortar to match profile of surrounding stone.

.13 Finish patch surface to match adjacent stone surface, in colour and texture.

.14 Moist cure restored surfaces for 4 days minimum. Apply moist cloth covered with plastic sheet. Maintain moisture in cloth by means of mist sprayer, for the entire curing period.

.15 Refacing mouldings:

.1 Form face roughly to required shape with wood float leaving repair mortar proud.

.2 Chisel finish to final shape when mortar has set.

.16 Repoint mortar joint with specified mortar. Joint profile to match existing. See Section 04 03 07 – Historic – Masonry Repointing.

3.10 SHARD REPAIR

.1 Retain all stone shards which become loose from stone arrises during removal of existing mortar. Idendify and tag locations where shards have debonded.

.2 Clean surfaces of detached segment of dust and dirt by scrubbing with water and brush if necessary.

.3 Allow stone to dry.

.4 Apply dab of polyester resin to dry, middle area surface of detached stone portion.

.5 Working quickly, compress the two surfaces together to secure original fitting.

.6 Cut away excess polyester resin while in the gel stage, just prior to hardening.

.7 Proceed with crack repair as per Article 3.5 – Crack Repair.

.8 Complete this work prior to backpointing.

3.11 DESCALING

.1 Descale the surface of the stone, by removing loose masonry portions by impact with bush hammer, or better serving tools, as directed by Departmental Representative.

.2 Where only a portion of a stone face requires descaling, clean the entire surface and repair to ensure uniformity of colour.

.3 Where scaling is deep (greater than 2mm), stop work and notify Departmental Representative. Repair or replacement may be required.

.4 Where scaling is shallow (less than 2mm), bevel the edges of retained and firm surface plates to ensure water shedding.

.5 Where descaling covers an area greater than 0.1 m^2, notify Departmental Representative for direction, prior to proceeding, as an alternative repair or replacement may be required.

3.12 RESURFACING STONE

.1 Finish surface of stone by rubbing and polishing to match existing.

.2 Ensure uniformity of colour and finish by treating the entire face of the stone.

3.13 REGLETS

.1 Mark location of reglets on stone face with removable marker. Reglet location must be marked by the Contractor responsible for the installation of the metal flashings. Obtain approval of Departmental Representative, prior to proceeding to cut reglets in stone face.

.2 Use straight edge to ensure reglet is cut in a straight line. Cut reglet to the dimensions specified. Do not overcut. Arris of stone at edges of reglet must be straight. Chipping of stone is not acceptable.

.3 If stone is damaged during cutting of reglets, replace with new stone, at no cost to the Departmental Representative.

3.14 JOINT REPAIR

.1 Do repointing work in accordance with Section 04 03 05.21 - Period Masonry Repointing.

.2 Make good damage incurred to mortar joints.

3.15 CLEANING

.1 Obtain Departmental Representative's approval of cleaning operations before starting cleaning work.

.2 Protect vegetation and adjacent grounds from excessive water accumulation.

.3 Clean stone work surfaces after repairs have been completed and mortar has set.

.4 Clean stone surfaces of grout or mortar residue resulting from work performed without damage to stone or joints.

.5 Clear site of debris, surplus material and equipment, leaving work area in clean and safe condition.

3.16 PROTECTION OF COMPLETED WORK

.1 Protect finished work from impact damage for period of two weeks.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 03 05.13 –Period Masonry Mortaring.

.2 Section 04 03 05.21 – Period Masonry Repointing.

.3 Section 04 05 00 – Common Work Results for Masonry.

.4 Section 04 05 19 – Masonry Anchorage and Reinforcing.

1.2 PRICE AND PAYMENT PROCEDURES

.1 Provide unit prices for replacement of stone. The unit price for each replacement will include all costs necessary to complete the specific replacement, including additional shoring and scaffolding, removal and disposal of existing stone, consolidation of core, all anchorage, mortar and grout work necessary to stabilize adjacent masonry, and to install the new stone.

.2 For quantity estimation of dressed quoin stones and jamb stones, measure long face only. Allow for waste required to achieve desired size of replacement stone.

.3 Payment for this work will include all costs associated with supplying materials, and executing work as described herein and reflected in the contract.

1.3 REFERENCES

.1 Definitions:

.1 Lewis: instrument inserted at top of stone as means of attachment in raising and lowering. Holds stone by means of keys or wedges fitted to dovetailed recess.

.2 Dogs: metal appliance for securing parts or members together by means of one or more projecting teeth or bent portions, lug, cramp.

.3 Fabricator: company having sufficient capacity to quarry, cut, and deliver stonework on schedule.

.4 Installer: company or person specializing in commercial stone work. Employ skilled stone masons on site to do necessary field cutting as stones are set.

.5 Dressed quoin stones and jamb stones: Corner stone with two finished surfaces.

.2 Reference Standards:

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C97/C97M-2009, Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.

.2 ASTM C170/C170M-2009, Standard Test Method for Compressive Strength of Dimension Stone.

.3 ASTM C568-10, Standard Specification for Limestone Dimension Stone.

.4 ASTM C616/C616M-10, Specification for Quartz-Based Dimension Stone.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings:

.1 Submit shop drawings for all new stone required, describing method of stone replacement, including removal, shoring and erection. Refer to Drawings for locations.

.2 Drawings to show all details for size, section, bedding, jointing, anchor or tying system and finish of stone. Base dimensions on accurate site measurements.

.3 Submit moulded and profiled work details in full size.

.3 Samples:

.1 Submit samples of replacement stones for approval, prior to purchase of stone.

.2 Submit samples from original quarry or from quarry supplying replacement stone and samples of the existing stone salvaged on site, as follows:

.1 Two samples: representing full range of colour, pattern and inclusions.

.2 One: sized and dressed to match existing stone units.

.3 Five: 150 mm x 100 mm x 50 mm for compressive strength test to ASTM C170.

.4 One: 150 mm x 150 mm x 12 mm for porosity test to ASTM C97.

.5 Select samples from currently worked bed of quarry and accompanied by quarry certification.

.6 Samples should be representative of the full range of colour, visible markings, and finish to be supplied for the entire project. Indicate quarry bed or direction of bedding on samples.

.7 Submit the following samples to indicate required finishes:

.1 1 – 250 mm x 250 mm x 250 mm: bordered and bush hammered.

.2 1 – 250 mm x 250 mm x 250 mm: bordered, bush hammered and media blasted to a light sand colour.

.8 Submit stone samples to the testing laboratory designated by the Departmental Representative, for conformance with applicable ASTM Standards, prior to fabrication.

1.5 QUALITY ASSURANCE

.1 Allow Departmental Representative access to mason's workshop for inspection of current work-in-progress.

.2 Qualifications:

.1 Execute work by personnel experienced in conservation of historic masonry.

.2 Lead masons engaged by Masonry Contractor to have experience with historic masonry. Remaining mason qualification as per Section 04 03 43.13 – Period Stone Repairing.

.3 Departmental Representative has right to reject masons who do not demonstrate appropriate abilities or experience.

.4 Masons employed on this project throughout course of project must meet above requirements. Where, during course of project, masons leave work force, replacement masons must also meet requirements.

.3 Mock-ups:

.1 Construct mock-up in accordance with Section 04 05 00 – Common Work Results for Masonry.

.2 Prepare mock-up of stone colour and tooling of stone face, to be approved on site by the Departmental Representative prior to commencement of the stone fabrication.

.3 Allow one week for inspection of mock-up by Departmental Representative, before proceeding with replacement work.

.4 When accepted, mock-up may remain as part of finished work.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver finished stone to site in substantial, purpose made containers, packed to avoid chipping damage or soiling from any means.

.2 Label each container to clearly indicate contents and location on building.

.3 Indicate on each stone, quarry bed or direction of bedding and location of stone on building, referenced to shop drawings. Mark stones where not exposed, with permanent markers.

.4 Protect and store stones to facilitate their resetting.

.1 Store dismantled masonry units on wood pallets, protected from exposure to water, elements, and potential mechanical damage, fully covered under polyethylene.

.2 Ventilate shelter to keep condensation from forming on internal surfaces.

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

.4 Ensure contact between stones is avoided by placing protective, non-staining material between and around each stone.

.5 Avoid excessive handling, and protect against chipping, damage, soiling or staining.

.6 Damaged stone, and stone that is repaired prior to reaching site, will be rejected.

.7 Packaging Waste Management: remove for reuse, in accordance with Waste Management plan.

Part 2 Products

2.1 MATERIALS

.1 Obtain new stone from a single quarry source acceptable to Departmental Representative.

.2 Limestone: to ASTM C568, category III - High Density, of uniform colour, texture and strength, free from holes, shakes, cracks or other defects. Colour to match existing stone masonry on weathered side. Colour to be approved by Departmental Representative.

.3 Ensure single quarry source has resources to provide materials of consistent quality and matching existing stone. For compatibility, stone to have similar mechanical and aesthetic properties to the existing stone. Based on site testing, the existing average stone characteristics are:

.1 Compressive Strength: 80 MPa

.2 Absorption: 1.10% Bulk

.3 Specific Gravity: 2,723 kg/m^3 (170 lbs/ft^3).

.4 The following quarries supply limestone:

.1 Dressed Stone

.1 Attia Limestone of a similar colour to Kingston limestone (existing stone) is available from Attia Quarry: 6414 County Road, Hwy 169, Township of Ramara, Ontario.

.2 Frontenac Limestone of a similar colour to Kingston limestone (existing stone) is available from Rideauview Contracts in Inverary, Ontario.

.3 St. Marc Limestone (formerly known as Deschambeau Limestone), Greymont (Portneuf) Inc., 595 Boul. Dussault, St. Marc, Québec.

.2 Rubble Stone

.1 Champlain Limestone, a potentially suitable match for the existing stone is available from Les Carrières Ducharme Inc., Havelock, Québec.

.2 Limberlost Limestone, Bruce Peninsula, Wiarton, Ontario.

.3 Montreal Greystone, Ansa Inc., Montreal, Quebec.

2.2 STONE BEDDING PLANES

.1 Supply stone to be laid on its natural quarry bed, with the following exceptions:

.1 Arches: lay stones with bed at right angles to thrust.

.2 Projecting, undercut members and soffit stones: to be edge-bedded.

.2 Face bedded stone will be rejected.

2.3 STONE FABRICATION

.1 Cut stone to shape and dimensions obtained from accurate measurements and profiles taken from existing stone, and full to square with joints as indicated.

.1 Dress exposed faces true.

.2 Allow for beds and joints to be the same as average joint thickness in location of new replacement stone, but not to exceed 20 mm thick, and at right angles to face.

.2 Cut stones for anchors, cramps, dowels and support systems.

.1 Provide Lewis pin and clamp holes in pieces which cannot be manually lifted.

.2 Do not cut holes in exposed surfaces.

.3 Fabrication of Replacement Stone

.1 Record profile of existing stone.

.2 Cut and carve new stone to match existing profile.

.3 Obtain approval of new carved stone by Departmental Representative, prior to installation.

.4 Finish exposed faces and edges of stones to comply with requirements indicated on drawings for finish and to match approved samples and field-constructed mock-up. Install date stamp into stone as detailed.

2.4 FABRICATION TOLERANCES

.1 Fabricate dimension stone to the following tolerances:

.1 Unit Length: plus or minus 1.5 mm.

.2 Unit Height: plus or minus 1.5 mm.

.3 Deviation from Square: plus or minus 1.5 mm, with measurement taken using the longest edge as the base.

.4 Deviation from flat surface on any exposed face: plus or minus 1.0 mm.

2.5 EXISTING STONE

.1 Use hard, sound, and clean existing stone salvaged on site only with Departmental Representative's approval.

2.6 MORTAR

.1 Mortar: in accordance with Section 04 03 43.13 -Period Masonry Mortaring.

2.7 ACCESSORIES

.1 Anchors, cramps, dowels: Refer to Section 04 05 19 – Masonry Anchorage and Reinforcing.

Part 3 Execution

3.1 SITE VERIFICATION OF CONDITIONS

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

.2 Obtain Departmental Representative's approval and instructions for repair and replacement of masonry units before proceeding with repair work.

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

3.2 PREPARATION

.1 Prevent absorption of ground water and water accumulation on stone. Rest stones in their natural bedding during weathering.

.2 Move and lift stone units using means to prevent damage. Submit stone units dropped or impacted to Departmental Representative for inspection and approval. Do not make holes or indentations for Lewises or dogs on face or top side of stone.

.3 Indicate bedding planes of stone units. Duplicate bedding marks on usable pieces of cut stone.

.4 Place safety devices and signs near work area as directed.

.5 Install and remove temporary shoring or other supports as required.

.6 Cover adjacent plant material and fragile surfaces.

.7 Repoint backup masonry, install anchors and install mortar in collar joint as per Section 04 03 07 - Historic-Masonry Repointing.

3.3 EXISTING STONE REMOVAL

.1 Remove existing deteriorated stone after obtaining approval from Departmental Representative.

.2 Record photographically from all aspects, those areas allocated for dismantling, prior to start of work.

.3 Using elevation drawings, accurately number each stone to be removed, and record its position. Numbering must correspond to the shop drawings.

.4 Where existing stone is to be reset, mark stone on face, before removal, with marking product which can be completely erased when required, or label attached to stone, without damaging masonry unit. Method of marking to the approval of the Departmental Representative.

.5 Use approved methods to loosen stones which will cause no damage either to stones or to other elements of the lock walls.

.6 Do not use circular millstone or saw, pneumatic chisel, steel tools exerting concentrated pressure on edge of stone. Obtain Departmental Representative’s approval for use of power tools before commencing work.

.7 Loosen wet masonry only when temperature is above freezing point.

.8 Remove loose material from deteriorated stones and clean by wet scrubbing with vegetable fibre brush unless otherwise instructed by Departmental Representative. Do not use high pressure water jet.

.9 Place detached stones on wood surfaces during handling. Prevent contact with metal or vegetation.

.10 Clean dust, mortar and stone fragments from slot.

3.4 RAKING JOINTS

.1 Remove mortar in accordance with Section 04 03 05.21 –Period Masonry Repointing.

3.5 CUTTING/SIZING OF STONE

.1 Use calipers, squares and levels to measure hole for new stone. Allow for mortar joints of thickness as noted in Article 2.3 – Stone Fabrication. Where existing joints are narrower than 4 mm, confirm joint thickness with Departmental Representative prior to cutting stone.

.2 Provide 1:10 slope on top face of stone unit, sloping down to front face.

3.6 MOVING STONES

.1 Use Lewises to lift stones to working level.

.2 Move stones horizontally in wheelbarrows or on sleds.

.3 Move large stones using nylon belts properly spaced to provide a safe and even bearing for the stone.

.4 Slide stones into place on wood ramps.

.5 Protect edges of stone from damage when hoisting and lifting from position. Use wood shims to isolate units from hoisting belts.

.1 Incorporate only undamaged stone in Work.

3.7 INSERTING REPLACEMENT STONE

.1 Clean stone by washing with water and natural fibre brush before laying.

.2 Dampen surfaces of slot and apply bedding mortar.

.3 Lay heavy stones and projecting stones after mortar in courses below has hardened sufficiently to support weight.

.4 Prop and anchor projecting stones until wall above is set.

.5 Set large stones on water soaked softwood wedges, to support stone in proper alignment until mortar has set. Remove wedges when dry, do not break off.

.6 Insert and compress firm mortar to within 30mm of pointing surface. Allow mortar to set 24 hours.

.7 Remove mortar dropping from face of stone before mortar is set. Sponge stone free of mortar along joints as work progresses.

.8 Install stainless steel anchors to fix stone face plates as indicated. Provide minimum of two anchors per stone, top and bottom.

.9 Set stones plumb, true, level in full bed of mortar with vertical joints buttered and placed full except where otherwise specified. Completely fill anchor, dowel and lifting holes and voids left by removed edges.

.10 Grout solid all voids behind stone using specified grout.

3.8 FILLING JOINTS/POINTING

.1 Fill joints and point: in accordance with Section 04 03 05.21 –Period Masonry Repointing.

3.9 PROTECTION OF WORK

.1 Cover top of completed and partially completed wall, not enclosed or sheltered, with weatherproof coverings at end of each working day.

- .1 Drape cover over wall and extend 0.5 m down both sides.
- .2 Anchor securely in position.
- .3 Prevent finished work from curing too quickly.
- .4 Protect from drying winds. Pay particular attention at corners.

.2 Protect adjacent finished work from marking or damage which may be caused by on-going work.

.3 Provide temporary bracing of masonry work during erection until permanent structure provides adequate bracing.

3.10 CLEANING

.1 Confirm acceptance of mock-up cleaning operations to demonstration from Departmental Representative before starting cleaning work.

.2 Clean stone work surfaces after repairs have been completed and mortar has set.

.3 Clean stone surfaces of adhesive or mortar residue resulting from work performed without damaging stone or joints.

.4 Clear site of debris, surplus material and equipment, leaving work area in clean and safe condition.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 03 43.13 – Period Stone Repairing

.2 Section 04 05 00 – Common Work Results for Masonry.

1.2 DEFINITIONS

.1 Make Good: restore new or existing Work after being damaged, cut, patched or rejected by the Consultant. Use materials identical to the original materials, with visible surfaces matching the appearance of the original surfaces in all details, and with no apparent junctions between new and original surfaces. Where original materials are not available, submit a proposal of materials for review by the Consultant.

1.3 ADMINISTRATIVE REQUIREMENTS

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

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit method of reference numbering for dismantling stone prior to start of stone removal to Consultant for approval. Provide a unique identification code for each dismantled stone.

.3 Submit drawing or chart indicating dimensions and location of each stone to be dismantled in removal area, with reference to the approved identification code of the dismantled stone.

.4 Shop Drawings:

.1 Submit drawings stamped and signed by Professional Engineer registered or licensed in the Province of Ontario.

.2 Provide drawings for shoring and bracing where masonry will be laterally unsupported.

.5 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.

1.5 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for incorporation into Closeout Documentation. Include:

.1 Photographic record of stonework to be dismantled and rebuilt.

.2 Drawing or chart indicating dimensions and location of each dismantled stone in removal area, with reference to the identification code of the dismantled stone.

.3 Record drawings of layout of stored stones.

1.6 QUALITY ASSURANCE

.1 Qualifications:

.1 Masonry Contractor:

.1 Work of this Section: executed by Contractor specializing in historic stone conservation work, using similar stone dismantling techniques, and with a record of successful performance.

.2 Foreperson:

.1 Provide competent trade foreperson specializing in type of work required.

.2 Experience: experience in deconstruction of historic stone masonry. Must be present on site throughout duration of Work.

.2 Mock-ups:

.1 Construct mock-up in accordance with Section 04 05 00 – Common Work Results for Masonry, supplemented by the following:

.1 Perform mock-up 1200 mm x 1800 mm to demonstrate dismantling procedures and use of appropriate tools for each type of masonry condition specified in locations designated by Consultant.

.2 Demonstrate use of Lewis pins/strapping and slinging methods for handling stone.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Protect and store stones to facilitate their resetting.

.1 Carefully clean mortar residue from dismantled stones using traditional masonry chisels, before being stored or reinstated. Do not damage stone while removing mortar. The original surface of the stone must be fully visible after mortar has been removed.

.2 Store dismantled masonry units on wood pallets, protected from exposure to water, elements, and potential mechanical damage fully covered under polyethylene.

.3 Submit storage and identification system to Consultant for approval.

.4 Carefully remove, package and store carved elements at a secure location, if stored on site; to be approved by the Consultant, until ready for conservation and reinstallation.

.3 Where stone is deemed unsuitable for reinsertion in the wall, stockpile for use as Dutchman repairs, when required.

1.8 AMBIENT CONDITIONS

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

.2 At temperature of 5°C and below:
- .1 Keep stones dry.
- .2 Protect wet stones from freezing.
- .3 Execute work when ambient temperature is above 5˚C. Do not dismantle masonry when ambient temperature is below 5˚C. Damaged masonry units, designated for reinstallation, resulting from removal of frozen mortar, will be replaced at the Contractor's expense.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 EXAMINATION

.1 Examine masonry, staging and storage areas and notify Consultant in writing of conditions detrimental to acceptable and timely completion of Work.

.2 Review and confirm scope of dismantling and reinstallation of stone masonry with Consultant on site, before commencing dismantling.

3.2 SITE VERIFICATION OF CONDITIONS

.1 Report in writing, to Consultant areas of deteriorated stone not identified in the documents. Obtain Consultant's approval and instructions for repair of stone before proceeding.

.2 Stop work in area where hazardous materials are found and report to Consultant immediately.

3.3 PREPARATION

.1 Perform descaling on loose, deteriorated stone surfaces before dismantling begins. Refer to Section 04 03 43.13 – Period Stone Repairing.

.2 Carry out all fissure or shard repairs in the immediate area, prior to any dismantling work.

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

.4 Clean stone surface of dust and stone chips.

3.4 PROTECTION

.1 Prevent damage to surrounding building components, natural features and paving which are to remain. Make good damage incurred.

.2 Obtain Consultant's approval for repair methodology.

3.5 SPECIAL TECHNIQUES

.1 Number and identify stones and other elements on a photographic record before dismantling. Recording of stone location and dimensions is required for historic record.

.2 Before dismantling work on areas requiring the removal of more than one masonry unit, carry out a measured survey by indicating location and dimensions of each stone in removal area on a drawing, chart or index card. Record all key dimensions (stone lengths/heights), reference points (e.g. window or quoin stones), joint widths, etc. to permit faithful reinstallation. Record conditions of level and plumb and advise Consultant of any concerns prior to beginning work. For arched openings, include the location of striking points, springing lines and radii. Submit to Consultant for review and approval.

.3 Temporary Marking and Recording:

- .1 Install stone identification as follows, before removal without damaging masonry unit:
  - .1 Write the code for each stone clearly and legibly on painter's tape with permanent marker and apply the tape with the code to the face of the stone as a temporary measure.
- .2 If the stone will be removed from the immediate work area/the scaffolding or will not be reinstalled within 24 hours, legibly mark the top bed or unseen joint surface with the unique identification code of the stone. Use of permanent marker is permitted, if kept well away from seen faces. Stones will be identified and tagged with mechanically-fixed aluminium tags away from the scaffolding.
- .3 Tracking relocated stones and other masonry units:
  - .1 Use numbering, marking, and positioning system shown on drawing.
- .4 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 and card-index.
- .5 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.
- .6 Ensure that temporary marking will remain resistant to weather, handling and cleaning until final marking of stones.

3.6 TEMPORARY SHORING

.1 Construct shoring, cradling, and other temporary framing work needed to support structure, or parts of it, during removal operations and in anticipation of resetting, if structure is not to be completely dismantled, according to approved shop drawings.

3.7 METHOD FOR LOOSENING STONES

.1 Use approved methods to loosen stones which will not cause damage either to stones or to other elements of the existing walls.

.2 Plan to remove all stones indicated for replacement as fully intact units, to be reused as Dutchman stock. If a stone indicated for replacement cannot be salvaged for Dutchman stock and must be demolished (broken up), seek approval from Consultant in writing before proceeding.

.3 Carefully rake all mortar joints surrounding stone units to be dismantled, to sufficient depth until the stone can be loosened without damage.

.4 Remove mortar from top, bottom and side joints, with the back surface of the joint square and of an even depth.

.5 Use only hand-held tools with mallet or pneumatic driven percussion at low stroke speed. Avoid using circular millstone or saw, pneumatic chisel, steel tools exerting concentrated pressure on edge of stone. If there is a risk of existing cracks of fissures causing separation of stone units/damage/loss of shards, then stop work and obtain Consultant's approval for pre-dismantle repair before proceeding.

.6 Loosen wet masonry only when temperature is above freezing point.

.7 Ensure that adjacent stones are not used as lever points in removal of stone.

3.8 DISMANTLING AND MOVING STONES

.1 Avoid damaging arrises of stone when removing mortar and freeing up.

.2 Remove excess mortar using hand tools.

.3 Use wood wedges where required to remove or dislocate stone.

.1 Use flat pry bars protected with impact absorbing protection (burlap, cardboard).

.4 Use nylon hoisting belts. Use minimum 2 belts per stone.

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

.1 Use separators or wood shims to isolate units from hoisting belts.

.6 Where damage occurs to stone, report to Consultant and repair stone in accordance with Section 04 03 43.13 – Period Stone Repairing.

.7 Make good damage incurred at no additional cost to Contract.

.8 Obtain approval of repaired damage by Consultant.

3.9 HANDLING

.1 Usage of Lewis bolts for handling stone is permitted, subject to Consultant's approval and a successful demonstration mock-up.

.2 Place detached stones on wood surfaces during handling. Prevent contact with metal or vegetation.

.3 When stones are lowered to ground, place directly on wooden pallet used for transport or storage.

.4 Transport and keep stones on wooden pallets.

.5 Ensure that sharp edges of stones do not come into contact with hard objects. Protect arises at all times.

3.10 TEMPORARY STORAGE STAGING AREA

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

.2 Make stones accessible and retrievable when required.

3.11 FINAL MARKING

.1 Before cleaning, complete final marking on surface that supports good adhesion and legibility and will not be visible after resetting as follows:

.1 Once stones are removed from the wall, use aluminium tags engraved with stone codes to identify stones until reinstallation. Securely anchor aluminium tags to the stone with a non-ferrous fastener such as plastic sleeve and stainless steel screw.

.2 Maintain 100 mm distance from any seen face when installing aluminum tags. Where possible (not seen), always secure tags to Top Beds. Where this is not possible, secure tags to backs of stones. Do not tag seen faces.

.2 Ensure identifier tags are legible at all times and it is not necessary to rearrange stones on pallets in order to read the tag.

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

.4 Before reinstallation of stone units, detach aluminium tag and fastener without damaging stone unit.

3.12 CLEANING

.1 Perform cleaning operations when temperature is above freezing.

.1 After cleaning, protect wet stones against freezing until dry.

.2 Clean stones by wet scrubbing with vegetable fibre brush unless otherwise instructed by Consultant.

.1 Do not use high pressure water jet.

.2 Remove excess mortar with hand tools.

.3 Use chemical cleaning methods only with prior written approval of Consultant.

3.13 FINAL STORAGE

.1 If stone is required to be stored for an extended period, provide shelter:

.1 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 Produce record drawing showing layout of stones designated for storage.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 03 05.21 – Period Masonry Repointing.

.2 Section 04 05 19 – Masonry Anchorage and Reinforcing.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA A371-14, Masonry Construction for Buildings.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Conduct pre-installation meeting one week prior to commencing work of this Section, to:

.1 Verify project requirements, including mock-up requirements.
.2 Verify substrate conditions.
.3 Co-ordinate products, installation methods and techniques.
.4 Sequence work of related sections.
.5 Coordinate with other sub-trades.
.6 Review manufacturer's installation instructions.
.7 Review masonry cutting operations, methods and tools and determine worker safety and protection from dust during cutting operations.
.8 Review warranty requirements.

.2 Sequencing: Sequence with other work.

1.4 ACTION SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish, limitations and colours.
.2 Provide two copies of Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS).

.3 Samples:

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
.2 Provide samples as follows:

.1 One of each type of masonry unit proposed for use.
.2 One sample each of mortar and grout.

.3 One of each type of masonry anchorage proposed for use, supplemented by specific requirements in Section 04 05 19 - Masonry Anchorage and Reinforcing.

.4 One sample of each type of stone to be used to replace existing stone, where stone has not been salvaged from site.

.5 One sample of each type of Restoration mortar.

.3 Submit samples for testing to laboratories employing technicians certified/trained in procedures for testing masonry units.

.4 The approved samples denote the standard of material to be used.

.4 Shop Drawings:

.1 Provide drawings stamped and signed by Professional Engineer registered or licensed in the Province of Ontario.

.2 Where existing masonry becomes unsupported during construction, provide shop drawings detailing temporary bracing required, designed to resist lateral forces during installation.

.5 Temporary Bracing:

.1 Submit stamped engineered drawings for temporary bracing.

1.5 INFORMATION SUBMITTALS

.1 Certificates: provide manufacturer's product certificates certifying materials comply with specified performance requirements and physical properties.

.2 Test and Evaluation Reports:

.1 Provide certified test reports in accordance with Section 01 33 00 – Submittal Procedures.

.2 Test reports to certify compliance of masonry units and mortar ingredients with specified performance characteristics and physical properties.

.3 Provide data for masonry units, in addition to requirements set out in referenced CSA Standards, indicating initial rates of absorption.

.4 For stone replacement units, submit test reports confirming compressive strength, density and porosity to requirements set out in referenced CSA Standards.

.3 Installer Instructions: provide manufacturer's installation instructions, including storage, handling, safety and cleaning.

.4 Manufacturer's Reports: provide written reports prepared by manufacturer's on-site personnel to include:

.1 Verification of compliance of work with Contract.

.2 Site visit reports providing detailed review of installation of work and installed work.

1.6 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturer: capable of providing field service representation during construction and approving application method.

.2 Installer: experienced in performing work of this section; who has specialized in installation of work similar to that required for this project.

.3 Masons: company or person specializing in masonry installations with masonry work similar to this project.

.1 Masons employed on this project must demonstrate ability to reproduce mock-up standards.

.4 For heritage work: The principal stone mason and site superintendent must demonstrate an ability to pass a hands-on test of skills, if so administered by the Departmental Representative. The Departmental Representative has the right to reject either of these individuals, if their qualifications cannot be substantiated, or who does not demonstrate the appropriate abilities or experience on the following tasks:

.1 Raking joints by hand.
.2 Cutting stone.
.3 Carving stone.
.4 Dutchman repairs.
.5 Pinning techniques.
.6 Restoration mortar repairs: repairs involving proprietary stone restoration mortar shall be carried out by persons who have successfully completed the manufacturer's training course and have been certified by the manufacturer for the type of work required. Provide proof of accreditation by the manufacturer before work begins.
.7 Historical repointing.

.5 All masons employed on this project must meet the above requirements. Where, during the course of the project, masons leave or become unavailable to perform their duties, replacement masons must also possess comparable experience equivalent to the masons being replaced.

.6 Apprentices: Apprentices may work on the project provided their work is under the direct supervision of an experienced mason, at a ratio of no more than two apprentices for one experienced mason.

.2 Mock-ups:

.1 Construct mock-up panel of masonry wall construction, 1200 x 1800 mm showing masonry colours and textures, use of reinforcement, jointing, coursing, mortar, reglets, stone repairs, tooling and workmanship.

.2 For repointing, mock-up must include examples of saw-cut joints, raked joints, backpointed joints and finishpointed joints for both horizontal and vertical applications

.3 Mock-up used:

.1 To judge workmanship, aesthetics, substrate preparation, operation of equipment and material application.

.2 For testing to determine compliance with performance requirements.

.4 Construct mock-up where directed by Departmental Representative.

.5 Notify Departmental Representative 48 hours before commencing each mock-up.

.6 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with work.

.7 When accepted by Departmental Representative, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

.8 Start work only upon receipt of written acceptance of mock-up by Departmental Representative.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Only accept materials that have been delivered to site in original, unbroken, undamaged packages. Damaged packages are not to be accepted on site.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.3 Storage and Handling Protection:

.1 Keep materials dry until use.

.2 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

.4 Packaging Waste Management:

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

1.8 SITE CONDITIONS

.1 Weather Requirements: to CAN/CSA A371.

.2 Site Environmental Requirements

.1 Cold weather requirements: Supplement Clause 6.7.2 of CAN/CSA A371 with following requirements:

.1 Maintain temperature of mortar between 5 degrees C and 30 degrees C until batch is used or becomes stable.

.2 Maintain ambient temperature between 5 degrees C and 30 degrees C and protect site from wind chill.

.3 Cover mortar less than 7 days old with tarpaulins, when temperature is forecast to fall below 5 degrees C, and insulated tarpaulins when temperature is forecast to fall below 0 degrees C.

.4 Provide heating of masonry work when the average air temperature falls below -4 degrees C.

.5 Maintain mean temperature of masonry above 0 degrees C for a minimum of 28 days, after mortar is installed.

.6 Do not repoint if the temperature is forecast to drop below -4 degrees C in the following 24 hours.

.7 Each unheated section of wall must be preheated in it’s enclosure for a minimum period of 72 hours above 10 degrees C, before any mortar is applied.

.2 Hot weather requirements:

.1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

.2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven

rain, until masonry work is completed and protected by flashings or other permanent construction.

.3 Spray mortar surface at intervals and keep moist for minimum time required for curing as noted in Section 04 03 05.21 – Period Masonry Repointing, after installation.

.4 Provide hot weather protection against direct sunlight and wind, when air temperature exceeds 20 degrees C.

.3 Maintain minimum/maximum thermometers and relative humidity gauges on site and in all enclosures and maintain a daily record of temperature and humidity.

1.9 PERFORMANCE

.1 The following will be considered deficiencies in the work, in addition to any failure to meet other provisions of these specifications:

.1 Mortar shrinkage cracks between units.
.2 Unfilled joints.
.3 Spalling of units or joints.
.4 Poor colour or texture blending of joints or units.
.5 Dusting, efflorescence of joints or units.
.6 Surface discolouration, discolouration, variance of colour or crumbling of mortar.
.7 Failure of anchors of built-in items.
.8 Sloppy fitting, or otherwise poor workmanship in levelling, bedding or jointing of units.
.9 Failure to match adjacent work or failure to match control test area.
.10 Failure to adequately cure the mortar.

Part 2 Products

2.1 MATERIALS

.1 Masonry materials are specified in Related Sections:

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 EXAMINATION

.1 Examine conditions, substrates and work to receive work of this Section.

.2 Examine openings to receive masonry units. Verify opening size, location, and that opening is square and plumb, and ready to receive work of this Section.

.1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.2 Proceed with installation after unacceptable conditions have been remedied and after receipt of written approval from Departmental Representative.

.3 Verification of Conditions

.1 Verify that:

.1 Field conditions are acceptable and are ready to receive work.

.2 Commencing installation means acceptance of existing substrates.

3.3 PREPARATION

.1 Surface Preparation: prepare surface in accordance with manufacturer's written recommendations.

.2 Protect adjacent materials from damage and disfiguration.

.3 Provide temporary bracing of masonry work during and after erection, as required.

.4 Bracing must be approved by Departmental Representative.

.5 Winter Heating

.1 When average daily temperature is forecast to fall below -4 degrees C, provide winter heat and maintain 55% relative humidity level within the scaffold/housing enclosure.

.2 The use of open flame to provide heating is strictly forbidden.

3.4 INSTALLATION

.1 Masonry work in accordance with CAN/CSA A371 except where specified otherwise.

.2 Build masonry plumb, level, and true to line, with vertical joints in alignment, respecting construction tolerances permitted by CAN/CSA A371.

.3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.5 CONSTRUCTION

.1 Jointing:

.1 For joint finishing, see Section 04 03 05.21 – Period Masonry Repointing.

3.6 SITE TOLERANCES

.1 Conform to Clause 6.2 of CAN/CSA A371, unless otherwise noted.

3.7 FIELD QUALITY CONTROL

.1 Site Tests, Inspection:

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

.2 Notify inspection agency minimum of 24 hours in advance of requirement for tests.

.3 Departmental Representative will pay costs for testing.

3.8 CLEANING

.1 Perform cleaning after installation and when mortar has fully cured to remove construction dust and accumulated environmental dirt.

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

3.9 PROTECTION

.1 Protect masonry, metal flashings, finished window frame surfaces and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 05 00 – Common Work Results for Masonry.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

- .1 ASTM A276/A276M-15, Specification for Stainless Steel Bars and Shapes.
- .2 ASTM A666-14, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- .3 ASTM A955/A955M-15, Specification for Deformed and Plain Stainless Steel Bars for Concrete Reinforcement.
- .4 ASTM C39/C39M-10, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- .5 ASTM C109/C109M-11, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.
- .6 ASTM C1242-15, Guide for Design, Selection, and Installation of Dimension Stone Anchors and Attachment System.
- .7 ASTM E96/E96M-14, Standard Test Methods for Water Vapor Transmission of Materials.

.2 Canadian Standards Association (CSA)

- .1 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction.
- .2 CSA A82-10, Fired Masonry Brick Made from Clay or Shale.
- .3 CSA A179-14, Mortar and Grout for Unit Masonry.
- .4 CSA A370-14, Connectors for Masonry.
- .5 CAN/CSA A371-14, Masonry Construction for Buildings.
- .6 CSA S304.1-14, Design of Masonry Structures.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

- .1 Provide manufacturer's printed product literature, specifications and datasheets illustrating specified products to be incorporated into project.
- .2 Provide two copies of Workplace Hazardous Materials Information System (WHMIS) - Material Safety Data Sheets (MSDS) in accordance with Section 01 35 30 - Health and Safety Requirements.
- .3 Submit product data on helical anchors, stainless steel anchors and grouted anchors.

.3 Shop Drawings:

.1 Provide shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.1 Provide drawings stamped and signed by Professional Engineer registered or licensed in the Province of Ontario.

.2 Provide shop drawings detailing anchorage details, lists and placing drawings.

.3 On placing drawings, indicate sizes, spacing, location and quantities of reinforcement and connectors.

.4 Show details of the anchors, specify required hole size to be cored in the stone, and installation procedures. Indicate material specifications for the steel portion of the anchors.

.5 Shop drawings for cementitious injected grout anchors, showing design of anchor system, including design calculations. Include grout volume for each anchor type.

.4 Manufacturer's Instructions:

.1 Provide manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

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

.4 Mock-ups:

.1 Construct mock-ups in accordance with Section 04 05 00 - Common Work Results for Masonry.

1.5 FIELD MEASUREMENTS

.1 Make field measurements necessary to ensure proper fit of members.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle masonry anchorage and reinforcing materials in original packaging until required for installation.

.2 Packaging Waste Management:

.1 Separate and recycle waste materials in accordance with Waste Management plan.

Part 2 Products

2.1 MATERIALS

.1 Connectors: Stainless steel to CSA A370 and CSA S304.1.

.2 Corrosion protection: to CSA S304.1, stainless steel to CSA S304.1 and CSA A370.

.3 Helical Wall Ties: stainless steel helical anchors to Grade 304, sizes as shown on Drawings. Acceptable Manufacturer:

- .1 Helifix
- .2 Blok-Lok Spira-lok
- .3 Thor Helical

.4 Adhesive Anchors: stainless steel threaded rod anchors, Grade 304, with two part hybrid adhesive system, as used for Hilti type adhesive anchors (HY 270). Supply anchors as per Drawings.

.5 Stone Anchorage: type 304 stainless steel conforming to ASTM A666. Supply anchors as per Drawings.

.6 Grout Anchors: Proprietary assembly comprising of steel anchor body and grout retaining device designed for filling with non-shrink grout.

- .1 Anchor Body: Stainless Steel to AISI type S304. Test Criteria ASTM A276.
- .2 Grout: To meet the following performance characteristics:
  - .1 Compressive Strength 17.5 to 22.5 MPa. Test standard ASTM C109 or ASTM C39.
  - .2 Initial Rate of Water Absorption 1 to 3 kg/m^2/min. to CSA A82.2.
  - .3 Water Vapour Transmission Rate: 2 to 4 kg/m^2/hr. to ASTM E96.
  - .4 Freeze Thaw Durability: 40 years to ASTM C666.

2.2 FABRICATION

.1 Fabricate reinforcing in accordance with CSA A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

.2 Fabricate connectors in accordance with CSA A370.

.3 Obtain Departmental Representative's approval for locations of reinforcement splices other than shown on placing drawings.

.4 Ship reinforcement and connectors, clearly identified in accordance with drawings.

.5 Anchor Lengths: Determine anchor lengths on site prior to fabrication. Allow for any and all brick/stone removals required to confirm the required anchor lengths. Allow for any deviations in length due to irregularities discovered that must be compensated for such as anchor stone position, size, thickness.

2.3 SOURCE QUALITY CONTROL

.1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcement steel and connectors, showing physical and chemical analysis, minimum 5 weeks prior to commencing reinforcement work.

.2 Upon request, inform Departmental Representative of proposed source of material to be supplied.

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 PREPARATION

.1 Prior to coring of masonry, reconsolidate all exposed masonry core adjacent to the anchor, as specified.

.2 Prior to installation, determine and document amount of grout necessary for minimum successful installation.

.3 Prior to site measuring of anchors, obtain confirmation of proposed location of each anchor from Departmental Representative. Upon completion of measuring and confirming conditions to achieve successful installation, bring deviations or complications to the Departmental Representative for review.

3.3 INSTALLATION

.1 Supply and install masonry connectors and reinforcement in accordance with ASTM C1242, CSA A370, CAN/CSA A371, CSA A23.1 and CSA S304.1 unless indicated otherwise.

.2 Prior to placing mortar and grout, obtain Departmental Representative's approval of placement of reinforcement and connectors.

.3 Supply and install additional reinforcement to masonry as indicated.

.4 The use of expansion type anchors for temporary or permanent applications in stone masonry is prohibited.

3.4 GROUT ANCHOR INSTALLATION

.1 Install anchors using individuals trained and certified by the approved anchor supplier and in accordance with CAN/CSA A371. Follow procedures specified by anchor supplier.

.2 Core-drill the anchor holes using air-cooled diamond drilling process. Rotary percussive drilling or water cooled drilling is not permitted. Vibration caused by the coring is not

acceptable. Use a stationary drill rig attached to fixed supports to ensure accuracy of the drilling.

.3 Where weak substrates are encountered when drilling, notify the Departmental Representative for direction on how to proceed.

.4 The interior of the core in the stone is to be roughened or riffled. A smooth interface between the grouted sock and the stone will not be accepted.

.5 Use anchor insertion method or core hole protection that will prevent friction or collapsing core wall materials that could result in damage to the anchor and its grouting systems.

.6 During installation of anchors, record the volume of grout installed for each anchor. Identify the installed volume with the number of the anchor. Submit this information to the Departmental representative weekly.

.7 Failure to install the minimum grout volume in the anchor or for visible end of sock to inflate will be reason for anchor installation rejection. When this occurs, notify the Departmental Representative. The anchor and its installation must be replaced at no cost to the Departmental Representative.

.8 Tolerances

- .1 Sock Length: ± 2%
- .2 Anchor Length: ± 2%
- .3 Hole Diameter: ± 2mm
- .4 Coring Alignment:
  - .1 Horizontal Anchors: L/500
  - .2 Vertical Anchors: L/500
- .5 Grout Volume: ± 5%.

3.5 HELICAL WALL TIES

.1 Install helical wall ties as indicated. Installation as per manufacturer's instructions. Repair mortar joint after installation as per specifications.

.2 Pre-drill hole for anchor. Drill bit diameter to be one size smaller than the required anchor diameter.

.3 Install anchors after backpointing has been approved by the Departmental Representative.

.4 Do not mark face of stone with the drill. Damage as a result of careless use of the drill will be repaired at the Contractor's expense.

.5 Ensure the head of the anchor will be completely covered by finishpointing mortar.

.6 Where helical anchors are installed as the outer leaf of the masonry walls is being constructed, drill helical anchors into the backup masonry units and lay in a bed of mortar joint in outer leaf, as reconstruction of the outer leaf proceeds.

3.6 ADHESIVE ANCHORS

.1 Install adhesive anchors as per manufacturer's instructions.

3.7 ANCHORS

.1 Supply and install stainless steel anchors as indicated.

3.8 FIELD BENDING

.1 Do not field bend reinforcement and connectors except where indicated or authorized by Departmental Representative.

.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.

.3 Replace bars and connectors which develop cracks or splits.

3.9 SITE QUALITY CONTROL

.1 For Grout Anchors, notify the Departmental Representative to inspect the completed anchor installation prior to reconstructing the stone masonry.

.2 Departmental Representative to inspect installation when:

.1 Masonry is consolidated prior to drilling hole, to agreed upon hole location.

.2 Holes are drilled and cleaned out.

.3 Anchors installed and inflated.

3.10 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment and barriers.

END OF SECTION

Part 1 General

1.1 SCOPE OF WORK

.1 The work described herein applies to the repair and conservation of the wrought iron gallery railings, the wrought iron hardware on the metal clad shutters at RW1-103 & 104, all door hardware, the wrought iron security bars on the exterior of windows RW2-01 through RW2-06, the iron shutters and associated hardware on the interior face of ground floor windows, as well as the modern code compliant steel railings at the gallery level.

1.2 REFERENCES

.1 Definitions:

.1 Wrought Iron: a two component metal consisting of high purity iron and iron silicate, a particular type of glass-like slag, both in physical association.

.2 Stainless Steel, 300 series.

.3 Low carbon steel, commonly known as mild steel.

.4 Ductile Cast Iron, containing magnesium and copper or tin, for enhanced ductility and corrosion resistance; must not contain recycled cast iron.

.2 References:

.1 Canadian Standards Association (CSA):

.1 CSA W48-14, Filler Metals and Allied Materials for Metal Arc Welding.

.2 CSA W59-13, Welded Steel Construction (Metal Arc Welding).

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination

.1 Coordinate work before and during the project to ensure that required modifications to the iron work are understood, and approved by the Departmental Representative before execution, painting and reinstallation. No cutting shall be done on site.

.2 Any potential or actual conflict between the accurate reinstallation of the restored iron work and the masonry must be brought to the attention of the Departmental Representative within 30 days of the iron work being removed from the masonry.

.3 Coordinate removals and re-assembly with masons so that anchoring and attachment points in the stone can be accurately located and prepared.

.4 Undertake each initial step of iron conservation from tagging, photographing, disassembly, and surface preparation through repair and painting under direct review of Departmental Representative.

.5 Coordinate with masonry conservation especially in regards to the repair of existing mortices into masonry and the creation of new mortices in new or old stonework.

.2 Sequencing.

.1 Sequence with other work in accordance Construction Progress Schedule. Comply with manufacturer's written recommendations for sequencing construction operations.

.3 Scheduling.

.1 Schedule with other work in accordance with Construction Progress Schedule.

1.4 ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS

.1 Provide submittals for review in accordance with Section 01 33 00 – Submittal Procedures.

.2 Shop Drawings.

.1 Clearly indicate materials, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details and accessories.

.3 Paint Samples

.1 Submit triplicate 100 x 200 mm "draw-downs" of each paint formula type and colour specified on applicable materials for Departmental Representative's review, prior to commencement of work.

.2 Colours and finishes to be selected by Departmental Representative. Revise and resubmit as required.

.3 When approved, samples will become the acceptable standard of quality for appropriate on-site surface, with one of each sample retained on site.

.4 Note that all historic iron work including hardware, will be painted black.

.5 Note that the code compliant guard rail will be painted grey to match the limestone.

1.5 CLOSEOUT SUBMITTALS

.1 Provide Record Documentation:

.1 All patterns for the reproduction wrought, cast and steel components.

.2 Photograph record of all components: before, during, and after conservation with identification labels clearly visible.

.3 Project Record Drawings, include location of replacement and interventions indicating their type.

1.6 QUALITY ASSURANCE

.1 Allow Departmental Representative access to the workshop(s) for inspection of current work-in-progress.

.2 Qualifications:

.1 Ironwork Contractor:

.1 Ironwork contractor to have experience in the conservation and replication of historic architectural ironwork on projects of similar size and complexity to Work of this Contract.

.2 Perform work in accordance with established procedures for historic masonry conservation and The Standards and Guidelines for the Conservation of Historic Places in Canada, 2nd Edition, published by Parks Canada.

.3 Contractor to have on staff, metal conservator with demonstrable applicable education/training, in conserving architectural metals as primary occupation, including projects involving wrought iron and cast iron restoration. Conservator to oversee all aspects of the wrought iron restoration.

.4 Contractor to have on staff a blacksmith familiar with all traditional aspects of working wrought iron and steel such as drawing out, upsetting, and forge welding, as well as experience with traditional joinery techniques such as riveting, peened over tenons.

.3 Mock-ups.

.1 Construct mock-ups in accordance with Section 01 33 00 – Submittal Procedures.

.2 Perform mock-ups, including demonstration procedures for each type of repair and each type of newly forged item and newly cast items for review in location designated by Departmental Representative.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements.

.1 Carefully lift each section onto a flatbed truck and lay flat on 38 x 92 mm spacers set at 600 mm on centre.

.2 Do not stack components. At no time, slide or drag sections if metal touches metal.

.3 Secure sections in place by ratchetting with nylon straps where supported by spacers. Do not over tighten.

.2 Storage and Handling Requirements.

.1 Separate dismantled ironwork to approval of Departmental Representative to prevent contact between elements before shipping to shop.

.2 Provide temporary storage for removed elements.

.3 Transport and store ironwork at storage location to approval of Departmental Representative.

.4 Wrap restored ironwork in foam or bubble wrap before it leaves the shop and while it is lifted into place and positioned.

.5 After painting, support railing sections as required to ensure no flexing that may damage paint films.

.3 Packaging Waste Management.

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

.2 Divert unused metal materials from landfill to metal recycling facility.

.3 Divert unused paint material from landfill to official hazardous material collections site.

.4 Do not dispose of unused paint materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.

1.8 TEMPORARY GUARD RAILS

.1 Upon removal of metal guard rails, construct temporary code compliant guard rails out of timber.

.2 Design and construct in such a way that no fasteners contact historic masonry.

.3 Provide shop drawings of proposed temporary guard rails and revise and resubmit to satisfaction of Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Materials to be used in conservation process shall be untainted by previous work.

.2 All wrought iron shall be best quality forged iron, tough, ductile and fibrous in character, and of even texture.

.1 Composite material consisting of iron silicate (slag) strands in a ferrite matrix.

.2 Slag stands must be fine and evenly distributed.

.3 Composition

.1 98% or more iron.

.2 0.02 to 0.03% carbon

.3 0.02% maximum sulphur

.4 0.15% maximum phosphorus.

.4 Field acceptance tests: Hot hammer 25 mm square bar down to 3 mm thick without splitting along slag stringers.

.3 Forge-welding flux: Anhydrous Borax.

.4 Welding rods: to CSA W48.

.1 Wrought iron welding rod for repair of wrought iron.

.5 Air abrasive media: aluminium oxide, 100 grit, glass bead, 60/10 grit.

.6 Penetrating oil.

.7 All machine screws are to be stainless steel, 300 series with slot heads.

.8 White lithium grease.

.9 Methylene-chloride based paint stripper.

.10 Lead wool for packing rail ends into mortices within masonry.

.11 Threaded fasteners and pins: 300 series stainless steel.

.12 Neoprene spacers: Black.

.13 Stainless steel fasteners, 300 series, slot heads.

.14 Rail extensions, stainless steel, 300 series.

.15 Low carbon steel, commonly referend to as mild steel.

.16 Bubble wrap.

.17 Ductile cast iron.

2.2 FABRICATION

.1 Where remedial or replacement sections are to be combined with original components:

- .1 Build work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Fabricate items from metal matching the original component unless otherwise noted or specified.
- .3 Where practical, fit and shop assemble work, ready for erection.
- .4 For forged work utilize traditional blacksmithing methods and techniques to match originals such as drawing out, upsetting, peened over tenons, forge welding, etc.
- .5 Modern gas or electric welding may only be used where indicated on drawings.

.2 Equipment and Facilities:

- .1 Provide indoor facilities off-site (workshops) for all aspects of this work including, but not limited to layout, surface preparation and all blacksmithing work.
- .2 Provide machine shops, paint booths, and all other facilities required to perform the work, off-site.
- .3 Equip the workshop with the following tools and equipment:
  - .1 An electrolytic reduction system for removal of paint and corrosion products:
  - .2 Custom made and sized tanks of sufficient size and number to hold the rail components.
  - .3 The steel tank(s) shall serve as the anode. (+)
  - .4 The objects being treated form the cathode.
  - .5 An electrolyte consisting of a saturated solution of sodium hydroxide (NaOH).

.6 A direct current (DC) power supply of 100 amps at 6 volts.

.4 Screwdrivers accurately sized for fastener.

.1 Provide gunsmith screwdrivers with hollow-ground blades and fixed or interchangeable bits.

.5 Component labels: stainless steel tag with hole at one end, punched with required information and secured with re-bar tie wire.

.6 Cable pulls: nylon, various lengths.

.7 Straps/slings: nylon, nominal 75 mm wide.

.8 Padding: ethafoam sheet, mover's blankets.

.9 Auto carrier: flat aluminium deck, with nylon securing straps.

.10 A coal-fired forge sized to heat sections of wrought iron. Natural Gas forge not acceptable.

.11 Other traditional blacksmithing equipment and tools sufficient to execute traditional blacksmithing operations such as forge welding, drawing out and upsetting.

.12 Ductile cast iron anchors for modern railing to be sized once inside dimension of top rail is confirmed. Intention is that the cast component, with all paint films including inside of the hollow steel rail, fits with 2 mm clearance.

Part 3 Execution

3.1 SAFETY

.1 Follow all regulations and recommendations for handling and disposing of paint containing lead.

.2 Follow all regulations and recommendations for handling lead in its liquid melted and solid states.

3.2 EXAMINATION

.1 Verification of Conditions.

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

.1 Mark any condition problems on the drawing set that are not already noted and report immediately to Departmental Representative.

.2 Obtain Departmental Representative's approval and instructions for repair and replacement of ironwork units before proceeding with repair work.

.3 Assume existing paint contains lead, and follow regulations for lead paint removal and disposal.

.4 Rail ends are set in lead, follow regulations for handling lead.

3.3 PREPARATION

.1 Install labels using rebar wire, two stainless steel labels (one at each end), minimum size of 10mm by 100mm long, stamped with unique identifier number for the part, on each component being disassembled. Do not use aluminium.

.2 Ensure that individual components such as railing sections, door hardware, window bars, etc. are numbered and inventoried to allow re-installation in original location and in original orientation.

.3 Use the same component designation as indicated on drawings with sufficient additional information to ensure configuration and orientation will be understood during reassembly. Refer to drawings for assembly nomenclature. Include label information on drawings. Each tag shall also carry the notation "Property of the Gov't of Canada". Modify labelling system as directed by Departmental Representative.

.4 Record with digital photography and annotated measured drawings how the iron components fit and relate to adjacent historic material prior to disassembly.

.5 Maintain accurate and up to date records, on drawings provided by Departmental Representative, of any unseen conditions or necessary repair work above and beyond that already noted on drawings. Bring these drawings to each site meeting for review and adjust and update as directed by Departmental Representative.

.1 Submit a copy of these drawings to the Departmental Representative at the completion of the Work.

3.4 REMOVAL

.1 Do not begin removals until the as-found photographs have been submitted and approved by the Departmental Representative.

.2 Throughout the process of removing the iron work from masonry/woodwork, exercise extreme care. Only undo existing connections; cutting historic material will not be tolerated.

.3 Exercise extreme caution in chiseling out lead/mortar from mortices in masonry.

.4 Brace, pad and protect components.

.5 Shop Work – Disassembly:

.1 Larger assemblies held with screws or bolts are to be fully disassembled in the shop.

.2 Add additional tags and key to drawings as this work proceeds.

3.5 PAINT AND CORROSION PRODUCT REMOVAL FROM HISTORIC IRON WORK

.1 Remove all paint and corrosion products from all historic ferrous metal work by electrolytic reduction.

.2 Wash loose dirt, paint, etc., from surfaces using a pressure washer and potable water.

.3 If necessary, paint shall be removed with methylene chloride based paint stripper to speed up the process. The softened paint shall be removed with wood or plastic scrapers not metal. Follow manufacturer's printed instructions for process and safety.

.4 Load the iron components in to the tank with small wires to ensure good current supply to each piece of iron and the negative lead. Connect the positive lead to the tank.

.5 Ensure that the iron components are not in direct contact with the tank (anode).

.6 Fill the tank with hydroxide solution until all parts are submerged.

.7 Turn on the power supply and check with a voltage metre that there is a voltage difference between the anode (tank) and the cathode (iron components). If there is no voltage then there is a short to be corrected.

.8 Shut off power and remove parts from the tank and pressure wash. If the surfaces are reduced to a dull grey with some black or brown mottling they are sufficiently clean.

.9 Wash with a pressure washer and water only to remove all salts and dry immediately with compressed air.

.10 Any components still showing corrosion products are to be treated again as described above.

.11 Immediately before painting, give surfaces a dusting with air abrasive to remove any light corrosion that may have occurred in the meantime. The metal should be clean and grey and no corrosion products at all. Do not blast “white” as this is overly aggressive and will result in the loss of surface detail and edge sharpness.

.12 When rust and existing paint has been removed, notify the Departmental Representative to inspect steel and confirm scope of repair/restoration work required. Do not proceed with painting until steel surface is approved in writing by the Departmental Representative.

3.6 PAINT AND CORROSION PRODUCT REMOVAL FROM MODERN MILD STEEL CODE COMPLIANT RAILING

.1 Assume paint shall be removed by caustic chemical stripping based on testing and approved mock ups.

.2 Chemical stripping to be followed by electrolytic reduction as described above.

.3 Assume need to neutralize surfaces based on testing and approved mock up and based on manufacturer’s written instructions.

.4 Wash with a pressure washer and water only and dry immediately with compressed air.

.5 Immediately before painting, give surfaces a dusting with air abrasive to remove any light corrosion that may have occurred in the meantime. The metal should be clean and grey.

.6 When rust and existing paint has been removed, notify the Departmental Representative to inspect steel and confirm scope of repair/restoration work required. Do not proceed with painting until steel surface is approved in writing by the Departmental Representative.

3.7 REPAIR/RESTORATION

.1 New Wrought Ironwork-General:

.1 In working the wrought iron for the reproduction of replacement elements, all welding is to be forge welding done in the fire. The use of gas welding will be limited to repairs where indicated.

.2 Unless indicated otherwise, all wrought iron work in shall use the tradition techniques of drawing out, upsetting, forge welding, tenoning, etc.

.3 The Departmental Representative will reject the black-smithing work if a high level quality work cannot be demonstrated.

.4 The quality of work will be judged by the finish texture of the work, which is the absence of hammer marks, the structural integrity of structural connections such as forge welds, peened over tenons, etc., as well as the physical match of the new work compared to the old.

.2 Weld Repair:

.1 Oxy-acetylene gas welding shall be used for the repair of wrought iron components in particular where it is necessary to extend the length of baulsters.

.2 Pre-heat surrounding material.

.3 Full depth welding only.

.4 Do deep welds in lifts.

.5 Weld from both sides wherever geometrically possible.

.6 Use wrought iron filler rod only, not nickel.

.7 For thick or high impurity parent material do weld in multiple lifts. Keep weld liquid until impurities have risen to the surface. Allow metal to freeze and brush off impurities before making another lift of weld material or grinding smooth (final pass).

.8 File smooth.

.3 Repair Type ‘A’

.1 Remove sloppy modern weld repairs, assume all four faces of components wherever components intersect, fill wasted areas with weld and grind smooth.

.2 This type of repair is typically required where feet are attached to balusters, where feet are attached to bottom rails, where balusters have been repaired at bottom, and where balusters and diagonal balusters meet top and bottom rails.

.3 Assume 30 locations on average, per railing section.

.4 Repair Type ‘B’

.1 Where components have been wasted by corrosion puddle in wrought iron to rebuild profiles and file and grind smooth, assume all four sides.

.2 Assume two locations on average, per railing section each averaging 150 mm square.

.5 Repair Type ‘C’

.1 This requires cutting back to sound material, adding new stainless steel extensions of correct matching size and profile by welding, and grinding and filing smooth.

.2 This repair is required at each rail end – assume 4 locations on average per section.

.6 Repair Type ‘D’

.1 This requires the straightening of rails or balusters.

.2 This is limited to straightening components that have been deformed and is to be done cold.

.3 Assume two components on average, per railing section.

.7 Repair Type ‘E’

.1 This requires the filling of miscellaneous redundant holes.

.2 Puddle in wrought iron weld material and grind and file smooth.

.3 Assume on average, two locations per railing section.

.8 Repair Type ‘F’

.1 This repair requires the removal of existing non-original feet with associated modern weld and the replacement with new.

.2 Assume the need to fill and recreate the counter sink for the bolt in the rail.

.3 Drill and tap for new bolts.

.4 Assume 4 on average, per section.

.9 Repair Type ‘G’

.1 This repair is required at the bottom of each baluster.

.2 Baulsters are to be removed to facilitate work by removing all modern weld and by the removal of the bolt through the top rail.

.3 Cut baluster back to sound material and weld on correct length.

.4 Assume need to fill bolt hole at top and to drill and tap for new stainless steel bolt.

.5 At bottom, add new foot and attach by drilling and tapping for new stainless steel bolt.

.6 Assume 7 locations on average, per section.

.10 Repair Type ‘H’

.1 This repair requires the removal of existing modern mid-span braces and all associated weld and the installation of new utilizing traditional peened tenons and rivet as shown.

.2 Assume one per railing section.

.11 Repair Type ‘I’

.1 This repair is for the diagonal balusters and requires the replacement of the mid span rivet, assume 4 locations per railing section.

.2 This repair is also for the diagonal braces and is for the building up of peened over tenons at each end where they are structurally compromised.

.3 Assume the need to remove modern weld.

.4 Assume 8 per railing section.

.12 Painting

.1 Coordination with painting is a critical aspect of the reassembly process.

.2 Once all components have been restored, reproduced or modified, all surfaces are to be lightly cleaned with air abrasive immediately prior to the application of primer.

.3 Prior to reinstallation, apply the zinc rich primer, two epoxy base coats and two polyurethane top coats to all surfaces of all components except for threaded holes.

.4 All painting to be applied in accordance with manufacturer's printed instructions free of sags, runs, drips or other imperfections.

.5 Apply both coats of polyurethane top coat by brush after iron is reinstalled, to give the appearance of a traditional hand applied finish.

.6 When components are connected with fasteners such as stainless steel bolts, apply zinc rich primer and two epoxy base coats to mating surfaces prior to assembly, then the final two polyurethane top coats after assembly.

.7 Note that zinc rich primer is not required for components installed at building interior.

3.8 REINSTALLATION

.1 Reinstallation of the iron rail shall be closely coordinated with the masonry restoration work.

.2 Brace railings when handling after painting, to avoid flexing.

.3 Wherever it is necessary to modify the iron components by machining, cutting or grinding, the iron work shall be returned to the shop to have all paint films restored.

.4 Reinstall the restored iron work as indicated in drawings.

.5 Take care not the damage the paint film on the iron work.

.6 Touch up paint as required or as directed by Departmental Representative.

3.9 LEAD SETTING

.1 Rail ends and stainless steel rail extensions are to be set into mortices within the masonry and packed with lead wool.

.2 Level and plumb the railing sections temporarily with clamps, wedges and/or wood supports.

.3 Pack the mortice full so that the lead is flush with the face of the masonry unit.

.4 Touch up paint where required and/or as directed by the Departmental Representative.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM C920-14a, Standard Specification for Elastomeric Joint Sealants.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Manufacturer's product data to describe.

.1 Caulking compound.

.2 Primers.

.3 Sealing compound, each type, including compatibility when dissimilar sealants are in contact with each other.

.3 Samples

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

.2 Cured samples of sealants for each color where required to match adjacent material. Colour of sealant to be approved by Departmental Representative.

.4 Submit manufacturer's instructions to include installation instructions for each product used.

1.3 QUALITY ASSURANCE/MOCK-UP

.1 Construct mock-up to show location, substrate preparation, size, shape and depth of joints complete with back-up material, primer, caulking and sealant.

.2 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.3 Locate where directed.

.4 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with sealant work.

.5 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work.

.6 Qualifications of Applicator

.1 All sealant applicators must have proven experience in the application of sealants. Experience can be substantiated in the form of naming a minimum of three projects, with supporting references, on which the applicator has applied the sealant.

.2 Approved sealant applicator must be the individual who prepares the mock-up. The Departmental Representative has the right to reject any applicator who does not demonstrate the ability to apply the sealant in conformance with this specification.

.3 Indication of lack of skill or defective work to be sufficient grounds for the Departmental Representative to reject the installed caulking and to require its immediate removal and complete recaulking at no additional cost to the Owner during the warranty period.

1.4 DELIVERY, STORAGE, AND HANDLING

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

1.5 WASTE MANAGEMENT AND DISPOSAL

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

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

.3 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.4 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.

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

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

.7 Fold up metal banding, flatten, and place in designated area 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 5 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 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. Ensure sealant and substrate materials are within the temperature range of 5 degrees C to 27 degrees C (-29 degrees C for silicones) for 24 hours before and during application, until sealant has cured.

.3 Where necessary to apply sealants below temperatures of 5°C, follow manufacturer’s recommendations.

1.8 PROTECTION

.1 Make good damage caused by inadequate or improper protection at no extra cost to the Owner.

.2 Protect masonry and other work from marking and other damage. Protect completed work. Use non-staining coverings.

.3 Prevent damage to building, fencing, trees and other landscaping features. Make good damage.

.4 Provide complete protection for partially completed work until all repairs are completed. The Contractor is responsible for making good damage caused by the failure to provide adequate protection, at no extra charge to the Owner.

.5 Provide protection against the spread of dust, debris and water at or beyond the work area.

.6 Ensure that all workers wear adequate, approved protective equipment during the work.

1.9 WARRANTY

.1 Warrant that caulking work will not leak, crack, crumble, melt, shrink, bubble, run, lose adhesion or stain adjacent surfaces.

Part 2 Products

2.1 SEALANT MATERIALS

.1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.

.2 When low toxicity caulks are not possible, confine usage to areas which offgas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize offgas time.

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

.4 Sealants acceptable for use on this project must be listed on ASTM.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Single-component Polyurethane

.1 High performance, medium-modulus, low-VOC, UV stable, non-sag polyurethane sealant, class 50, to ASTM C920. Colour to be selected by Departmental Representative.

.2 Preformed Compressible and Non-Compressible back-up materials, flexible.

.1 Polyethylene, Urethane, Neoprene or Vinyl Foam.

.1 Extruded open cell foam backer rod.

.2 Size: oversize 25 %.

.2 Neoprene or Butyl Rubber.

.1 Round solid rod, Shore A hardness 70.

.3 High Density Foam.

.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m^3 density, or neoprene foam backer, size as recommended by manufacturer.

.4 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.

2.4 AIR

.1 Pressurized air: Clean and free from oil or other contaminants.

.1 On-line filter with a manual drain and pressure control gauge at the working face must be fitted to all air lines.

2.5 COMPATIBILITY

.1 Ensure that all materials used are compatible.

2.6 DESIGN OF JOINTS

.1 Use smallest possible depth to width ratio. For the preferred joint width of 12mm, width to depth ratio of caulking should be 2:1.

.2 Minimum depth of joint should not be less than 6mm, maximum joint width should not exceed 50mm.

.3 Maximum depth of caulking should not exceed 13 mm.

.4 Use bond breaker or backer rod below the sealant.

Part 3 Execution

3.1 GENERAL

.1 The work of this Section may be performed only in areas where masonry repairs and repointing, wood repairs and painting are complete and approved by the Departmental Representative.

.2 For exterior sealants, arrange for a technical representative of the manufacturer to conduct adhesion tests for each joint condition and to make recommendations with respect to the sealant type, primers (if required) and joint preparation. Do not deviate from the manufacturer's recommendations without prior written approval.

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

.4 The joint must be routed out, no saw cutting is permitted.

.5 Reinstate construction and control joints in the same locations as they were positioned, prior to the repair, unless otherwise directed.

.6 Give at least 2 days of notice to the Departmental Representative, before starting the work.

.7 Do not proceed with the work until unsatisfactory conditions have been corrected to the satisfaction of the installer.

.8 Commencement of the work of this Section will be construed as acceptance of the site conditions and, thereafter, the Contractor shall be fully responsible for satisfactory work as specified herein.

3.2 PROTECTION

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

3.3 SURFACE PREPARATION

.1 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work, by wire brushing, grinding or sanding. Use a dry clean air stream if necessary to clean the joint of all particle matter.

.2 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.

.3 Wipe metal surfaces to be caulked with cellulose sponges or clean rags soaked with cleaning material and wipe dry with a clean cloth. Clean pre-coated metals with solutions or compounds which will not injure finish and which are compatible with primer and sealant.

.4 Ensure joint surfaces are dry and frost free.

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

.6 Commence caulking or sealing work only after joint surfaces have been inspected and approved by the Departmental Representative.

3.4 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.

3.5 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.

3.6 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.7 APPLICATION

.1 Sealant.

.1 Apply sealant in accordance with manufacturer's written instructions.
.2 Mask edges of stone and wood and joints 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. Superficial pointing with skin bead is not acceptable.
.7 Neatly dust the sealant with aggregate. Aggregate to match that being used in mortar.
.8 Tool exposed surfaces before skinning begins to give slightly concave shape.
.9 Remove excess compound promptly as work progresses and upon completion.
.10 Cut out damaged caulking unacceptable to the Departmental Representative, re-prepare and prime joints and install new material as directed.

.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 Where sealants remain tacky after curing, protect by applying painters tape where work is occurring adjacent to the new sealant. Debris adhering to the sealant will be cause for rejection of the sealant.

.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.

3.8 MANUFACTURER'S WARRANTY INSPECTION

.1 Upon completion, arrange for inspection of exterior sealant work by a technical representative of the sealant manufacturer.

.2 Correct any deficiencies.

.3 Arrange for the issuance of the manufacturer's 24-month materials warranty for exterior sealants.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 08 03 52.71 – Historic - Wood Window Rehabilitation.

.2 Section 08 03 80 – Historic - Glazing.

.3 Section 09 91 00 – Painting Woodwork.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA O141-05 (2014), Softwood Lumber.

.2 National Lumber Grading Authority (NLGA)

.1 NLGA Standard Grading Rules for Canadian Lumber 2014.

1.3 ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings.

.1 Submit drawings.

.2 Indicate materials and details, including assemblies, in large-scale for each replicated sash type, full-size profiles of components, elevations of unit, description of related components, exposed finishes and fasteners.

.3 Prior to preparation of shop drawings, take field measurements as material is removed to confirm dimensions and details.

.4 Site measure and adjust for each opening.

1.4 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data:

.1 Submit operation and maintenance data for windows for incorporation into manual.

1.5 QUALITY ASSURANCE

.1 Arrange for Departmental Representative to inspect period wood window fabrication shop during the Work.

.2 Qualifications:

.1 Contractor to have experience in the conservation and replication of historic wood windows and doors on projects of similar size and complexity to Work on this Contract.

.2 Carry out new wood work and repair work of this section using skilled tradespersons trained and experienced in rehabilitation and fabrication of traditional wood windows.

.3 Contractor's Field Supervision and Crew Qualifications: maintain full-time supervisor/foreperson on job site during times work is in progress. Supervisor must have door/window rehabilitation training and experience in wood repairs similar in nature and scope to specified work.

.4 Shop crew makeup: trade qualified journeyperson carpenters and registered apprentices in the ratio of no more than one to one (at least one journeyperson to one apprentice).

.5 Only workers accepted by Departmental Representative during mock-ups will be authorized to perform Work of this section.

.3 Mock-ups:

.1 Construct mock-up in accordance with Section 01 33 00 - Submittal Procedures.

.2 Construct a full-size mock-up to demonstrate each step outlined below under direct review of Departmental Representative. Adjust techniques as directed.

.1 Upper and lower sash

.2 One window frame for upper and lower sash

.3 One installed window frame

.4 One installed window frame with exterior sealant and interior trim installed

.5 One loop hole cover frame

.6 One loop hole cover frame installed

.7 Loop hole sashes installed with hardware.

.3 Notify Departmental Representative 5 days in advance of mock-up preparation. When accepted, mock-up demonstrates minimum standard for this work.

.4 Mock-up may remain as part of finished work.

1.6 DELIVERY,STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements.

.1 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 indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect windows from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management.

.1 Remove for reuse and return of pallets, crates, padding, and packaging materials in accordance with Waste Management Plan.

1.7 WARRANTY

.1 The warranty period to be as follows:

.1 New wood sashes and related accessories: 2 years.

.1 Workmanship, including warping, fit and operation: 2 years.

Part 2 Products

2.1 MATERIALS

.1 Softwood lumber: to CSA O141 and National Lumber Grades Authority (NLGA) requirements, with maximum moisture content of 10%, Grade ‘C’ Select, quarter cut with edge grain to the weather, species shall be Douglas Fir.

.2 For new interior stops, interior trim and jambs extension: Eastern White pine, maximum moisture content 10%, Grade ‘C’ select.

.3 Hardwood lumber: to National Hardwood Lumber Association (NHLA) requirements, moisture content of maximum 10%, clear, species shall be white oak.

.4 Glazing: in accordance with Section 08 03 80 – Historic - Glazing.

.5 Hardware: in accordance with Section 08 03 52.71 – Historic - Wood Window Rehabilitation.

.1 For each transom sash: replace existing hinges with 2 new cast iron hinges with stainless slot screws. Replace existing fall chain with new chain in solid brass with stainless slot screws. Match sample provided by Departmental Representative. At ground floor, reinstall one cast iron button with new stainless slot screw. At gallery level, reinstall two wood turn buttons (assume 50% replacement) with new stainless round head slot screws.

.2 For each pair of single hung sash: two new meeting rail locking pins to match sample provided and two new cast iron hinges, 38mm long with four new stainless steel flat head slot screws.

.3 For each loop hole cover: two cast iron hinges, one pull with bolt and one cast iron turn button.

.6 Sealants: “Perma-chink”, colour selected by Departmental Representative.

.7 Finishes: in accordance with Section 09 91 00 – Painting Woodwork.

2.2 FABRICATION

.1 All components to be one piece, full length without joints, and no laminations other than those shown in drawings.

.2 Date stamp new component on a hidden edge with year of fabrication; letters 10 mm high, 3 mm deep.

.3 Reproduce the sashes and frames, including transom sash and loop hole cover sash and frames indicated in drawings and on Work Sheets:

.1 Material: all sash components to be Douglas Fir, quarter sawn, with edge grain to the weather. Moisture content of components not to exceed 10 percent. Pegs to be oak 10mm 'square' but slightly diamond shaped in cross section.

.4 Construction:

.1 Mortise and Tenon:

.1 Top rail and stile single through mortise and tenon wedged draw-bore pegged.

.2 Meeting rail and stile single through dovetailed mortise and tenon draw-bore pegged.

.3 Bottom rail and stile through single mortise and tenon wedged draw-bore pegged.

.4 Vertical muntin bars to be continuous and wedged, pegged and drawbored. Other muntins to have stub tenons.

.5 Corners of frames to match original assumed to be notched housing.

.5 Dry fit and assemble window components before completing fabrication.

.6 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1000 mm or less and plus or minus 3 mm for units with a diagonal measurement over 1000 mm.

.7 Once sash tiles and rails and frame jambs, sills and head are ready for assembly, prime, apply oil, pine tar and paint in accordance with Section 09 91 00 – Painting Woodwork.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions.

.1 Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation.

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

.4 Install unit true and square. Use custom made red cedar shims to position frame in masonry opening. Place shims at corners only, two opposing shims at each location and set securely.

.5 Complete final painting inside and out, after installation.

.6 Insure smooth operation.

.7 Complete perimeter sealant after final painting.

3.2 CLEANING

.1 Progress Cleaning:

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Waste Management Plan.

3.3 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by window installation

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Related Requirements

.1 Section 05 70 10 – Decorative Metal Restoration.
.2 Section 08 03 40 – Historic - Wood Repairs.
.3 Section 08 03 52.71 – Historic –Wood Window Rehabilitation.
.4 Section 09 91 00 – Painting Woodwork.

1.2 REFERENCES

.1 References:

.1 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
.1 Architectural Woodwork Standards Manual (Edition 2) 2014.
.2 Canadian Standards Association (CSA International)
.1 CSA O141-05 (2014), Softwood Lumber.
.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).
.4 National Lumber Grading Authority (NLGA)
.1 NLGA Standard Grading Rules for Canadian Lumber 2014.

1.3 ADMINISTRATIVE REQUIREMENTS:

.1 Sequencing

.1 Rehabilitate/replace wood doorways in accordance with Work of this Section, Work Sheets and Drawings.
.1 Photograph doorways, inside and out, with schedule number clearly visible, prior to removal.
.2 Carefully remove associated trim, hardware, doors, transom sash and door frames. Carefully protect and transport to shop for repair.
.3 Replace doors or other components as directed in Work Sheets.
.4 Restore all in accordance with Work Sheets and Specifications.
.5 Paint wood doors and frames in accordance with Section 09 91 00 – Painting Woodwork.
.6 Restore and paint hardware in accordance with Work Sheets and Section 05 70 10 - Decorative Metal Restoration.
.7 Install restored and new hardware.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings

.1 Submit drawings.

.2 Indicate materials and details in large scale for head, jamb and sill, profiles of components, interior and exterior trim, anchorage details, description of related components and exposed finishes, limit of different finishes, fasteners, and caulking.

.3 Prior to preparation of shop drawings, take field measurements as material is removed to confirm dimensions and details.

.3 Samples

.1 Submit for review and acceptance of each unit.

.2 Samples will not be returned for inclusion into work with the exception of full size samples of replicated frames and doors.

.3 Submit one complete full size sample of each replicated frame and door type.

.4 Submit 250 mm long samples of moulding profiles; assume custom profiles requiring the fabrication of custom cutters.

.5 Submit samples of each type of hardware.

.4 Database

.1 Prepare database table to record interventions for each door unit in a similar manner as required in Section 08 03 52.71 – Historic - Wood Window Rehabilitation.

.5 Photographic Documentation

.1 Submit photographs of existing conditions, prior to commencing work, in accordance with Section 08 03 40 – Historic – Wood Repairs.

1.5 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data

.1 Submit operation and maintenance data for doors for incorporation into manual.

.2 Record Documentation.

.1 Submit assembled documentation in the form of a Conservation Report to document every step of the restoration process from examination of existing conditions to reinstallation.

.2 Submit Database to locate interventions by type for each door unit.

1.6 MANDATORY REQUIREMENTS

.1 Contractor to have experience in the conservation and replication of historic wood windows and doors on projects of similar size and complexity to Work of this Contract.

.2 Carry out wood repairs work of this Section using skilled tradespersons trained and experienced in rehabilitation and installation of wood repairs.

.1 Competent Worker: equipped with tools and equipment necessary to carry out work in a traditional manner.

.2 Contractor’s Field Supervision and Crew Qualifications: maintain full-time supervisor/foreperson on job site during times work is in progress. Supervisor must have door/window rehabilitation training and experience in wood repairs similar in nature and scope to specified work.

.3 Shop Crew Makeup: trade qualified journeyperson carpenters and registered apprentices in the ratio of no more than one to one (at least one journeyperson to one apprentice).

.4 Only workers accepted by Departmental Representative during mock-ups will be authorized to perform Work of this Section.

1.7 QUALITY ASSURANCE

.1 Mock-ups

.1 Construct mock-up in accordance with Section 01 33 00 – Submittal Procedures.

.2 Construct a full-size mock-up to demonstrate each step outlined below under direct review of Departmental Representative. Adjust techniques as directed.

.1 Removal of door and transom sash.

.2 Restoration of one frame.

.3 Restoration of one door.

.4 Fabrication of one new door.

.5 Installation of one frame.

.6 Installation of door, transom sash and restored hardware.

.3 Notify Departmental Representative 5 working days in advance of mock-up preparation.

.4 When accepted, mock-up demonstrates minimum standard for this work.

.5 Mock-up may remain as part of finished work.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements.

.1 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 indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect doors from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management.

.1 Remove for reuse and return of pallets, crates, padding, and packaging materials in accordance with Waste Management plan.

1.9 WARRANTY

.1 Extended Period.

.1 For new doors and frames, two (2) years for the new wood doors and related accessories, and same for workmanship including warping, fit and operation.

Part 2 Products

2.1 MATERIALS

.1 Softwood lumber: to CSA O141 and National Lumber Grades Authority (NLGA) requirements, with maximum moisture content of 10%, grade 'C' Select, all quarter cut with edge grain to the weather, Douglas Fir.

.2 Hardwood lumber: to National Hardwood Lumber Association (NHLA) requirements, ¼ cut clear white oak, moisture content of maximum 10%.

.3 For dutchman repairs and replacement of individual components, wood for splicing and replications in accordance with Section 08 03 40 – Historic - Wood Repair.

.4 Hardware:

.1 For transom sash see Section 08 03 52.71 Historic – Wood Window Rehabilitation.

.2 For doors reclaim and reinstall iron rim lock, HL hinges, Suffolk latch and associated components restored and painted as per Section 05 70 10 - Decorative Metal Restoration. Paint prior to installation and install after final painting of wood work.

.3 One 150 mm wrought steel hook & eye, such as that by "Old Quebec Hardware", eye fastened to door hook set into adjacent masonry mortar joint, as a hold open. Provide samples for review. Set and lead anchor in predrilled hole in mortar joint.

.4 One 150 mm forged steel window bolt, such as that by "Old Quebec Hardware". Provide sample for review.

.5 Fasteners: in accordance with Section 08 03 52.71 – Historic - Wood Window Rehabilitation.

.6 For locations where new forged HL hinges are required, see Work Sheet.

2.2 NEW DOOR FABRICATION

.1 Stiles, rails and panels to be one piece solid stock.

.2 Where face width of panels exceeds 200 mm they must be made up in two pieces with a glued tongue & groove joint on centre as shown in drawings.

.3 All components to be run in solid stock and not simulated with an applied moulding.

.4 Doors to be made from Douglas fir, quarter sawn, with edge grain to the weather. Moisture content of components not to exceed 10 percent at time of fabrication.

.5 Pegs and wedges to be oak, pegs about 12 mm square, but slightly diamond shaped in section.

.6 Stamp year of fabrication in top edge of door in letters 10 mm high and 3 mm deep.

.7 New door frames to be quarter cut white oak in laminations as shown on drawings.

.8 Construction of New Doors and Frames

.1 Typically through mortice and tenons, wedged and pegged slightly draw bored.

.2 Leave panels free to float.

.3 Dry fit and assemble door components before completing fabrication.

.4 Once stiles and rails are ready for assembly, prime and paint end grain and before assembly in accordance with Section 09 91 00 – Painting Woodwork.

.5 Note that door sizes vary in height, width and thickness therefore site measure for each opening.

.6 Assume custom sizes for doors. No more than 6 mm may be trimmed from door stiles or rails, otherwise all adjustments are to be made by varying the panel size.

.7 If necessary to trim stiles or rails, trim equal amounts from sides, or top and bottom.

2.3 FINISHES

.1 Proceed in accordance with Section 09 91 00 – Painting Woodwork.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions.

.1 Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation.

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 PREPARATION

.1 Demolition/Removal

.1 Except where noted, carefully disassemble and remove all doors and frames, transom sash and associated trim, to facilitate work. Photograph in-situ, inside and out, with schedule number clearly visible, prior to removal.

.2 Salvage components for reuse in accordance with Contract Documents. Protect and transport to an off-site facility for shop work.

.3 Label salvaged components with gasket paper, mark with a waterproof marker and securely attach to the component on a hidden surface. For smaller components such as hardware, place in a sealable plastic bag with label visible within the bag. Mark “Property of the Government of Canada” on hidden surface of salvaged components removed from site.

.4 Carefully remove perimeter caulking/mortar.

.5 Carefully disassemble units to facilitate repair work.

.6 Carefully remove all trim to facilitate door frame removal.

.7 Where components are let into a mortise, such as the leaves of butt hinges, neatly cut adjacent paint using a sharp chisel or knife to avoid tear out.

.8 Unfasten stops and hardware and clean fasteners in sequence with hardware restoration.

.9 Clean the screw heads for removal. Apply penetrating oil 24 hours in advance of removal. Use screwdrivers that fit the heads.

.10 To remove nails from components, cut or pull nail through the back of the component. Do not drive nail through face of component.

.11 Remove existing obsolete equipment and place in storage as directed by Departmental Representative.

.2 Once frames are removed, fit interior face with temporary frame and door in accordance with approved shop drawing. Revise and resubmit as required. Fit door frame with gasket so that assembly is dust proof.

3.3 RESTORATION

.1 Restore salvaged doors in accordance to Section 08 03 52.71 - Historic – Wood Window Rehabilitation, Section 08 03 40 – Historic - Wood Repairs and as directed in Work Sheets.

3.4 REPLACEMENT

.1 Replace doorway components as indicated in Drawings, Specification and on Work Sheets.

3.5 INSTALLATION

.1 Brace shop fabricated door components to maintain squareness and rigidity during shipment and installation.

.2 Install stainless steel expansion bolt wedge anchors at door jambs, 2 per jamb at gallery level, centred on hinges and 4 per jamb at ground level. Counter sink into wood and ensure minimum of 50 mm purchase into masonry, 10 mm diameter.

.3 Provide solid wedge to secure door frame squarely at corner of frame and at each bolt.

.4 Install hardware in original locations.

.5 Adjust hardware for correct function.

3.6 ADJUSTING

.1 Re-adjust doors and hardware just prior to completion of construction to function freely and properly.

3.7 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent material caused by door installation.

.3 Protect floors and other surfaces for duration of project, using plywood and tarpaulins as necessary. Adjust as directed by Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 09 91 00 – Painting Woodwork.

1.2 REFERENCES

.1 Architectural Woodwork Manufacturers Association of Canada (AWMAC)

.1 Architectural Woodwork Standards Manual – (Edition 2) 2014.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.3 Canadian Standards Association (CSA International)

.1 CSA O141-05 (2014), Softwood Lumber.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS)

.5 National Lumber Grading Authority (NLGA)

.1 NLGA Standard Grading Rules for Canadian Lumber 2014

1.3 ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data.

.1 Submit manufacturer's instructions, printed product literature and data sheets for epoxy consolidant and patching compound, adhesives and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples

.1 Submit one (1) 300 x 100 x 50 mm minimum size wood sample, representing each wood repair type for review by Departmental Representative. Samples to be completed within six weeks of award of Contract and to remain in the site office for the duration of the project.

1.4 CLOSEOUT SUBMITTALS

.1 Record Documentation.

.1 Submit assembled documentation in the form of a Conservation Report to document every step of the restoration process from examination of existing conditions to reinstallation.

1.5 QUALITY ASSURANCE

.1 Mandatory Requirements

.1 Contractor to have experience in the conservation and replication of historic wood windows and doors on projects of similar size and complexity to Work of this Contract.

.2 Carry out wood repairs work of this section using skilled tradespersons trained and experienced in conservation of historic architectural woodwork.

.1 Contractor's Field Supervision and Crew Qualifications: maintain full-time supervisor/foreperson on job site during times work is in progress. Supervisor must have door/window rehabilitation training and experience in wood repairs similar in nature and scope to specified work.

.2 Shop Crew Makeup: trade qualified journeyperson carpenters and registered apprentices in the ratio of no more than one to one (at least one journeyperson to one apprentice).

.3 Only workers accepted by the Departmental Representative during mock-ups will be authorized to perform Work of this Section.

.2 Mock-ups

.1 Construct mock-up in accordance with Section 01 33 00 – Submittal Procedures.

.2 Construct a full-size mock-up to demonstrate each step outlined below under direct review of Departmental Representative. Adjust techniques as directed.

.1 Epoxy consolidation and patching of jambs and lower sash.

.2 Dutchman repair of a sill, a jamb, a muntin bar and a bottom rail.

.3 Replacement of an individual muntin bar, sash stile or rail.

.3 Notify Departmental Representative 5 working days in advance of mock-up preparation.

.4 When accepted, mock-up demonstrates minimum standard for this work.

.5 Mock-up may remain as part of finished work.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements.

.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements.

.1 Storage area designated by Departmental Representative.

.2 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

1.7 AMBIENT CONDITIONS

.1 Adhesive repair and epoxy consolidation and patching:

.1 Maintain temperature of elements to be repaired at between 21 degrees C and 24 degrees C throughout its thickness and for 48 hours after repairing.

.1 Wood within 75 mm of the repair is to be within the temperature range at the time of application. Shade the mixing and application area from direct sunlight.

.2 Provide temporary closure and equipment necessary to maintain temperatures specified.

.3 Undertake work under conditions of relative humidity at same level as operational requirements of end product.

Part 2 Products

2.1 MATERIALS

.1 Dimension lumber: to CSA O141 and National Lumber Grades Authority (NLGA) requirements.

.1 Typical Dutchman repair:

.1 Use Eastern white pine; quarter cut with edge grain to weather.

.2 Grade: “C” select.

.3 Moisture content: maximum 10%.

.2 Replacement of individual component, such as casings or stiles and rails:

.1 Use Douglas fir; quarter cut with edge grain to the weather.

.2 Grade: “C” select.

.3 Moisture content: maximum 10%.

.2 Hardwood lumber: to National Hardwood Lumber Association (NHLA) requirements.

.1 Dowels:

.1 Dowels to be white oak.

.2 Size: 9.5 mm diameter, length as designed.

.3 Moisture content: maximum 10%.

.2 Pegs:

.1 Pegs to be white oak.

.2 Size about 9.5 mm for sashes and 12 mm for doors, but roughly diamond shaped in section, length as required.

.3 Moisture content: maximum 10 %.

.3 Dutchman Repair to Door Frame Sills, Jambs, Head and Transom Bar:

.1 Quarter cut white oak, clear, maximum 10% moisture content.

.3 Fastener: nails, wood screws, wood pegs, wood pins, wood glues; brass or stainless steel 300 series; size to suit application. Exposed screws to be slot heads. Assume all nails are counter sunk and filled with putty after first coat of oil and paint.

.4 Adhesives:

.1 Adhesive shall be a two part epoxy formulated specifically for exterior architectural wood work repairs, with a proven track record of minimum 20 years.

.2 Adhesive shall have superior adhesive and cohesive strength.

.5 Epoxy Repair System:

.1 The epoxy system, namely both the consolidant and the patching compound, shall be by the same manufacturer and shall be a system formulated specifically for exterior architectural wood work repairs, with a proven track record of a minimum of 30 years and compatible with a linseed oil based paint system.

.2 Consolidant shall consist of a two parts and patching compound shall consist of a four parts, mixed immediately before use.

.3 Flexibility of the cured patching compound is important for compatibility with woodwork. It shall be possible to take a cured sample of both the consolidant and patching compound, 100 mm in diameter, by 4-5 mm. thick, and to bend them double and for them to return to their former shape without breaking.

.4 Fumed silica: fumed silica or equal may be used to thicken the patch to enhance tooling and application.

2.2 TOOLS

.1 Masking material: polyethylene to CAN/CGSB 51.34, minimum 0.15 mm thick (6 mils).

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable.

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

.2 Stop work and report immediately to Departmental Representative conditions relevant to this contract not described in drawings: evidence of deficiencies, fungal or insect attack which may affect the scope of work and durability of the finished product.

3.2 PREPARATION

.1 Protection of in-place conditions:

.1 Protect repair area and existing finishes and materials adjacent to repair area from damage during the Work by covering or masking.

.2 Surface Preparation:

.1 Remove paint in accordance with Section 09 91 00 – Painting Woodwork.

.3 Verify proposed repair type and area with Departmental Representative prior to starting work.

.4 Assume all windows and doors, including frames, are to be removed to facilitate work.

3.3 APPLICATION OF CONSOLIDANT

.1 Remove dirt, loose friable material, and soft wood decay (deterioration from fungal attack) to sound wood prior to application. Remove loose fragments and blow out dust.

.2 Riddle large or deep checks and/or cavities with 3 mm diameter holes at 13 mm spacing prior to applying consolidant.

.3 Obtain approval from Departmental Representative of preparation work prior to proceeding with installation.

.4 Protect the prepared area; wood to be treated with epoxy must be dry and have moisture content of less than 18%.

.5 Apply mixture by pouring and brushing onto the wood surface until prepared area is fully saturated. The applicator bottle can be used to inject into drilled holes or larger openings in the wood. Consolidant will readily follow grain of wood. For vertical surfaces drill small holes in wood on angle to hold consolidant. Apply wood consolidant while absorption continues.

.6 Apply liberally to prepared area but not beyond. Do not allow consolidant to touch adjacent areas, materials or building components. Repeat application 4 to 6 times over an 8 hour period or until surfaces do not accept more consolidant. Allow approximately 1 hour between applications.

.7 Protect until epoxy has cured. Keep treated area out of direct sunlight and at temperatures above 15 degrees C until cured. Shade treated area for minimum of 8 hours following application.

3.4 APPLICATION OF PATCH

.1 Apply epoxy patching compound with a putty knife, trowel or similar tool.

.2 Apply patch only to prepared cavities or checks previously encapsulated with epoxy consolidant. Do not apply in thicknesses greater than 38 mm or in any one area exceeding one quart at one time. Allow epoxy to set before applying additional layers.

.3 In certain situations, such as with window sills where the outside corner has been abraded away, the patch material shall be mixed at a low viscosity and cast to form the desired shape. Use clear packing tape as a release on the form.

.4 Plane, tool and sand surfaces smooth and remove all excess on the surface so that the epoxy is limited to voids and is not applied as a surface coating.

.5 For best results, allow 15-20 minutes of standing time after application before roughly shaping and moulding.

.6 Let filler cure 36-72 hours, depending on temperature. Cured epoxy can be worked and tooled similar to real wood.

.7 Sanding can generally take place within 24-48 hours. Premature sanding will gum up sand paper. Always sand with wood grain.

.8 In the process of tooling and sanding, remove excess epoxy to expose sound wood surface where possible.

.9 Never fill construction joints, such as that between a stile and rail, with epoxy.

.10 Restore original profile and ensure proper fit of wood components.

3.5 DUTCHMAN REPAIR AND REPAIRS TO SPLITS

.1 Prepare damaged area of existing parent wood component for Dutchman repair.

.2 Cut back damaged decayed wood as indicated minimum 6 mm beyond the last evidence of decay.

.3 Remove decayed wood with extreme care. Cause neither disruption nor damage to adjacent surfaces.

.1 Obtain approval from Departmental Representative of preparation work prior to proceeding with installation.

.4 Splice Dutchman repair piece into parent wood component.

.5 Set Dutchman repair piece in bed of adhesive. Do not attach to adjacent wood component.

.1 Apply adhesive evenly to both surfaces and clamp.

.2 Avoid adhesive drippings. Remove drips and splashes immediately.

.3 Remove hard cured adhesive evident in completed work.

.1 Obtain approval of removal methods from Departmental Representative.

.6 Clamp repair piece in place until adhesive has set. Protect repair piece and other wood components from pressure marks.

.7 Fasten larger repair piece to parent wood component with screws, size to suit. Countersink screw and fill hole with wood plug. Avoid using surface fasteners.

.8 Ensure joints are tight and visible only on close inspection.

.9 Exterior exposed joints should be weather tight, bevelled for moisture drainage to exterior.

3.6 REPLACEMENT OF INDIVIDUAL COMPONENT

.1 Drive out existing pegs/sash pins, to disconnect the rail or stile identified for replacement, after glass removal.

.2 Lay out and cut mortice and tenon joints as per existing to approved mock-up.

.3 Shape repair piece, to match size and profile of existing according to approved sample.

.4 Trial fit joints before fastening in place. Adjust as necessary to ensure close accurate fit with adjacent surfaces.

.5 Select dowel length to suit application, glue in place, and trim prior to sanding as required.

3.7 STABILIZATION OF JOINTS IN SASHES, TRANSOM LIGHTS AND LOOPHOLE COVERS

.1 Once glass is removed and wood stripped tighten loose joints or joints that are pulling apart by carefully removing sash pins, removing shims and cleaning joints out, clamping tightly, installing new shims with adhesive and an oak dowel with adhesive.

.2 Repair any damage caused by drawing out sash pins.

.3 Keep clamped until adhesive has set.

3.8 CLEANING

.1 Progress Cleaning:

.1 Leave Work area clean at end of each day.

.2 Remove decayed and infested wood from building site daily.

.2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment.

.1 Waste Management: Separate waste materials for reuse and recycling in accordance with Waste Management Plan.

3.9 PROTECTION OF COMPLETED WORK

.1 Cover completed work not enclosed or sheltered with waterproof breathable covering. Anchor securely in place.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 08 01 50 – Wood Window Replacement.

.2 Section 08 03 40 – Historic - Wood Repairs.

.3 Section 08 03 80 – Historic - Glazing.

.4 Section 09 91 00 – Painting Woodwork.

1.2 REFERENCES

.1 References:

.1 Architectural Woodwork Manufacturers Association of Canada (AWMAC)

.1 Architectural Woodwork Standards Manual - (Edition 2) 2014.

.2 Canadian Standards Association (CSA International)

.1 CSA O141-05 (2014), Softwood Lumber.

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 National Lumber Grading Authority (NLGA)

.1 NLGA Standard Grading Rules for Canadian Lumber 2014.

1.3 ADMINISTRATIVE REQUIREMENTS:

.1 Sequencing.

.1 Rehabilitate wood windows in accordance with Work of this Section and related sections, as identified in the drawings and on Work Sheets.

.2 Restore or replace sashes and frames, i.e., the double hung sashes, the transom sashes over doors and the loop hole covers, as shown on drawings and as indicated on work sheets.

.3 Retain all louvered vents for repair, repainting and reinstallation in original location.

.4 Remove all to facilitate work.

.5 Salvage components as directed.

.6 Repair wood window components as indicated and in accordance with Section 08 03 40 - Historic – Wood Repairs.

.7 Fabricate replica sashes and frames for replacement as indicated and in accordance with this Section.

.8 Install salvaged and new glazing in accordance with Section 08 03 80- Historic-Glazing; replace as indicated.

.9 Paint wood windows in accordance with Section 09 91 00 – Painting Woodwork.

.10 Install restored and new hardware.

.11 Install restored and new sashes and related wood window components.

.12 Touch-up affected adjacent finishes.

1.4 ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS

.1 Shop Drawings.

.1 Submit drawings.

.2 Indicate materials and details in large scale for head, jamb and sill, profiles of components, interior and exterior trim, junction between combination units, elevations of unit, anchorage details, description of related components and exposed finishes, limit of different finishes, fasteners, and caulking.

.2 Samples.

.1 Submit for review and acceptance of each unit.

.2 Samples will not be returned for inclusion into work.

.3 Submit 150 mm long samples of parting strips.

.4 Submit 250 mm long samples of moulding profiles; assume custom profiles requiring the fabrication of custom cutters.

.5 Submit samples of each type of hardware.

.3 Database.

.1 Prepare database table to record interventions as follows for each window unit:

.1 Repair type by wood component part of a frame and sash, to locate intervention within individual frame or sash.

.2 Replacement of a sash.

.3 Replacement of glazing by sash.

.4 Replacement of hardware components and related parts, by window operation type.

.4 Photographic Documentation

.1 Submit photographs of existing conditions, prior to commencing work.

.2 Submit photographs for each of the following stage of the work, for site and shop work, with separate submittals at each stage:

.1 Before removal, interior and exterior.

.2 Post removal, interior and exterior.

.3 Post paint removal.

.4 During repairs.

.5 Post repair but prior to painting.

.3 Submit photographs for each of the aforementioned stage of the work, for mock-ups, with separate submittals for each mock-up.

.4 Include window schedule number in each photograph.

1.5 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data

.1 Submit operation and maintenance data for windows for incorporation into manual.

.2 Record Documentation.

.1 Submit assembled documentation in the form of a Conservation Report to document every step of the restoration process from examination of existing conditions to reinstallation.

.2 Submit Database to locate interventions by type for each window unit.

1.6 QUALITY ASSURANCE

.1 Allow Departmental Representative access to the workshop(s) for inspection of current work-in-progress.

.2 Mandatory Requirements

.1 Contractor to have expertise in the conservation and replication of historic wood windows and doors on projects of similar size and complexity to Work of this Contract.

.2 Carry out wood repair work of this Section using skilled tradespersons trained and experienced in rehabilitation of historic wood windows.

.1 Contractor's Field Supervision and Crew Qualifications: maintain full-time supervisor/foreperson on job site during times work is in progress. Supervisor must have door/window rehabilitation training and experience in wood repairs similar in nature and scope to specified work.

.2 Shop Crew Makeup: trade qualified journeyperson carpenters and registered apprentices in the ratio of no more than one to one (at least one journeyperson to one apprentice).

.3 Only workers accepted by Departmental Representative during mock-ups will be authorized to perform Work of this Section.

.3 Mock-ups.

.1 Construct a full-size mock-up to demonstrate each step outlined below under direct review of Departmental Representative. Adjust techniques as directed.

.1 Restored upper and lower sash in restored frame.

.2 One installed restored window frame

.3 One installed window frame with exterior sealant and interior trim installed

.4 One loop hole cover frame with restored loop hole sashes and hardware

.5 One restore transom sash installed with hardware.

.2 Notify Departmental Representative 5 working days in advance of mock-up preparation.

.3 When accepted, mock-ups will demonstrate minimum standard for this work. Approved mock-up may remain as part of finished work.

.4 Inspections.

.1 Allow Departmental Representative access to Work.

.2 Give 5 working days of notice requesting inspection of Work by Departmental Representative to confirm interventions.

.1 Schedule in situ review of wood window frames.

.2 Schedule shop review of sashes and related wood components, post glazing and paint removal, and simultaneously of hardware following cleaning.

.3 Layout materials in shop to allow review of all facets with limited manipulation.

.4 Group work to minimize the number of reviews.

.5 Use Database to record interventions.

.6 Inspections during and post repair to occur as part of mock-up reviews and during regular site visits.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements.

.1 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 indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect windows from nicks, scratches, and blemishes. Ship and store (indoors) covered by breathable tarpaulins.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management.

.1 Remove for reuse and return of pallets, crates, padding, and packaging materials in accordance with Waste Management Plan.

Part 2 Products

2.1 MATERIALS

.1 Dimension lumber: to CSA O141 and National Lumber Grades Authority (NLGA) requirements.

.2 New parting strips, blind stops, sash supports and sills.

.1 Use Douglas fir, grade “C” select, quarter cut with edge grain to weather.

.2 Moisture content: maximum 10%.

.3 Replacement sash stops.

.1 Easter white pine Grade: ‘C’ Select.

.2 Moisture content: maximum 10%.

.4 Undertake repairs in accordance with Section 08 03 40 - Historic Wood Repairs.

.5 For replacement sashes, frames, casings and mouldings, wood for replications in accordance with Section 08 01 59 – Wood Window Replacement.

.6 Fasteners:

.1 Nails: stainless steel 300 series finishing nails, size to suit application.

.2 All exposed screws to be slotted stainless steel screws 300 series.

.3 Assume replacement of all screws holding hardware in stainless steel 300 series, slot head, match existing in terms of round or flat head.

.4 Assume need to fill all holes from current and former fasteners.

.7 Glazing: in accordance with Section 08 03 80 – Historic - Glazing.

.8 Hardware:

.1 For all double hung sash: replace all meeting rail locking pins with new to match sample provided, two per meeting rail.

.2 For all double hung sash: replace all butt hinges at sash support with new cast iron hinges 38mm, each leaf 25mm wide.

.3 For each transom sash, replace existing hinges with 2 new cast iron hinges with stainless slot screws. Replace existing fall chain with new chain in solid brass with stainless slot screws. Match sample provided by Departmental Representative. At ground floor, reinstall one cast iron button with new stainless slot screw. At gallery level, reinstall two wood turn buttons (assume 50% replacement) with new stainless round head slot screws.

.4 For loop hole windows replace hinges with cast iron in same or slightly larger size. Retain and reinstall turn buttons and pull with bolts; assume 50% of turn buttons are replaced in cast iron and that 100% of the wood pulls with bolts are replaced.

.5 Remove existing paint from metal hardware by boiling in vinegar in a double boiler and polish.

.6 Assume replacement of all screws with new in stainless steel to match.

.9 Sealants: “Perma-chink”, colour selected by Departmental Representative.

2.2 FINISHES

.1 Finish Materials.

.1 Proceed in accordance with Section 09 91 00 – Painting Woodwork.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions.

.1 Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation.

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 PREPARATION

.1 Demolition/Removal

.1 All window sashes & frames, transom sash, louvered screens and loop hole sash & frames shall be carefully removed to facilitate work. Photograph in-situ, inside and out, with schedule number clearly visible, prior to removal.

.2 Salvage window components for reuse in accordance with contract documents. Protect and transport to an off-site facility for shop work.

.3 Label salvaged components with gasket paper, mark with a waterproof marker, and securely attach to the component on a hidden surface. For smaller components such as hardware, place in a sealable plastic bag with label visible within the bag. Mark “Property of Government of Canada” on hidden surface of salvaged components removed from site.

.4 Carefully remove perimeter caulking/mortar.

.5 Carefully disassemble units to facilitate repair work.

.6 Carefully remove interior stops and cut out parting strips, to facilitate sash removal.

.7 Where components are let into a groove or mortise, such as parting strips and the leaves of butt hinges, neatly cut adjacent paint using a sharp chisel or knife to avoid tear out.

.8 Unfasten stops and hardware, and clean fasteners in sequence with hardware restoration.

.9 Clean the screw heads for removal. Apply penetrating oil 24 hours in advance of removal. Use screw drivers that fit the heads.

.10 To remove the nails from components, cut or pull nail through the back of component. Do not drive nail through face of component.

.11 Remove existing obsolete equipment and place in storage as directed by Departmental Representative.

.12 Once the frames are removed, cover the openings across interior with dust proof plywood plugs, each fitted with a 300 mm x 600 mm Plexiglas panel. Use compressible gaskets between dissimilar materials.

.13 Hold in place with 2x4 cleats and threaded rod in such a way that no fasteners go into historic fabric.

.14 Provide shop drawing for approval by Departmental Representative, revise and resubmit as directed.

3.3 REPAIR

.1 Repair frame and salvaged sashes, storms and screens with epoxy and/or Dutchman repairs in accordance with Section 08 03 40 – Historic - Wood Repairs.

.2 Finish wood windows in accordance with Section 09 91 00 – Painting Woodwork.

.3 Reinstall hardware.

3.4 REPLACEMENT

.1 Universally replace parting strips except at heads.

.2 Replace all sash stops except at heads.

.3 Replace individual components in accordance with Work Sheets and Section 08 03 40 – Historic - Wood Repairs.

.4 Replace sashes, storms and screens as indicated in Work Sheets and in accordance with Section 08 01 50 – Wood Window Replacement.

.5 Replace/reset glazing as indicated in Work Sheets and in accordance with Section 08 03 80 – Historic - Glazing.

.6 Reinstall restored and new hardware.

3.5 INSTALLATION OF SASHES AND FRAMES

.1 All priming and painting to be complete at time of installation except for final coat.

.2 Install and adjust double hung sashes so that they are easy to operate for their entire height.

.3 Install and adjust transom sashes, and loop hole sashes so that they operate easily.

.4 Install frames true and square. Use custom made western red cedar shims to position window frame into the masonry opening. Place shims only at corners of window frame, two opposing shims at each location, and set securely.

.5 Install interior trim as shown on drawings.

.6 Install hardware once painting is complete.

.7 Neatly seal interior/exterior of frame to masonry. Mask both edges, neatly tool and dust with mortar aggregate.

3.6 CLEANING

.1 Progress Cleaning: Leave Work area clean at end of each day.

.2 Final Cleaning:

.1 Upon completion remove surplus materials, rubbish, tools and equipment.

.3 Waste Management:

.1 Separate waste materials for reuse and recycling in accordance with Waste Management Plan.

3.7 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by window installation.

.3 Protect floors and other surfaces for duration of project, using plywood and tarpaulins as necessary. Adjust as directed by Departmental Representative.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Related Requirements

.1 Section 08 03 52.71 – Historic - Wood Window Rehabilitation.

.2 Section 09 91 00 – Painting Woodwork.

1.2 REFERENCES

.1 References:

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.

.2 CAN/CGSB-12.13-M91, Patterned Glass.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Samples.

.1 Submit for review and acceptance of each unit.

.2 Samples will be returned for inclusion into work.

.3 Submit 150 x 150 mm size samples of each type and thickness of glass

.3 Certificates.

.1 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Test and Evaluation Reports.

.1 Certified test reports showing compliance with specified performance characteristics and physical properties.

1.4 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data

.1 Submit operation and maintenance data for glazing for incorporation into manual.

1.5 QUALITY ASSURANCE

.1 Qualifications

.1 The glazer and personnel shall be of recognized standing in the industry, specializing in the area of work and known to have been responsible for satisfactory work equal to that specified.

.2 Certificates

.1 Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Mock-ups.

.1 Construct mock-ups in accordance with Section 01 33 00 – Submittal Procedures.

.2 Construct mock-up to include glass removal and setting for each glazing type, and putty installation.

.3 Mock-up will be used:

.1 To judge quality of work, substrate preparation, operation of equipment and material application.

.4 Locate where directed.

.5 Allow 72 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.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements.

.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements.

.1 Store materials glazing off ground and glazing compounds indoors between 18 degrees C and 23 degrees C and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect glazing and accessories from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management.

.1 Remove for reuse and return of pallets, crates, padding, and packaging materials in accordance with Waste Management plan.

1.7 FIELD CONDITIONS

.1 Ambient Conditions.

.1 Install glazing compounds when ambient temperature is 10 degrees C minimum. Maintain ventilated environment for 24 hours after application.

.2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

Part 2 Products

2.1 MATERIALS

.1 Flat Glass:

.1 Float glass, to CAN/CGSB-12.3, clear, thickness as per existing, assume about 3 mm thick.

.2 Patterned glass: to CAN/CGSB-12.13, thickness as per existing, assume about 3 mm thick.

.1 Install glass with texture facing in.

.2 Provide four (4) samples of obscure glass for consideration by Departmental Representative.

2.2 ACCESSORIES

.1 Setting blocks: Eastern white pine, minimum 40 mm x width of glazing x 2-3 mm height.

.2 Glazing compounds:

.1 Linseed oil putty, by same manufacturer as paint system, putty components:

.1 Linseed oil, raw: concentration 35-55%

.2 Calcium carbonate: concentration 45-65%

.2 Shellac flakes, de-waxed.

.3 Glazing points: non-ferrous metal.

.4 Tools:

.1 Clear glass jar with lid.

.2 Denatured alcohol (methyl hydrate).

.3 Portable steamer with hose.

.4 Pumice.

.5 Soft brush.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions.

.1 Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for glazing installation in accordance with manufacturer's written instructions.

.1 Verify that openings for glazing are correctly sized and within tolerance.

.2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

.3 Visually inspect substrate.

.4 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.5 Proceed with installation only after unacceptable conditions have been remedied.

.6 Note that glass sizes may vary at each opening.

3.2 PREPARATION

.1 Remove existing glazing and salvage for reuse.

.2 Assume the putty and paint contain dangerous amounts of lead and take all necessary precautions to protect workers. Contain and dispose of lead waste in accordance with those having jurisdiction.

.3 Soften putty using a combination of techniques including steam, infrared heaters or heat guns, but not chemicals. Insulate glass to avoid breaking glass from heat shock, remove glazing points, and carefully remove glass. Label each pane of glass for re-installation in its original location.

.4 Assume a total of 35% glass replacement in sashes being restored and note that no compensation for breakage beyond 35% will be provided.

.5 Proceed with re-glazing following sash repair and surface preparation respectively in accordance with Section 08 03 52.71 – Historic - Wood Window Rehabilitation and Section 09 91 00 – Painting Woodwork.

.6 Sand and clean glazing rebates.

.7 Before applying glazing, prime the glazing rebate with a mixture of shellac flakes and alcohol.

.8 Pour shellac flakes to a depth of 13 mm in the bottom of a small clear glass jar and add enough alcohol to just cover the flakes. Mix with a stick to the consistency of motor oil.

.9 Brush shellac mixture into all rebates.

.10 Seal any remaining mixture in a glass container and store in a dark, cool location for up to 2 weeks. Appropriately discard all unused mixture thereafter.

.11 Allow 2 hours to dry before applying putty.

3.3 INSTALLATION

.1 Cut replacement glass to suit size of existing lights and to clearances recommended by glass manufacturer. Each pane of glass is to be undersized about 1.5 mm around the perimeter.

.2 Set glazing lights in traditional manner, using glazing putty.

- .1 Empty the entire container of putty on a non-absorbent surface and knead until soft before use. This will be easier if the putty is warmed in microwave.
- .2 Use putty at a temperature between 15 degrees C and 25 degrees C. If the putty is too sticky, knead on a piece of cardboard to remove some of the oils. Do not add chalk to the putty, as this will cause separation of the product.
- .3 If the putty is too hard, re-warm the putty.
- .4 Use warmer softer putty for back puttying and harder putty for bevel putty.

.3 Apply back putty to the rebates about 1-2 mm thick but with enough putty so that the glass is well seated and there are no gaps between the glass and the rebates.

.4 Set replacement or salvaged glass on full bed of putty to proper frame tolerances. Ensure it is evenly seated.

.5 Install glazing points at 300 mm on centre, with edge point maximum 75 mm from corners.

.6 Neatly apply exterior putty bevel in line with edges of stiles and rails.

.7 Allow putty to set up for 24 hours before striking off excess.

.8 Tool putty to true, even lines, and free of creases, cavities, bubbles and other defects which will mar its appearance and performance.

.9 Apply ground pumice to each pane of glass, sequentially. Spread liberally with a soft brush, allowing the pumice to absorb any oil residue. Sweep the pumice off the glass. The glass should take on a nice shine, free of oily prints. The discarded pumice may be used again for subsequent panes.

.10 Allow putty to cure for minimum 72 hours before painting.

.11 Paint cured putty in accordance with Section 09 91 00 – Painting Woodwork.

.1 Lap paint onto glass by 2 mm with application of the exterior and interior finishing paint coats.

3.4 CLEANING

.1 Progress Cleaning:

.1 Leave Work area clean at end of each day.

.1 Remove traces of primer, caulking.

.2 Remove glazing materials from finish surfaces.

.3 Remove labels.

.4 Clean glass using approved non-abrasive cleaner in accordance with manufacturer's instructions.

.2 Final Cleaning:

.1 Upon completion, remove surplus materials, rubbish, tools and equipment.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by glazing installation.

END OF SECTION

This document is to be read in conjunction with the Drawings and Specifications.

GENERAL

- Assume that all components, i.e., interior trim, jamb trim, parting strips, sashes, etc., etc., are to be restored unless they are identified to be replaced.
- See drawings for terminology of components.
- Artefacts and furnishings shall be moved by owner.
- Assume the need to fill multiple holes in all old wood components, larger holes are to be epoxy repairs, minor holes can be filled with putty after first coat of paint is applied.
- Assume the need to fill screw holes at all hardware locations to provide sound purchase for new screws.
- Assume that 20% of all exterior surfaces on old material require epoxy repairs.
- Note that muntin bar profiles vary amongst double hung sash, transom sash and loop hole covers.
- For all interior trim such as soffits, stools, jamb extensions at windows and interior trim at doors mask and neatly point gap between wood and masonry with Perma-Chink™ and tool smooth.

Windows including double hung sashes, transom sashes and sashes forming loop hole covers

- Assume at gallery level that all sills are to be replaced and that the bottoms of all jambs require an extensive combination of Dutchman and epoxy repairs.
- Assume that 50% of all joints in sashes, transom lights and loop hole covers require stabilization.
- Assume that all blind stops are to be replaced.
- Assume that all parting beads and interior stops are to be replaced except where noted.
- Assume all interior trim is restored by gluing splits, epoxy repairs and splicing in Dutchmen to damaged areas.
- Assume all jamb extensions are replaced.
- Assume that all soffits, aprons and stools, identified for restoration, require the gluing of splits, epoxy repairs and splicing in Dutchmen to damaged areas.
- Assume each sash requires three Dutchmen repairs average length 200.
- Assume 10% of glass is currently broken and assume 30% will break during removal.
- Assume each window frame being restored requires the removal of decayed wood and stabilization of corners by the insertion of counter sunk screws.
- Assume that all hinged sash supports for upper sashes are replaced.

Louvred Vents

- Assume each louvred vent requires replacement insect screen, black aluminum, and completely new screen moulding.
- Assume each louvred vent requires adjustment to height and width by either planing or adding to.

Doors

- Assume at gallery level that all sills are to be replaced (except where noted) and that the bottoms of all jambs require an extensive combination of Dutchman and epoxy repairs.
- Assume each door being retained requires on average four Dutchman repairs average length 200 mm.

- Assume each door frame and/or associated trim being retained requires two Dutchman repairs average length 150 mm.
- Assume each door frame being retained requires the removal of decayed wood and stabilization of corners by the insertion of counter sunk screws.
- Assume that all interior trim at transom bar and head is restored by the use of Dutchman and epoxy repairs.

WINDOW OPENINGS

RW1-69	Remove existing unit and replace.
RW1-70	Remove existing unit and replace.
RW1-71	Remove existing unit and replace.
RW1-72	Remove existing unit and replace.
RW1-73	Remove existing unit and replace.
RW1-74	Remove existing unit and replace.
RW1-75	Remove existing unit and replace.
RW1-76	Remove existing unit and replace.
RW1-77	Remove existing unit and replace.
RW1-78	Remove existing unit and replace.
RW1-79	Remove existing unit and replace.
RW1-80	Remove existing unit and replace.
RW1-81	Remove existing unit and replace.
RW1-82	Remove existing unit and replace.
RW1-83	Remove existing unit and replace.
RW1-84	Remove existing unit and replace.
RW1-85	Remove existing unit and replace.
RW1-86	Remove existing unit and replace.
RW1-87	Remove existing unit and replace.
RW1-88	Remove existing unit and replace.
RW1-89	Remove existing unit and replace.
RW1-90	Remove existing unit and replace.
RW1-91	Remove existing unit and replace.
RW1-92	Remove existing unit and replace.
RW1-93	Remove existing unit and replace. Restore louvred vent. Re-glaze sash with obscure glazing.
RW1-94	Remove existing unit and replace. Restore louvred vent. Re-glaze sash with obscure glazing.
RW1-95	Remove existing unit and replace. Restore louvred vent. Re-glaze sash with obscure glazing.
RW1-96	Remove existing unit and replace. Restore louvred vent. Re-glaze sash with obscure glazing.

RW1-97	Remove existing unit and replace. Restore louvred vent. Re-glaze sash with obscure glazing.
RW1-98	Remove existing unit and replace. Restore louvred vent. Re-glaze sash with obscure glazing.
RW1-99	Remove existing unit and replace. Restore louvred vent.
RW1-100	Remove existing unit and replace. Restore louvred vent.
RW1-101	Remove existing unit and replace. Restore louvred vent. Remove modern steel shutters to facilitate work and reinstall at job end.
RW1-102	Remove existing unit and replace. Restore louvred vent. Remove electrical to facilitate work and reinstall at job end.
RW1-103	Restore hardware with new copper clad shutter, see drawings and specifications.
RW1-104	Restore hardware with new copper clad shutter, see drawings and specifications.
RW2-01	Restore frame and sashes. Remove insect screen and discard. Restore parting bead at head. Restore soffit, stool and apron. Coordinate with conservation of iron bars. Remove cut nails, curtains, and curtain cord to facilitate work and reinstall at job end.
RW2-02	Restore frame and sashes. Remove insect screen and discard. Restore parting bead at head. Restore soffit, stool and apron. Remove cut nails, curtains, and curtain cord to facilitate work and reinstall at job end. Coordinate with conservation of iron bars.
RW2-03	Restore frame and sashes. Replace Dutchman underside lower sash meeting rail. Restore parting bead at head. Restore soffit. Remove cut nails, curtains, and curtain cord to facilitate work and reinstall at job end. Coordinate with conservation of iron bars.
RW2-04	Restore frame and lower sash Replace upper sash. Restore parting bead at head. Restore soffit, stool and apron. Remove cut nails, curtains, and curtain cord to facilitate work and reinstall at job end. Coordinate with conservation of iron bars.

RW2-05	Restore frame and lower sash. Replace upper sash. Retain parting bead at head. Remove cut nails, curtains, and curtain cord to facilitate work and reinstall at job end. Coordinate with conservation of iron bars.
RW2-06	Restore frame and lower sash. Replace upper sash. Retain parting bead at head. Restore soffit. Remove cut nails, curtains, and curtain cord to facilitate work and reinstall at job end. Coordinate with conservation of iron bars.
RW2-07	Restore frame and sashes. Restore parting bead and stop at head. Remove cut nails, curtains, and curtain cord to facilitate work and reinstall at job end.
RW2-08	Restore frame and sashes. Retain parting bead and stop at head, splice Dutchman into end of stop Restore soffit. Remove cut nails, curtains, and curtain cord to facilitate work and reinstall at job end.
RW2-09	Restore frame and sashes. Splice in Dutchman bottom of west stile lower sash. Remove cut nails, curtains, and curtain cord to facilitate work and reinstall at job end.
RW2-10	Restore frame and upper sash. Replace lower sash. Remove cut nails, curtains, and curtain cord to facilitate work and reinstall at job end.
RW2-11	Restore frame and sashes. Restore stool and apron.
RW2-12	Restore frame and sashes. Restore stool and apron.
RW2-13A	Restore frame and sashes. Restore stool and apron.
RW2-13B	Restore frame and sashes. Restore soffit.
RW2-14	Restore frame and sashes.
RW2-15	Restore frame and lower sash. Replace upper sash.
RW2-16	Restore frame and sashes.
RW2-17	Restore frame and sashes. Restore stool and apron.
RW2-18	Restore frame and sashes. Restore soffit.
RW2-19	Restore frame and lower sash. Replace upper sash. Restore soffit. Restore stop at head.

RW2-20	Restore frame and sashes. Restore stool and apron. Restore stop at head.
RW2-21	Restore frame and sashes. Restore soffit.
RW2-22	Restore frame and sashes. Replace Dutchman across underside of bottom rail on lower sash. Restore soffit.
RW2-23	Restore frame and sashes. Restore louvred vent. Restore stop at head.
RW2-24	Restore frame and sashes. Restore parting bead at head and stop at head. Restore soffit.
RW2-25	Restore both sashes. Restore stool and apron. Restore interior stops.
RW2-26	Remove existing paneling to facilitate work and rebuild once window restoration work is completed. Restore both sashes. Glaze sashes with obscure glass. Assume all interior wood work is to be replaced.
RW2-27	Remove existing paneling to facilitate work and rebuild once window restoration work is completed. Restore both sashes. Glaze sashes with obscure glass. Assume all interior wood work is to be replaced.
RW2-28	Restore sashes. Restore louvred vent. Restore stop at head. Restore soffit, stool and apron.
RW2-29	Restore sashes. Replace soffit. Restore louvred vent. Restore stool and apron.
RW2-30	Restore sashes. Restore louvred vent. Restore soffit, stool and apron. Restore stop at head.
RW2-31	Restore sashes. Restore louvred vent. Restore soffit, stool and apron. Restore stop at head.
RW2-32	Restore sashes. Restore louvred vent. Restore soffit, stool and apron.

	Restore parting bead and stop at head.
RW2-33	Restore sashes. Restore louvred vent. Restore soffit and stool. Restore parting bead and stop at head.
RW2-34	Restore sashes. Restore louvred vent. Restore stop at head.
RW2-35	***Electrical conduit through lower sash Restore louvred vent. Restore stop at head. Restore sashes. Restore soffit.

DOOR OPENINGS

RD1-40	Remove existing and replace door and frame. Retain and restore transom sash.
RD1-41	Remove existing and replace door and frame. Retain and restore transom sash.
RD1-42	Remove existing and replace door and frame. Retain and restore transom sash.
RD1-43	Remove existing and replace door and frame. Retain and restore transom sash.
RD1-44	Remove existing and replace door and frame. Retain and restore transom sash.
RD1-45	Remove existing and replace door and frame. Retain and restore transom sash.
RD1-46	Remove existing and replace door and frame. Retain and restore transom sash.
RD1-47 (Washroom)	Remove existing and replace door and frame. Install new white oak threshold to match outward appearance of existing. Replace existing hinges with new forged HL hinges. Reclaim and reinstall washroom signs, automatic closers, push plates and pulls.
RD1-48 (Washroom)	Remove existing and replace door and frame. Install new white oak threshold to match outward appearance of existing. Replace existing hinges with new forged HL hinges. Reclaim and reinstall washroom signs, automatic closers, push plates and pulls.
RD1-49	Remove existing and replace door, frame and transom.
RD1-50	Remove existing and replace door, frame and transom. Replace existing hinges with new forged HL hinges.
RD1-51	Remove existing and replace door, frame and transom.

	Replace existing hinges with new forged HL hinges.
RD1-51A	Remove existing and replace door and frame. Retain and restore transom sash.
RD1-52	Remove existing and replace door and frame. Retain and restore transom sash. Replace missing HL hinges.
RD1-53	Remove existing and replace door and frame. Retain and restore transom sash. Replace missing HL hinges.
RD1-54	Remove existing and replace door and frame. Retain and restore transom sash. Replace missing HL hinges.
RD1-55	Remove existing and replace door and frame. Retain and restore transom sash. Replace missing HL hinges.
RD2-01	Remove outer storm door frame and carefully remove sealant. Restore door frame and transom sash. Replace door. Replace jamb trim for full height but restore piece at head. Restore soffit. Replace jamb trim.
RD2-02	Restore door frame and transom sash. Replace door. Replace jamb trim for full height but restore piece at head. Restore soffit. Replace interior trim.
RD2-03	Restore door frame and transom sash. Replace door. Replace jamb trim for full height but restore piece at head. Restore soffit. Replace interior trim.
RD2-04	Restore door frame and transom sash. Replace door. Replace jamb trim for full height but restore piece at head. Restore soffit. Replace interior trim. Splice in 6” Dutchman to interior face of transom bar.
RD2-05 (UNASSIGNED)	
RD2-06	Restore door frame and transom sash. Replace door. Replace jamb trim for full height but restore piece at head.

	Restore soffit. Replace interior trim, splice 2 dutchman repairs into interior transom bar trim.
RD2-07	Restore door frame and transom sash. Replace door. Replace jamb trim for full height but restore piece at head. Restore soffit. Replace interior trim. Remove transom screen and associated fittings and discard.
RD2-08	Restore door frame in situ DO NOT REMOVE Restore door DO NOT REPLACE. Replace jamb trim for full height but restore piece at head. Restore soffit.
RD2-09	Restore door frame and transom sash. Replace door. Replace jamb trim from transom bar down. Restore soffit. Replace interior trim at both jambs.
RD2-10	Restore door frame and transom sash. Replace door. Replace jamb trim from the transom bar down. Restore soffit. Replace interior trim at west jamb only from transom bar down.
RD2-11	Restore door frame and transom sash. Replace door. Remove electrical and reinstall at job end. Replace jamb trim from the transom bar down. Restore soffit. Replace interior trim both jambs only.
RD2-12	Restore door frame and transom sash. Replace door. Replace jamb trim from the transom bar down. Restore soffit. Replace interior trim from transom bar down.
RD2-13	Restore door frame and transom sash. Replace door. Replace jamb trim from the transom bar down. Restore soffit. Replace interior trim at west jamb, splice Dutchman repair to bottom of trim at east jamb.
RD2-14	Restore door frame and transom sash. Replace door. Replace jamb trim from both jambs, remove bar to facilitate work and reinstall.

	Restore soffit. Replace interior trim at west jamb only.
RD2-15	Restore door frame in situ DO NOT REMOVE. Restore door DO NOT REPLACE AND DO NOT STRIP PAINT. Replace jamb trim for full height but restore piece at head. Restore soffit. Replace missing HL hinges.
RD2-16	Restore frame and transom sash. Restore soffit. Replace glazed door. Discard louvred vent and associated fittings. Discard added exterior frame. Replace all jamb trim.
RD2-17	Restore frame and soffit. Replace glazed door and transom sash. Discard louvred vent and associated fittings. Replace all jamb trim. Replace interior trim.
RD2-18	Restore frame and transom sash. Discard louvred vent and associated fittings. Replace glazed door. Replace interior trim. Replace jamb trim. Splice in Dutchman repairs to outside face of transom bar. Restore louvred vent. Restore soffit with 8” Dutchman to beaded edge.
RD2-19	Restore frame and transom sash. Replace glazed door. Restore soffit. Replace jamb trim. Replace interior trim. Discard louvred transom vent and associated fittings. Splice in Dutchman repairs to outside face of transom bar.
RD2-20	Temporarily remove electrical and security contacts and reinstall at job end. Restore frame and transom sash. Replace glazed door. Restore soffit. Replace jamb trim. Replace interior trim. Discard louvred transom vent and exterior frame. Splice in Dutchman repairs to inside face of transom bar at hardware damage.

Part 1 General

1.1 REFERENCES

.1 References:

.1 Canadian General Standards Board (CGSB)

.1 CGSB 1-GP-2M-80 Oil, Linseed, Boiled.

.2 CGSB 1-GP-16M-79 Shellac Varnish.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 Master Painters Institute (MPI)

.1 Maintenance Repainting Manual 2015, Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List.

.4 National Fire Code of Canada.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Scheduling.

.1 Submit work schedule for various stages of painting to Departmental Representative for approval review. Submit schedule minimum of 48 hours 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.

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

1.3 ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data.

.1 Submit manufacturer's instructions, printed product literature and data sheets for paints and coating products and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Paint Samples.

.1 Submit triplicate 100 x 200 mm "draw-downs" of each paint formula type and colour specified on applicable materials for Departmental Representative’s review prior to commencement of the work.

.2 Colours and finishes to be selected by Departmental Representative. Revise and resubmit.

.3 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

.4 Exterior paint colours to match those used in Blocks 4 through 10.

.5 Assume one custom colour for both faces of doors, one for exterior of windows and one for interior of windows.

.4 Manufacturer Reports.

.1 Provide WHMIS Material Safety Data Sheets (MSDS) in accordance with Section 01 35 30 - Health and Safety Requirements for paints and coating materials to be used.

1.4 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data.

.1 Provide maintenance data for incorporation into Maintenance Manual.

.2 Record Documentation.

.1 Provide 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.

1.5 QUALITY ASSURANCE

.1 Qualifications.

.1 Installers/Applicators/Erectors.

.1 Contractor: to have a proven satisfactory experience. When requested, provide list of 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, to have proven satisfactory experience.

.3 Apprentices: may be employed provided they work under direct supervision of qualified journeypersons in accordance with applicable trade regulations.

.2 Materials

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

.2 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, glazing putty, linseed oil, pine tar and shellac) to be from a single manufacturer for each system used.

.3 Paint materials to be the highest quality product and shall be compatible with other coating materials as required.

.3 Mock-ups.

.1 Provide mock-up in accordance with Section 01 33 00 – Submittal Procedures.

.2 Prepare and repaint designated 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 painting work.

.4 Include all aspects of surface preparation including paint removal to bare wood and priming and application of one finish coat

.5 Provide additional mock-ups on-site for review by Departmental Representative if initial tests prove unsatisfactory.

.6 Provide Departmental Representative five working days of notice prior to undertaking work.

.7 Approved mock-up may be incorporated into final work.

.8 Assume the need for two custom colours for doors and two custom colours for windows.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver and store materials in manufacturers' original container with labels intact.

.2 Delivery and Acceptance Requirements.

.1 Ensure dry delivery and storage of materials and equipment at site.

.3 Storage and Handling Requirements.

.1 Store materials and equipment in a well-ventilated place between 10 degrees C and 32 degrees C, and protect from direct sun.

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

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

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

1.7 SITE CONDITIONS

.1 Surface preparation work shall be performed in favourable weather conditions as defined herein. The temperature range within the work area shall be between 10 degrees C to 30 degrees C.

.2 Wood being prepared must have a moisture content below 10% by weight. Protect area from moisture until final painting is complete and cured.

.3 Protect exterior surfaces from moisture and water as necessary from time of preparation until the final coats of paint have sufficiently dried to be unaffected by moisture and/or water.

.4 Use of a heated enclosure around the work area is acceptable.

.5 Mask or otherwise protect surrounding or adjacent historic fabric and occupants from all activities associated with this work. No fastenings associated with hoarding or other protection shall be installed in historic material without prior approval of Departmental Representative.

.6 Prevent dust associated with these activities from spreading beyond the immediate work area.

.7 Do not paint during or immediately following foggy, rainy or frosty weather, nor when the temperature is expected to go below 10 degrees C before the coating is dry, in excessively humid or windy weather, or on damp surfaces (wood maximum 10% moisture).

1.8 WARRANTY

.1 The warranty period for the painting of sashes and new components is to be 2 years.

Part 2 Products

2.1 MATERIALS

.1 Paint, linseed oil paint, by same manufacturer as putty compound, to CGSB 1-GP-2M.

- .1 Paint shall consist of cold-pressed, cleaned, filtered, sterilized, well-matured, cooked linseed oil only, with no solvents.
- .2 At factory add 20% zinc by volume.
- .3 Pigments shall be made from titanium oxide, iron oxides, chromium oxide green and ultramarine blue.
- .4 Tinting: as recommended by paint manufacturer.
- .5 Wood primer: Boiled linseed oil type, by same manufacturer as paint.
- .6 Cleaning solution: linseed oil soap, by same manufacturer as paint.
  - .1 Mix linseed oil soap with boric acid; 1 tablespoon of acid to 1 litre of soap.

.2 Wood Sealer: Shellac to CGSB 1-GP-16M.

- .1 Mix shellac flakes and methyl hydrate in a glass jar to the consistency of motor oil to be used for sealing knots and encapsulate extant grained finish. Mix only enough for one day’s use.

.3 Glazing Putty

- .1 Linseed oil based glazing putty by same manufacturer as linseed oil paint.

.4 Dark Pine Tar

- .1 Traditional pine tar made by burning the resin out of pine tree stumps.

.5 Paraffin Wax

- .1 Block paraffin wax as sold for canning purposes.

2.2 TOOLS

.1 Brush: natural bristle brushes of size and shape to suit application.

.2 Rags: micro fibre rags.

.3 Mechanical tools without sharp edges.

.4 Scouring pad: plastic mesh.

.5 Scrub brushes: natural fibre bristle or soft plastic type.

2.3 PAINT COATING SCHEDULE

.1 Primer for exposed surfaces of old wood to receive two coats of boiled linseed oil, applied warm onto warmed surface. To be followed by 4 coats of boiled linseed oil paint.

.2 Primer for exposed surfaces of new wood to receive one coat of boiled linseed oil, applied warm onto warmed surface. To be followed by 4 coats of boiled linseed oil paint.

.3 Prior to assembly, all hidden surfaces of all components to be primed with one coat of boiled linseed oil, applied warm onto warmed surface, and one coat of linseed oil paint, on “all 6 sides” prior to assembly. To be followed by one coat of boiled linseed oil paint.

.4 The outside of all window, door and loop hole frames, including jambs, head and sill, to receive two coats of dark pine tar mixed 1:1 with boiled linseed oil, applied warm to warmed surfaces, paying particular attention to construction joints and end grain.

.5 For new sash and door joinery, undertake the following, once components are fabricated: prime all end grain at mortice and tenons with two coats of boiled linseed oil, applied warm onto warmed surface. To be followed by one coat of boiled linseed oil paint. All to cure thoroughly before assembly.

.6 Do not oil or paint edges of upper and lower sash stiles. Immediately prior to installation, rub edges of stiles thoroughly with paraffin wax.

.7 Interior surfaces of sash, doors and all associated interior trim to be primed with alkyd primer and painted with 2 coats of latex paint.

Part 3 Execution

3.1 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, clean and restore such surfaces as directed by Departmental Representative.

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

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

.4 As painting operations progress, place "WET PAINT" signs to approval of Departmental Representative.

.5 To avoid spontaneous combustion, follow manufacturer's printed directions for handling linseed oil, tools, rags, etc. Remove any and all oil soaked rags from the site each day and soak rags in water off site and discard.

.6 Ensure protective coverings are breathable.

3.2 SURFACE PREPARATION

.1 Remove paint to bare wood on all sashed, doors and associated trim by the careful use of a combination of infrared stripping guns, heat guns and steam followed by scraping and sanding. Do not use heat guns on site, due to fire risk.

.2 Note that chemical strippers are not permitted.

.3 Neatly remove any existing caulking and mortar.

.4 Assume caulking, glazing putty, paint and wood contain dangerous amounts of lead and/or asbestos.

.5 All workers to wear appropriate safety equipment and shop to be equipped with appropriate air supply, exhaust, etc. Contain the work area to prevent dust from spreading. Dispose of waste in accordance with those having authority.

.6 Scraping and sanding shall be done carefully so as not to gouge or otherwise alter the profiles of mouldings. Orbital sanders are not permitted because of the tendency to tear across the grain.

.7 Customize blades for scrapers to match the shape of the original profiles.

.8 Sand elements lightly and ease corners in preparation for painting. Carefully sand to achieve smooth surface without altering profiles, feather edges, remove all dust with vacuum, and wipe clean.

.9 Seal knots with shellac as recommended by paint manufacture and in accordance with manufacturer's written instructions.

.10 Keep all surfaces dry until painting is complete.

.11 Remove dust, dirt, and surface debris by brushing, wiping with dry, clean cloths or compressed air.

.12 All new and old wood surfaces to be painted shall be thoroughly sanded with 120 grit sandpaper and wiped clean.

.13 Clean all surfaces with linseed oil soap using scouring pad. Rinse thoroughly as directed by manufacturer, taking care not to over soak. Let dry 24 hours.

.14 All repair work to be completed prior to undertaking the work of this section.

.15 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.

.16 Remove paint from all exterior and interior surfaces, except door and window soffit and where directed elsewhere.

3.3 COATING APPLICATION

.1 Application

.1 Method of application to be as approved by Departmental Representative. Apply paint by brush and micro fibre rags. Conform to manufacturer's application instructions unless specified otherwise.

.2 All exterior wood work to be back primed with oil and to have one application of paint to “all six sides” before assembly.

.3 For all new joiners’ work, such as windows, doors, and loop hole covers as well as frames for all, prime end grain and joinery, including mortice and tenon, with boiled linseed oil and one coat of paint, prior to assembly.

.4 Note that the entire outside of window and door frame sills, as well as the backsides of the bottom two feet of each jamb are to receive two coats of dark pine tar on bare wood, no painting is required at these locations. In particular work pine tar into end grain and construction joints.

.5 Pine tar to be mixed 50/50 with boiled linseed oil and is to be applied warm at 60 degrees C. The surface of the wood is also to be warmed as the mixture is applied.

.6 All surfaces treated with pine tar to off gas for three weeks, prior to delivery to site.

.7 Heat boiled linseed oil primer and maintain a temperature of 50-60 degrees C. Also heat the surface of the wood with a hair dryer as application proceeds.

.8 Paint application:

.1 Prior to mixing paint, remove any skin from the surface. As some settling of pigment may have occurred during shipping, stir the paint thoroughly with a hand-blender before painting.

.2 Do not dilute paint with solvents. Where necessary, thin with a maximum 5% boiled linseed oil.

.3 Order paint from supplier with added zinc white, 20% by volume, to the paint as a fungicide. As this affects paint colours, samples will be adjusted prior to painting.

.4 Apply warmed paint in thin coat with a brush and/or micro fibre rags. Note that linseed oil paints are to be applied much more thinly, but in multiple coats, compared to conventional paints.

.5 After first coat of paint on wood, fill any minor holes or small checks and all countersunk fasteners with linseed oil based glazing putty and rub smooth.

.9 Allow boiled linseed oil to properly cure between subsequent coats for minimum time period as recommended by manufacturer.

.2 Room Labels on Doors

.1 Note that the room labels currently painted on the outside faces of the doors are to be replicated.

.2 Using the stencil provided by the Departmental Representative, trace the lettering onto the door face assuring that it is straight, level, and evenly spaced.

.3 Using an artists' brush neatly paint in the lettering, colour to be white, assume the need for two coats.

.4 All spelling mistakes to be corrected at Contractor's expense.

3.4 RE-INSTALLATION

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

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

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

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

3.5 CLEANING

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

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

.3 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.

.1 Clean brushes and tools with soap from same line as paint manufacturer.

3.6 PROTECTION OF COMPLETED WORK

.1 Protect area where paint has been applied.

.2 On completion of specified work remove surplus materials, tools and equipment and debris on work area; leave clean and tidy to complete satisfaction of Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 05 70 10 – Decorative Metal Restoration.

1.2 PRICE AND PAYMENT PROCEDURES

.1 Dismantling, cleaning, repairs, shop painting, reinstallation of iron work railing components, and field painting will be included in lump sum bid.

1.3 REFERENCES

.1 The Master Painters Institute (MPI)

.1 MPI Painting Manual, 2015.

.2 Environmental Choice Program (ECP)

.1 CCD-047-98 (R2005), Architectural Surface Coatings.

.2 CCD-048-98 (R2006), Surface Coatings - Recycled Water-borne.

.3 Federal Standard (FS)

.1 FED-STD-595B-2015, Colours Used in Government Procurement.

.4 The Society for Protective Coatings (SSPC)

.1 SSPC-SP 1-82(R2016), Solvent Cleaning.

.2 SSPC-SP 2-82(R2004), Hand Tool Cleaning.

.3 SSPC-SP 3-82(R2004), Power Tool Cleaning.

.4 SSPC-SP 6/NACE No. 3-07, Commercial Blast Cleaning.

.5 SSPC-SP 7/NACE No. 4-07, Brush-off Blast Cleaning.

.6 SSPC-Vis-1-2002, Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs) Editorial Changes September 1, 2000 (Steel Structures Painting Manual, Chapter 2 - Surface Preparation Specs.).

.7 SSPC-PA 204, Measurement of Dry Coat Thickness with Magnetic Gauges.

.8 SSPC Good Painting Practices, Volume 1, 4th Edition.

1.4 ACTION SUBMITTALS/INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Samples

.1 Submit for review and acceptance of each unit.

.2 Submit 3 sets of manufacturers colour swatches in black range for selection of black colour.

.3 Submit 3 colour draw samples on black and white card stock base on selected colour swatch. Note that the intention is to match the black colour used on previous phases.

.4 Paints that do not appear on MPI Approved Products List must be approved by Departmental Representative before use on project. When it is proposed to use non-qualified paint, submit 1L sample of paint to Departmental Representative at least four (4) weeks prior to commencement of painting for analysis and acceptance. Mark samples with name of project, its location, paint manufacturer's name and address, name of paint, MPI standard number and manufacturers paint code number.

.5 Enable Departmental Representative to take 1L samples of each paint delivered to site, one sample from manufacturer's containers and one sample from painters' pot.

.3 Certificates:

.1 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Test and Evaluation Reports.

.1 Submit test reports showing compliance with specified performance characteristics and physical properties .

.5 Construction Waste Management:

.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.

.6 Recycled Content:

.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.

.7 Manufacturer’s Instructions.

.1 Submit manufacturer's instructions, printed product literature and data sheets for painting exterior metal surfaces and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 30 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures.

1.5 QUALITY ASSURANCE

.1 Testing Agencies.

.1 Departmental Representative shall engage independent testing agency to verify the quality and specified thickness of coatings applied in this Section.

.2 Certifications.

.1 Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements.

.1 Deliver materials to site in original factory packaging, labeled with manufacturer's name and address.

.3 Packaging Waste Management.

.1 Develop Construction Waste Management Plan related to Work of this Section.

.2 Remove for reuse by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan.

Part 2 Products

2.1 MATERIALS

.1 Decorative Metal Restoration, Paint Finishes:

.1 Primer: MPI Product # 20, Multi component epoxy zinc rich primer, Premium Grade.

.1 Primer for second coat: tinted sufficiently off finish colour of first coat to show where second coat is applied.

.2 Tinting material: compatible with primer and not detrimental to its service life.

.2 Two Coat Epoxy Base Coats: MPI Product # 98, two component epoxy, high build, glass, Premium Grade:

.1 Colour of second coat: tinted sufficiently off finish colour of first coat to show where second coat is applied.

.2 Tinting material: compatible with primer and not detrimental to its service life.

.3 Two Coat Top Coats: MPI Product # 72, Polyurethane, two component, pigmented gloss, MPI Gloss Level 6, Premium Grade:

.1 Colour of first coat: tinted sufficiently off second coat to show where second coat is applied.

.2 Tinting material: compatible with primer and not detrimental to its service life.

.3 Colour of second coat: Gloss Black.

.4 Media blasting of surface: to SSPC (Steel Structures Painting Council).

.1 To SSPC (Steel Structures Painting Council).

.2 See Section 05 70 10 – Decorative Metal Restoration for additional direction.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions.

.1 Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for painting exterior metal surfaces installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Assume paint contains dangerous levels of lead.

.3 Remove paint by electrolytic reduction as described in Section 05 70 10 – Decorative Metal Restoration.

3.2 PREPARATION

.1 Surface Preparation.

.1 Metal surfaces to be repainted:

.1 Clean surfaces by removing all loose, cracked, brittle or non-adherent paint, rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with following recommendations in MPI Manual and Section 05 70 10 – Decorative Metal Restoration.

.2 Compressed air to be free of water and oil before reaching nozzle.

.3 Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes, by blowing with clean dry compressed air, or by vacuum cleaning.

.4 Apply paint after prepared surfaces have been accepted by Departmental Representative.

.5 Prior to starting paint application ensure degree of cleanliness of surfaces is to SSPC-Vis 1.

.1 Apply primer, paint, or pretreatment after surface has been cleaned and before deterioration of surface occurs.

.2 Clean surfaces again if rusting occurs after completion of surface preparation.

.6 Mixing paint:

.1 Do not dilute or thin paint for brush application.

.2 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.

.3 Do not mix or keep paint in suspension by means of air bubbling through paint.

.4 Thin paint for spraying according to manufacturer's written instructions. If directions are not on container, obtain instructions in writing from

manufacturer and provide copy of instructions to Departmental Representative.

.2 Demolition/Removal

.1 See Section 05 70 10 – Decorative Metal Restoration for paint removal from metal.

3.3 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Apply paint by spraying. Use sheepskins or daubers when no other method is practical in places of difficult access.

.3 Apply final coat by brush on site after reinstallation.

.4 Where surface to be painted is not under cover, do not apply paint when:

.1 Air temperature is below 5 degrees C or when temperature is expected to drop to 0 degrees C before paint has dried.

.2 Temperature of surface is over 50 degrees C unless paint is specifically formulated for application at high temperatures.

.3 Fog or mist occur at site; it is raining or snowing; there is danger of rain or snow; relative humidity is above 85%.

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

.5 Previous coat is not dry.

.5 Supply cover when paint must be applied in damp or cold weather. Supply, shelter, or heat surface and surrounding air to comply with temperature and humidity conditions specified. Protect until paint is dry or until weather conditions are suitable.

.6 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

.7 Apply each coat of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.8 Spray Application:

.1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

.2 Provide traps or separators to remove oil and water from compressed air and drain periodically during operations.

.3 Keep paint ingredients properly mixed in spray pots or containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.

.4 Apply paint in uniform layer, with overlapping at edges of spray pattern.

.5 Brush out immediately runs and sags.

.6 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray. In areas not accessible to spray gun, use brushes, daubers or sheepskins.

.7 Remove runs, sags and brush marks from finished work and repaint.

.9 Shop Painting:

.1 Do shop painting after fabrication and before damage to surface occurs from weather or other exposure.

.2 Spray paint contact surfaces of field assembled, bolted, friction type joints with primer coat only. Do not brush primer after spraying.

.3 Paint metal surfaces which are embedded in masonry.

.4 Do not begin painting until all metal repairs are completed.

.5 Remove weld spatter before painting. Remove weld slag and flux by methods as specified in paragraph 3.2.1.1 Metal Surfaces to be Repainted.

.10 Field Painting:

.1 Apply final paint coating to iron assembly as soon as practical after reinstallation.

.2 Touch up metal which has been shop coated with same type of paint and to same thickness as shop coat. This touch-up to include cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas.

.3 Field paint surfaces (other than joint contact surfaces) which are accessible before erection but which are not to be accessible after erection.

.4 Where painting does not meet with requirements of specifications, and when so directed by Departmental Representative remove defective paint, thoroughly clean affected surfaces and repaint in accordance with these specifications.

.11 Handling Painted Metal:

.1 Handle painted metal after paint has dried, or when necessary for handling for painting or stacking for drying.

.2 Scrape off and touch up paint which is damaged in handling, with same number of coats and kinds of paint as were previously applied to metal.

3.4 SITE QUALITY CONTROL

.1 Site Tests and Inspections.

.1 Upon completion of the painting procedures test for dry film reading and evaluate the results per SSPC-PA 2.

3.5 CLEANING

.1 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Waste Management Plan.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

.1 Protect painted surfaces from damage during construction.

.2 Protection of surfaces:

.1 Protect surfaces not to receive paint.

.2 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats of paint. Remove contaminants from surface and apply paint immediately.

.3 Protect cleaned and freshly painted surfaces from dust to approval of Departmental Representative.

.3 Repair damage to adjacent materials caused by painting exterior metal surface application installation.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

.1 Samples.

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit:

.1 Sod for each type specified.

.1 Install approved samples in one square metre mock-ups and maintain in accordance with maintenance requirements during establishment period.

.2 Bio-degradable geotextile fabric.

.3 Obtain approval of samples by Departmental Representative.

1.2 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.3 SCHEDULING

.1 Schedule sod laying to coincide with preparation of soil surface.

.2 Schedule sod installation when frost is not present in ground.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Waste Management plan.

.2 Divert unused fertilizer from landfill to official hazardous material collections site approved by Departmental Representative.

.3 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

.1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.

.1 Turf Grass Nursery Sod types:

.1 Number One Kentucky Bluegrass Sod - Fescue Sod: Nursery Sod grown solely from seed mixture of cultivars of Kentucky Bluegrass and Chewing Fescue or Creeping Red Fescue, containing not less than 40% Kentucky Bluegrass cultivars and 30% Chewing Fescue or Creeping Red Fescue cultivars.

.2 Turf Grass Nursery Sod quality:

.1 Not more than 2 broadleaf weeds or 10 other weeds per 40 square metres.

.2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.

.3 Mowing height limit: 35 to 65 mm.

.4 Soil portion of sod: 6 to 15 mm in thickness.

.2 Sod establishment support:

.1 Geotextile fabric: biodegradable, 25 mm square mesh.

.2 Biodegradable starch pegs: 17 x 8 x 200 mm.

.3 Water:

.1 Contractor to supply.

.4 Fertilizer:

.1 To Canada "Fertilizers Act" and "Fertilizers Regulations".

.2 Complete, synthetic, slow release with 65 % of nitrogen content in water-insoluble form. Ensure no runoff of fertilizer to water course.

2.2 SOURCE QUALITY CONTROL

.1 Obtain approval from Departmental Representative of sod at source.

.2 When proposed source of sod is approved, use no other source without written authorization from Departmental Representative.

Part 3 Execution

3.1 PREPARATION

.1 Verify that grades are correct and prepared in accordance with recommendations of sod supplier. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.

.2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.

.3 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated, to tolerance of plus or minus 8 mm, for Turf Grass Nursery Sod, surface to drain naturally.

.4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site.

3.2 SOD PLACEMENT

.1 Lay sod within 24 hours of being lifted, if air temperature exceeds 20 degrees C.

.2 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements. Cut sod into existing surface. Do not layer sod on top of soil i.e. flush interface.

.3 Roll sod as directed by Departmental Representative. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.3 SOD PLACEMENT ON SLOPES AND PEGGING

.1 Install and secure geotextile fabric in areas indicated, in accordance with manufacturer's instructions.

.2 Start laying sod at bottom of slopes. Follow horizontal contour of slope, not vertical placement.

.3 Peg sod on slopes steeper than 3 m horizontal to 1 m vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to following pattern:

.1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.

.2 Not less than 3-6 pegs per square metre.

3.4 FERTILIZING PROGRAM

.1 Fertilize during establishment and warranty periods to in accordance with sod supplier recommendations.

3.5 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following operations from time of installation until acceptance.

.2 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.

.3 Cut grass to 50 mm when or prior to it reaching height of 75 mm. Remove clippings which will smother grassed areas as directed by Departmental Representative.

.4 Maintain sodded areas weed free 95%.

.5 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

3.6 ACCEPTANCE

.1 Turf Grass Nursery Sod areas will be accepted by Departmental Representative provided that:

.1 Sodded areas are properly established.

.2 Sod is free of bare and dead spots.

.3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.

.4 Sodded areas have been cut minimum 2 times prior to acceptance.

.2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.7 MAINTENANCE DURING WARRANTY PERIOD

.1 Perform following operations from time of acceptance until end of warranty period:

.1 Water sodded Turf Grass Nursery Sod areas at weekly intervals to obtain optimum soil moisture conditions to depth of 100 mm.

.2 Repair and resod dead or bare spots to satisfaction of Departmental Representative.

.3 Cut grass and remove clippings that will smother grass, as directed by Departmental Representative to height as follows:

.1 Turf Grass Nursery Sod:

.1 50 mm during normal growing conditions.

.2 Cut grass at 2 week intervals, or as directed by Departmental Representative, but at intervals so that approximately one third of growth is removed in single cut.

.3 Fertilize areas in accordance with fertilizing program.

.4 Eliminate weeds by mechanical or chemical means, to extent acceptable to Departmental Representative.

3.8 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION