PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 04 03 08.02 – Historic – Mortaring.

.2 Section 04 05 10.02 - Common Work Results for Masonry.

.3 Section 04 05 19.02 - Masonry Anchorage and Reinforcing.

1.2 UNIT PRICES

.1 Unit Prices

.1 Unit prices apply to masonry work at Pier 47 only, all other masonry work is included in the lump sum price. The unit price will include all costs necessary to complete the specific repair, including supplying materials, additional shoring and scaffolding and executing work as described herein and reflected in contract.

.2 Measurement and Payment

.1 The work for work at Pier 47 only, all other masonry work is included in the lump sum price, payment for this work will be on a unit price basis and will include all costs associated with supplying materials, and executing work as described herein and reflected in contract.

.2 The work for this Section at Pier 47 only, will be paid based on the actual quantities measured on site and the unit prices stated in the Bid and Acceptance Form.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM A276-08, Standard Specification for Stainless Steel Bars and Shapes.

.2 Canadian Standards Association (CSA)

.1 CSA A23.1- 09/A23.2-09, Construction Materials and Methods of Concrete Construction.

.2 CSA A179-04, Mortar and Grout for Unit Masonry.

.3 CAN/CSA A371- 04, Masonry Construction for Buildings.

1.4 DEFINITIONS

.1 Raking: the removal of loose/deteriorated mortar until sound mortar is reached, but not less than a depth of 25 mm. Deep raking the removal of loose/deteriorated mortar until sound mortar is reached, from 25mm depth to full depth of mortar joint.

.2 Backpointing: filling of masonry joints for the depth from which mortar has been raked out to a point 25 mm from the stone face.

.3 Finish pointing: filling and finishing of masonry joints from which mortar has been raked out, for a depth of 25 mm.

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

.5 Repair: using adhesives to rebond sections of fractured masonry.

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

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

.8 Resurfacing: tooling and polishing of stone surface to renew it's texture and finish.

.9 Historic Masonry Repointing: Rake out and repoint mortar joints, including raking out, backpointing and finish pointing.

1.5 SYSTEM DESCRIPTION

.1 Work of this Section includes but is not limited to:
- .1 Visually inspecting for obvious signs of deteriorated masonry.
- .2 Raking all joints, and as noted on Drawings.
- .3 Preparation of masonry surface including joints surface cleaning, flushing of voids and open joints, and masonry wetting.
- .4 Repointing of all masonry joints, including backpointing and finish pointing.
- .5 Removal of loose portions on stone surface.
- .6 Re-setting of dislodged masonry units.
- .7 Ensuring cure of mortar.
- .8 Grouting by hand, small voids.
- .9 Consolidation of fractured masonry units or spalled units.
- .10 Replacement of deteriorated or missing units.

1.6 SAMPLES

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

.2 Submit labelled samples of materials used on project for approval before work commences.

1.7 QUALIFICATIONS

.1 Refer to Section 04 05 10.02 - Common Work Results for Masonry.

.2 One thoroughly experienced, reliable and competent worker shall be in charge of all mortar mixing for the duration of the project. The experience must include mixing mortar for a minimum of three projects similar to this project. Contractor to identify this individual to the Departmental Representative at the start of the project.

1.8 MOCK-UPS

.1 Construct mock-up in accordance with Section 01 33 00 - Submittal Procedures.

.2 Construct mock-up 1.2 m x 1.8 m to demonstrate raking out and repointing procedure for the following:
- .1 Sawcutting of joints using power tools, where permitted.
- .2 Raking out of joints.
- .3 Backpointing of joints.
- .4 Finishpointing of joint.

.3 Construct mock-up under supervision of Departmental Representative to demonstrate a full understanding of specified procedures, techniques and formulations are achieved before work commences.

.4 Construct mock-up where directed.

.5 Allow 72 hours for inspection of mock-up by Departmental Representative before proceeding with masonry repointing and repair work.

.6 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

1.9 DELIVERY, STORAGE AND HANDLING

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

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

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

.4 Remove rejected or contaminated material from site.

1.10 PROTECTION

.1 At end of each working day, cover unprotected work with waterproof membranes. Membranes should extend to 0.5 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly.

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

.3 All methods of enclosure and protection shall be to the approval of the Departmental Representative.

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

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

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

1.11 EXISTING CONDITIONS

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

1.12 ENVIRONMENTAL REQUIREMENTS

.1 When temperature is 5°C or less:
  .1 Store cements and sands for immediate use within heated enclosure. Allow these materials to reach minimum temperature of 5°C (that is equilibrium with air temperature in enclosure).
  .2 Heat water to minimum of 20°C and maximum of 30°C:
    .1 At time of use temperature of mortar to be minimum of 15°C and maximum of 30°C.

.2 Do not mix cement with water or with aggregate or with water-aggregate mixtures having higher temperature than 30°C.

.2 Protection requirements are specified in Section 04 05 10.02 - Common Work Results for Masonry.

.3 Obtain approval from Departmental Representative for methods of enclosure and protection.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Mortar materials: to Section 04 03 08.02 – Historic – Mortaring.

.2 Dowels: Stainless Steel, to ASTM A276, Grade 304.

2.2 PROPORTIONS

.1 Proportions: to Section 04 03 08.02 – Historic – Mortaring.

2.3 MORTAR

.1 Mortar: to Section 04 03 08.02 – Historic – Mortaring.

2.4 ANCHORS

.1 Anchorage for stone: to Section 04 05 19.02 – Masonry Anchorage and Reinforcing.

PART 3 EXECUTION

3.1 GENERAL

.1 Perform work in accordance with CAN/CSA A371.

.2 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.

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

.4 For backpointing in deep, narrow joints, fabricate long stainless steel packing tools, to force mortar into the joints and compact it.

.5 Finish joints per match existing tooling joints, except where specified otherwise.

.6 Use suitable approved jointing tool unless otherwise specified to form compacted joints. Tool length for finish pointing not to exceed 50 mm.

3.2 REPOINTING

.1 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 All cutting out of joints is to be done with hammer and chisel, or air tools, unless otherwise specified. Great care must be taken so as not to damage masonry units adjacent to joints. Cut away from the arrises to prevent spalling 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 above conditions, as observed in the mock-up.

.5 If the contractor is found not to comply with these requirements, he will be required to remove all mortar by using 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:

.7 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.

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

.9 Notify the Departmental Representative to inspect the grinding, prior to removing the remaining mortar with hand tools.

.10 The remaining mortar must be removed by hand tools.

.11 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.

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

.13 Clean by compressed air, surfaces of joints without damaging texture of exposed joints.

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

.15 Fine joints (less than 4mm) need not be raked out more than 10mm, in order to reduce the danger of chipping the masonry edges. Use flat-bladed quirks and light hammers, hack-saw blades or similar tools to rake out joints. Do not saw-cut the stone.

.16 Leave no standing water.

.17 Damaged stone includes widening of existing joints, nicks, gouges and chipped or scratched surfaces from cutting out tools, resulting from improper workmanship. Any stone damaged as a result of careless raking, or saw cutting, shall be replaced at no cost to the Departmental Representative.

.18 In no area can the joints be raked out for more than four levels of scaffold in height, prior to repointing, unless approved by the Departmental Representative.

.19 If masonry unseats or bond is broken, remove unit and reset.

.2 Backpointing

.1 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 finish pointing. Where voids exist that conventional backpointing cannot fill, notify Departmental Representative for direction.

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

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

.4 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 30 mm thick, minimum 12 mm thick, allowing each layer to set to thumb print hard before placing next layer. 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.

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

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

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

.3 Finish pointing:

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

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

.3 Dampen joints and completely fill with mortar. If surface of stone has worn rounded edges, keep pointing back from surface to provide same width of joint. Keep joints back approximately 1 mm behind arrises. Avoid feather edges. Pack mortar solidly into voids and joints, to ensure positive adhesion to all inner surfaces.

.4 Keep masonry damp while pointing is being performed.

.5 Do no pointing in freezing weather. See Section 04 05 10.02, Common Work Results for Masonry for protection required for work in this Section.

.6 Build-up pointing in layers not exceeding 20 mm in depth. Allow bottom layers to set before applying subsequent layers. Pack and compress mortar into voids to fit approximately, but no less than 15mm thick. Maintain joint width.

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

.8 Allow mortar to set so that there is no free water that will cause run off on stone faces, then tool to match approved mock-up joints. Tool head joints, then horizontal joints. Do not overwork the face of the joints. Joints shall be uniform in appearance. Do not brush joints until they have set to the extent that brushing will not mark the joint surface.

.9 When mortar is thumbprint hard, finish joints with stippling action using a short bristle brush to compact the joint further, and produce a textured finish, exposing the aggregate.

.10 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)

.4 Curing:

.1 Moist cure freshly pointed joints by covering with moist burlap enclosure and polyethylene sheeting, for minimum of 3 days after finish pointing. Keep wall and burlap misted.

.5 Protection

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

3.3 ANCHORAGE REMOVAL

.1 Remove embedded anchors/fence components.

.2 Rake out and repoint joints affected by anchors/fence components.

.3 Colour of mortar to match colour of mortar already installed.

3.4 DESCALING

.1 Remove loose masonry portions by impact with bush hammer as directed by Departmental Representative.

3.5 RESETTING

.1 Prepare area to receive reset stones. Allow for resetting several loose backup stone in fresh mortar.

.2 Replace deteriorated masonry as directed by Departmental Representative. Shave back-up as necessary to reset stone.

.3 Build up core where more than 50 mm from back of stones to be reset. Build up in traditional manner with stone off sets in mortar. All mortar to fully set up.

.4 Install new stainless steel cramp anchors, two per stone, built into backup material.

.5 Install mortar on face of backup masonry for collar joint, just prior to resetting stone.

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

.7 Insert and compress firm mortar to within 50 mm of pointing surface. Allow mortar to set 24 hours.

.8 Pull out wood wedges when dried and shrunken.

.9 Backpoint in layers, and leave ready for finish pointing.

3.6 FIELD QUALITY CONTROL

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

.2 Notify Departmental Representative prior to saw cutting joints, to permit the stone masonry to be photographed. Provide clear access to all points of stone masonry to permit this photography to occur.

.3 Provide the Departmental Representative with a minimum of 72 hour notice for required inspections.

.4 Approval of raked out condition of joints, and approval of backpointing mortar, must be received in writing to the contractor before the next procedure can proceed.

.5 Where work proceeds to the next phase, without the approval of the Departmental Representative, the Contractor will remove all unapproved mortar at his cost.

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 Do further cleaning after mortar has set and cured.

.3 Clean masonry with stiff natural bristle brushes and plain water only. Vinegar or chemicals are not to be used unless instructed in writing by Departmental Representative.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 04 03 07.02 - Historic - Masonry Repointing and Repair.

.2 Section 04 05 10.02 - Common Work Results for Masonry.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

- .1 ASTM C109/C109M-11b Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).
- .2 ASTM C144-04, Specification for Aggregate for Masonry Mortar.
- .3 ASTM C185-08, Standard Test Method for Air Content of Hydraulic Cement Mortar.
- .4 ASTM C207-06 Specification for Hydrated Lime for Masonry Purposes.
- .5 ASTM C348-02, Test Method for Flexural Strength of Hydraulic-Cement Mortars.
- .6 ASTM C780-11, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Masonry.
- .7 ASTM C940-98a (2003), Test Method for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced Aggregate-Concrete in the Laboratory.
- .8 ASTM C979/C979M-10, Specification for Pigments for Integrally Coloured Concrete.

.2 Canadian Standards Association (CSA International).

- .1 CAN/CSA A3000-08, Cementitious Materials Compendium.
- .2 CAN/CSA A179-04 (R2009), Mortar and Grout for Unit Masonry.

1.3 ALLOWABLE TOLERANCES

.1 The Departmental Representative reserves the right to reject mortar which fails compressive strength range for specified mortar mix.

1.4 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.

1.5 SUBMITTALS

.1 Product Data.

- .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit five copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for mortar, grout, parging, colour additives and admixtures.

.2 Samples.

- .1 Submit samples in accordance with Section 01 33 00.01 - Submittal Procedures.

.2 Submit two 50 mm x 50 mm size samples of mortar matched to mortar used at Victoria Lookout.

.3 Prior to the mixing or preparation of mortars submit for approval to the Departmental Representative confirmation of source or product data sheet of:

.1 Aggregate and Sand.

.2 Cements.

.3 Lime.

.4 Manufacturer's Instructions.

.1 Submit manufacturer's installation instructions.

1.6 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties. Include the following:

.1 Sand gradation testing in accordance with CAN/CSA A179.

.2 Bulking of aggregate sample, 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 and 28 days or otherwise required.

.2 Testing Standards

.1 Vicat cone test: to ASTM C780.

.2 Cube strength: to CAN/CSA A179, Annex B.

.3 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

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

.5 Mock-ups: Construct mock-ups in accordance with Section 04 05 10.02 – Common Work Results for Masonry.

1.7 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 ALTERNATIVES

.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 rule applies during the entire contract.

1.9 SITE CONDITIONS

.1 Existing Conditions

.1 Investigate possible structural problems and report before beginning masonry work.

.2 Ambient Conditions
- .1 Execute work to CAN/CSA A179.
- .2 Installation of Relative Humidity (RH) and Temperature equipment: Measure temperature and RH. Report to Departmental Representative.

PART 2 PRODUCTS

2.1 MATERIALS

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

.2 Mortar and grout: to CAN/CSA A179.

.3 Aggregate: to CAN/CSA A179; gradation to ASTM C144. Use well graded aggregate passing 4.75mm down to 150 micron sieve where joints are greater than 6mm. Use aggregate passing 1.18mm down to 300 micron sieve where 6mm thick joints or less are indicated. In the event that the sand does not meet the noted gradation requirements, the contractor will be required to carry out additional sieving to meet the requirements or provide alternate sand.

.4 Colour: to ASTM C979. Ground coloured natural aggregates or metallic oxide pigments.
- .1 Provide a sample of the mortar to the Departmental Representative prior to commencement of the work.

.5 Water: potable or from approved non-potable supply.

.6 Lime:
- .1 Hydrated lime: ASTM C 207, type SA.

.7 Portland Cement: CAN/CSA A3000, white, non staining, type GU.

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

.9 Grout for stonework: Hydraulic lime based injection and reinforcement grout, conforming to CAN/CSA A179, ASTM C348 and ASTM C940, control water content to conform to CAN/CSA A179, Clause 4.2.1.2 or Clause 4.3.1.5.

.10 Restoration mortar for patching of stone to be a proprietory mix, pre-mixed/pre-bagged. Properties to be compatible with existing stone.

.11 Polymer Latex admixture.

2.2 PROPERTIES

.1 Bedding and pointing mortar for stonework: type O based on proportion specifications. Range for compressive strength for Limestone: 1 MPa at 7 days and 2 MPa at 28 days.
- .1 Mortar Mix 1: 1:2:6 cement; lime; aggregate mix for severe exposure, such as upper stone details, and for 2m above grade.
- .2 Mortar Mix 2: 1:2:9 cement; lime; aggregate mix for all other locations.
- .3 For all walls adjacent to pathways, footpaths and roadways, for joints to 1200mm above grade, add polymer latex admixture as per manufacturer's instructions.

.2 Restoration mortar; premix to manufacturer's instructions.

.3 Vicat Cone Penetration for Stonework: to ASTM C780.
- .1 Pointing Mortar: 15-20mm.
- .2 Bedding Mortar: 20-30mm.

.4 Allowable air content for all Lime Mortars; 8% to 14%.

2.3 MIXES

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

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 CONSTRUCTION

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

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. 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%. Record water quantities and use for subsequent mixes to help ensure uniformity of all subsequent mixes.

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

.7 All pointing mortar can be mixed using a regular paddle mixer. Only electric motor mixers are permissible. Mixers run on hydrocarbons are not permitted, due to fumes.

.8 Mixing by hand must be pre-approved by the 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.

.9 Clean all mixing boards and mechanical mixing machine between batches.

.10 Mortar must be weaker than the masonry units it is binding.

.11 Mortar must not contain elements detrimental to the original masonry or surrounding materials.

.12 Appoint one individual to mix mortar, for duration of project. In the event that this individual must be replaced, mortar mixing must cease until the new individual is trained, and mortar mix is tested.

3.4 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

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

.3 Clean masonry with low pressure clean water and soft natural bristle brush. For limestone, pressure should be between 276 and 410 kPa. See Section 04 03 07.02 - Historic: Masonry Repointing and Repair.

3.5 SCHEDULE

.1 Use mortar matching existing mortar in colour for finish pointing to minimum depth of 30mm.

.2 Use non-staining mortar for all repointing work.

3.6 PROTECTION OF COMPLETED WORK

.1 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor 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 CAN/CSA A179. The mortar testing company should have capacity to provide Vicat Cone test and to 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 test as specified.

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

.4 Air content to ASTM C185, for all lime mortars, 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, or more frequently as required by the Departmental Representative.

.5 Test sand and aggregate for bulking at start of project, at each new sand delivery, and at severe change in weather. Verify moisture content conforms to CAN/CSA A179.

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

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 04 03 07.02 – Historic – Masonry Repointing and Repair.

.2 Section 04 03 08.02 – Historic – Mortaring.

.3 Section 04 05 10.02 – Common Work Results for Masonry.

1.2 UNIT PRICES

.1 Unit Prices

.1 Unit prices apply to masonry work at Pier 47 only, all other masonry work is included in the lump sum price. The unit price will include all costs necessary to complete the specific repair, including supplying materials, additional shoring and scaffolding and executing work as described herein and reflected in contract.

.2 Measurement and Payment

.1 The work for work at Pier 47 only, all other masonry work is included in the lump sum price, payment for this work will be on a unit price basis and will include all costs associated with supplying materials, and executing work as described herein and reflected in contract.

.2 The work for this Section at Pier 47 only, will be paid based on the actual quantities measured on site and the unit prices stated in the Bid and Acceptance Form.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM A276–08, Specification for Stainless Steel Bars and Shapes

.2 Canadian Standards Association (CSA)

.1 CAN/CSA A179-04, Mortar and Grout for Unit Masonry.

1.4 DEFINITIONS

.1 Repair of Stone: any repair, other than cosmetic, i.e. superficial, and replacement, done to conserve/restore original appearance and function of partly deteriorated stones. Repairs include use of restoration mortar for small chips and spalls, crack repairs, Dutchman repairs, fracture repairs and descaling.

.2 Filling: material used to rebuild broken or deteriorated part of stone.

.3 Historic Repair of Stone (Resetting): Remove and reset of existing units. Remove and reset displaced stones, Including all required anchors, collar joints, bedding mortar and pointing. Average size of stones: 400 x 400 x 300.

.4 Historic Repair of Stone (Fractured, In-Situ): In-situ fracture repairs. Perform in-situ repair to fractured units. Including all collar joints, bedding mortar and pointing.

.5 Historic Repair of Stone (Fractured, Removed): Fracture repairs. Remove and repair fractured units, including all collar joints, bedding mortar and pointing.

.6 Historic Repair of Stone (Cracked): Perform minor crack repairs to fractured stone that do not require-in-situ pinning. Average length per repair 300mm.

.7 Historic Repair of Stone (Mortar): Proprietary restoration mortar. Average size: 300x300x25mm max. depth.

.8 Historic Repair of Stone (Dutchman): Dutchman repair. Average size: 200mm x 200mm x 100mm.

.9 Historic Repair of Stone (Pin Removal): Remove steel insert and perform stone repair using proprietary restoration mortar.

.10 Grout: material used as adhesive to fasten broken/fractured stone elements by direct application at fracture interface and/or by application to added reinforcing elements such as dowels.

.11 Mortar: material used to repoint the adjacent mortar joints to stone element being repaired.

1.5 QUALITY ASSURANCE

.1 Work of this section in accordance with Section 04 05 10.02 – Common Work Results for Masonry.

1.6 SAMPLES

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

.2 Submit grout and mortar samples to CAN/CSA A179.

1.7 MOCK-UPS

.1 Construct mock-ups in accordance with Section 01 33 00 – Submittal Procedures, and Section 04 05 10.01 – Common Work Results for Masonry.

.2 Construct the following mock-ups as directed by the Departmental Representative as being required for the project before making repairs:

.1 Two crack repairs.
.2 Two shard repairs.
.3 Two in-situ fracture repairs.
.4 One fracture repair, with stone removed.
.5 Two stone restoration repairs.
.6 Two Dutchman repairs.
.7 One stone face descaled.
.8 Reglet: length 1.0m.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Store materials in a dry area and supported above ground.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Maintain temperature between 5°C and 30°C during and 48 hours after repair, throughout thickness of stone.

.2 Choose epoxy resin compatible with humidity condition of stone as specified by manufacturer.

.3 Provide for temporary enclosures and heating equipment to maintain specified temperatures. Take precautions to avoid overheating masonry.

1.10 EXISTING CONDITION

.1 Record and report to Departmental Representative site conditions non-conforming to those specified before beginning work.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Materials for mortar and grout, see Section 04 03 08.02, Historic Mortaring.

.2 Water: clean and free of deleterious materials such as acid, alkali and organic material in accordance to CAN/CSA A179.

.3 Dowels: stainless steel, threaded rod, to ASTM A276, Grade 304.

.4 Deformed wire: stainless steel or equivalent non-corrosive metal, 2 mm diameter.

.5 Stone slabs: to have similar mechanical and aesthetic properties to existing, and in accordance with Section 04 03 42.02 – Historic – Replacement of Stone.

.6 Hairline Crack Filling: Dispersed Hydrated Lime (DHL), grout and shelter coat pigmented to stone colour to approval of Departmental Representative.

.7 Epoxy Resin Gel: Two component, solvent free, epoxy resin adhesive mortar.

.8 Restoration Mortar, see Section 04 03 08.02 – Historic-Mortaring.

2.2 MORTAR MIXES

.1 Mixes, see Section 04 03 08.02, Historic Mortaring.

2.3 SOURCE QUALITY CONTROL

.1 Retain purchase orders, invoices, suppliers test certificates and documents to prove that materials used in contract meet requirements of specification.

.2 Produce above upon request by Departmental Representative and allow free access to sources where materials were procured.

PART 3 EXECUTION

3.1 PREPARATION

.1 Remove decayed section of stones until sound surface is reached. Obtain Departmental Representative's approval for methodology and tools to be employed before commencing this work.

3.2 PROTECTION

.1 Prevent damage to building, pavement and carved stone features which are to remain. Make good any damage.

.2 Take utmost care not to damage historic fabric. Make good any damage.

3.3 REMOVAL OF CAULKING AND SEALANTS

.1 Remove caulking and sealants.

3.4 CRACK REPAIR

.1 Drill 5mm diameter injection ports as per injection grout manufacturer's specifications.

.2 Clean out void with compressed air and potable water until water runs clear. Final flushing should be with a 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 grout to harden.

.6 Prepare DHL shelter coat using compatible pigments with the DHL grout.

.7 Inject shelter coat over crack fills. Apply in thin layers to bring out to surface.

3.5 REPAIR OF A FRACTURED STONE

.1 Remove existing stone, see Section 04 03 42.02, Historic – Replacement of Stone.

.2 Obtain Departmental Representative's approval for repair methodology before commencing work.

.3 Remove elements which require minor repair without losing pieces or worsening damage. Do not damage existing Work.

.4 Drill 13mm diameter holes, 60mm long in each section at fracture, maximum spacing at 300mm on centre. Provide minimum two holes per stone. Clean dust out of hole using acetone and cotton swabs.

.5 Insert 12mm diameter stainless steel dowels, 100 mm long, and apply specified grout to holes and interface. Let grout cure for 24 hours minimum.

.6 Glue stone faces together with epoxy adhesive, or approved grout. Allow to set for 24 hours minimum.

.7 Reinstate consolidated element into work.

.8 Reinsert stone, see Section 04 03 42.02, Historic – Replacement of Stone. Repoint with specified mortar. Joints to be similar in profile to existing. If fracture lines up with vertical mortar joints above and below the fractured stone, rotate the stone 180 degrees, if the pattern on the stone permits, and reinsert.

.9 Repair surface of fracture to profile and colour of the surrounding stone, as per Article 3.4 - Crack Repair.

3.6 REPAIR OF FRACTURED STONE IN-SITU

.1 Drill 11 or 13 mm diameter holes, extend 60 mm beyond fracture, spaced at 300 mm on centre maximum, minimum 2 per stone. Confirm dowel size with Departmental Representative, prior to drilling hole.

.2 Clean dust out of hole using acetone and cotton swabs.

.3 Insert 10 or 12 mm diameter stainless steel dowels, 100 mm long and apply epoxy adhesive to holes and joints. Let set for 24 hours minimum. Drill out the outer 12mm of epoxy filler and repair with restoration mortar.

.4 Repair fracture as per Article 3.4 – Crack Repair.

.5 Finish surface of fracture to colour and profile existing stone.

3.7 REFACING PARTLY DETERIORATED STONE WITH SLAB (DUTCHMAN REPAIR)

.1 Remove decayed stone until sound surface is reached. Cut existing stone to square void in stone as much as possible, with minimum depth 50 mm.

.2 Select new stone to complement surrounding colour, free from defects and with bedding similar to adjacent work. Where possible, salvage from existing weathered stone on site.

.3 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 Moisten stone surface prior to application of grout.
- .3 Insert 10mm diameter dowels, 100mm long into existing stone and apply specified grout to holes and interface. Allow to set for 24 hours minimum.
- .4 Where new or existing stone is less than 100mm thick, length of dowel to be 50% of the thickness of stone on each side of the interface.

.4 Dovetailed grooves as mechanical fasteners:
- .1 Make 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 Moisten surface of stone prior to application of grout.
- .3 Apply specified grout to dovetailed grooves and interface of existing stone.

.5 Moisten stone surface. Fill dowel holes and/or dovetailed grooves of new stone slab with specified grout. Erect new stone slab into position. Secure stone temporarily to allow grout to set. Ensure joint between new and existing stone is filled solid and finished to match existing stone face.

.6 Leave face of Dutchman slightly proud and finish to original profile by rubbing back or tooling as required. Rubbing back marks on existing stone are not permitted.

.7 Repoint mortar joint, see Section 04 03 07.02 – Historic – Masonry Repointing and Repair.

3.8 REFACING PARTLY DETERIORATED STONE WITH FILLING (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 shall be on hand during work and shall supplement and take precedence over this specification. Repairs shall match existing stone. 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.

.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 After removing dust, moisten surfaces. 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 shall 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 section in layers, not exceeding 15 mm thickness, allowing each layer to set before proceeding with next.

.8 Use wood float and avoid excessive trowelling to prevent crazing.

.9 If area to be repaired is carved or moulded, form roughly to required shape with wood float leaving repair mortar proud, then chisel finish to final shape when mortar has set.

.10 Remove laitance with stiff, near dry, fibre brush.

.11 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.

.12 Repoint mortar joint, see Section 04 03 07.02 – Historic – Masonry Repointing and Repair.

.13 Surface finish of patches must correspond with existing stone in colour and texture.

3.9 SURFACE SPALLING STONE REPAIR

.1 Descale the surface of the stone, by removing loose masonry portions by impact with bush hammer, 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) and where directed by the Departmental Representative, prepare repair area, clean surface and apply stone restoration mortar as per

Article 3.8 – Refacing Partly Deteriorated Stone with Filling (Including Voids, Chips, Old Patches).

.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 200 x 200 mm, notify Departmental Representative for direction.

3.10 RESURFACING STONE

.1 Finish surface of stone by rubbing and polishing to match existing.

.2 Entire face of stone to receive this treatment to ensure uniformity of colour and finish.

3.11 REGLETS

.1 Mark location of reglets on stone face with removable marker. 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 Stone damaged during cutting of reglets must be replaced by the Contractor at no cost to the Departmental Representative.

3.12 CLEANING

.1 Clean mock-up to demonstrate cleaning operations to 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 grout or mortar residue resulting from work performed without damage to stone or joints.

.4 Clear site of debris, surplus material and equipment, leaving work area in clean and safe condition.

3.13 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 SECTIONS

.1 Section 04 03 07.02 - Historic - Masonry Repointing and Repair.

.2 Section 04 03 08.02 – Historic – Mortaring.

.3 Section 04 03 43.02 – Historic – Dismantling Stone Masonry.

.4 Section 04 05 10.02 – Common Work Results for Masonry.

.5 Section 04 05 19.02 – Masonry Anchorage and Reinforcing.

.6 Section 04 43 23.02 - Quarried Stone Veneer Cladding.

1.2 STONE AVAILABILITY

.1 Use replacement dimensioned per Section. 04 43 23.02 - Quarried Stone Veneer Cladding.

1.3 PRICE AND PAYMENT

.1 Cost to obtain and transport replacement stone is included in the lump sum bid price.

.2 Cost to do final cutting and tooling of rough dimension stone to indicated finish stone shapes, sizes and tooling is included in the lump sum bid price.

.3 Cost to salvage, clean, transport, store and reinstall existing face stones is included in the lump sum bid price.

1.4 REFERENCES

.1 American Society for Testing and Materials (ASTM).

.1 ASTM C 97/C 97M-09, Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.

.2 ASTM C 170/C 170M-09, Standard Test Method for Compressive Strength of Dimension Stone.

.3 ASTM C568-03, Specification for Limestone Dimension Stone.

1.5 SHOP DRAWINGS

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

.2 Submit shop drawings for all new stone required. Refer to drawings for locations.

.3 Drawings shall show all details for size, section, bedding, jointing, anchor or tying system and finish of stone. All dimensions must be based on accurate site measurements.

.4 All moulded and profiled work details to be submitted full size.

.5 Submit stone templates for each type and each size of masonry unit specified: facing stone, coping stone, upper and lower pier stones, gate threshold stone and walkway curb stones.

.6 Mark each stone with the quarry bed or direction of bedding and the reference number corresponding to the schedules with concealed permanent marking.

1.6 SAMPLES

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

.2 Submit samples of new finished and salvaged replacement stone for approval, prior to purchase of stone.

.3 Samples from designated quarry: submit samples of replacement stones. Submit 4 sets of stone as follows:

.1 Select samples from currently worked bed of quarry and accompanied by quarry certification.

.2 Submit 4 samples, each 300x300x75mm.

.4 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.

1.7 SCHEDULES

.1 Submit schedule of stone units indicating type, rough dimension size, orientation, gross weight and reference number.

.2 The Departmental Representative may adjust sizes by up to 10% of those shown to account for construction requirements.

.3 Submit schedule within one week of contract award indicating milestones, including but not restricted to:

.1 Preparation, submission of shop drawings.

.2 Sourcing stone.

.3 Inspection at supplier holding facility.

.4 Inspection at fabrication site after the initial cutting down of the stones..

.5 Inspection at fabrication site after the final cutting and tooling.

.6 Delivery and inspection.

1.8 MOCK-UPS

.1 Construct mock-up in accordance with Section 04 05 10.02 – Common Work Results for Masonry.

.2 Allow 72 hrs for inspection of mock-up by Departmental Representative, before proceeding with replacement work.

.3 When accepted, mock-up may remain as part of finished work.

1.9 QUALITY ASSURANCE

.1 The qualifications of the stone masons working on replacement of stone, must be in accordance with Section 04 05 10.02 – Common Work Results for Masonry.

.2 Make mason's workshop accessible to Departmental Representative for inspection of current work-in-progress.

.3 Employ workers specially trained and experienced in this type of work.

.4 Submit certified test reports on replacement stone in accordance with Section 04 05 10.02 – Common Work Results for Masonry.

.5 Independent testing agencies:

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

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional Inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.

.6 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 stone from quarry with specified performance characteristics and physical properties including but not limited to the following:

.1 Compressive strength: test to ASTM C 170.

.2 Porosity: test to ASTM C 97.

.3 Provide data for stone, in addition to requirements set out in referenced ASTM Standards, indicating initial rates of absorption.

.7 Inspections:

.1 The Departmental Representative will inspect stones to determine if they meet the criteria included in this specification and match the samples.

.1 Stone that fails to meet criteria shall be rejected.

.2 The Departmental Representative will inspect the stone for acceptance of quality and dimensions at the following stages:

.1 After the initial purchase of the rough blocks at the supplier holding yard.

.2 After the initial cutting down of the stones.

.3 After the final cutting and tooling.

.3 The Contractor will ensure that all the stones are unpacked, arranged and ready for review by Departmental Representative with modest manipulation before quality control visits.

.4 If the stone is not found to meet the required quality and dimensions:

.1 The Contractor will provide additional material at no additional cost to the project until all material is accepted by the Departmental Representative.

.2 The Contractor will pay all costs associated with re-inspections by the Departmental Representative.

1.10 PRODUCT 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 assembly, referenced to shop drawings. Mark stones where not exposed with permanent markers.

.4 Avoid excessive handling, and protect against chipping, damage, soiling or staining.

.5 Damaged stone, and stone that is repaired prior to reaching site, will be rejected.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Obtain new stone from a single quarry source acceptable to Departmental Representative.

1. Ensure single quarry source has resources to provide materials of consistent quality and matching existing stone.

.2 Select stone from the areas of the quarry that meet or exceed the minimum acceptable quality for the stone and from where the accepted samples have been obtained.

.3 Stone shall be free of imperfections; no stylolytes (resembling faults and/or fissures), no clay, no iron or other inclusions, no holes. Acceptable stylolytes are very thin and discontinuous.

.4 Naturally-bedded: for facing, coping, and pier stones.

.5 Cure stone block for sufficient time to ensure that cracking, or any other deficiency resulting from insufficient curing shall not be present in the stone.

.2 Limestone: to ASTM C 568, category II - Medium Density, colour and texture to match approved sample.

.1 Source: Carrière St. Marc.

2.2 ANCHORAGE

.1 Dowels, ties and cramps: stainless steel type 304. See Section 04 05 19.02 – Masonry Anchorage and Reinforcing.

2.3 STONE CUTTING

.1 Cut stone to shape and dimensions obtained from accurate measurements and profiles taken from existing stone, and as indicated.

.2 Dress exposed faces true, make beds and joints same thickness as existing, and at right angles to face.

.3 Execute moulded work from full size details. Make exposed arises in true alignment and ease slightly to prevent snipping.

.4 Cut stones for anchors, cramps, dowels and support systems. Provide lewis pin and clamp holes in pieces which cannot be manually handled. Do not cut holes in exposed surfaces.

2.4 TOLERANCES

.1 Fabrication tolerances shall not exceed.

.1 3 mm± on any dimension.

.2 3 mm± deviation from square.

.3 3 mm± deviation from flat surface on any exposed face.

.2 Face bedded stone will be rejected.

2.5 BEDDING OF STONE

.1 All stone shall be supplied to be laid on its natural quarry bed.

2.6 FINISHES

.1 Dress exposed surfaces to follow existing profiles as follows:

.1 All finishes to match existing at Victoria Lookout to approval of Departmental Representative, unless otherwise noted

2.7 FABRICATION OF REPLACEMENT STONE

.1 Record profile of existing stone.

.2 Cut and carve new stone to follow existing profile.

.3 Obtain approval of new carved stone by Departmental Representative prior to installation.

2.8 SOURCE QUALITY CONTROL

.1 Prepare mock-up of tooling of stone face, to be approved on site by the Departmental Representative prior to commencement of the stone fabrication.

PART 3 EXECUTION

3.1 PREPARATION

.1 Prevent absorption of ground water and exposure to rain. 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 shoring and supports as required.

.6 Cover adjacent fragile surfaces.

3.2 REMOVAL OF EXISTING STONE

.1 Remove existing deteriorated stone as per Section 04 03 43.02 – Historic - Dismantling Stone Masonry, 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 to be reset, mark stone on face, before removal, using marking product which can be completely erased when required, without damaging masonry unit.

.5 Use approved methods to loosen stones which will cause no damage either to stones or to other architectural elements.

.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 Place detached stones on wood surfaces during handling. Prevent contact with metal or vegetation.

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

.10 For stones to be reset, remove excess mortar by chisel.

3.3 CUTTING/SIZING OF STONE

.1 Use calipers, squares and levels to measure hole for new stone. Allow for mortar joints of 10 mm thickness maximum. Where existing joints are narrower, confirm joint thickness with Departmental Representative prior to cutting stone.

.2 Cut and size stones to sizes indicated in schedule.

3.4 MOVING STONES

.1 Move stones horizontally in wheelbarrows or on sleds.

.2 Move large stones using minimum 2 nylon belts properly spaced to provide a safe and even bearing on the stone.

.3 Slide stones into place on wood ramps.

3.5 INSERTING NEW STONE

.1 Clean stone by washing with water and natural fibre brush before laying.

.2 Dampen surfaces of slot and apply mortar.

.3 Prepare and rebuild backup masonry wall in accordance with Section 04 03 07.02 – Historic – Masonry Repointing and Repair.

.4 Lay heavy stones and projecting stones after mortar in courses below has hardened sufficiently to support weight.

.5 Prop and anchor projecting stones until wall above is set.

.6 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.

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

.8 Remove mortar droppings from face of stone before mortar is set. Sponge stone free of mortar along joints as work progresses.

.9 Use stainless steel anchors to fix stone face plates as indicated. Provide minimum of two anchors per stone.

.10 Install anchors, dowels and cramps.

.11 Set stones plumb, true, level in full bed of mortar with vertical joints flushed full except where otherwise specified. Completely fill anchor, dowel and lifting holes and voids left by removed edges.

.12 Limestone must be laid in its natural bed, unless noted.

.13 Grout solid all voids behind stone using specified grout.

3.6 PROTECTION

.1 Cover top of completed and partially completed wall, not enclosed or sheltered, with weatherproof coverings at end of each working day. Drape cover over wall and extend 0.5 m down both sides. Anchor securely in position. Prevent finished work from curing too quickly.

.2 Protect adjacent work from marking or damage due to work.

.3 Provide temporary bracing of masonry work during erection until permanent structure provides adequate bracing.

3.7 FILLING JOINTS/POINTING

.1 Fill joints and point: in accordance with Section 04 03 07.02 - Historic - Masonry Repointing and Repair.

.2 Keep new mortar moist for 3 days to cure.

End of section

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 02 41 16.02 - Selective Structure Demolition.

.2 Section 01 14 25 - Designated Substance Report.

1.2 ADMINISTRATIVE REQUIREMENTS

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

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings
- .1 Submit drawings stamped and signed by Professional Engineer registered or licensed in Province of Ontario.
- .2 Provide drawings for shoring and bracing where masonry will be laterally unsupported.

.3 Site Quality Control Submittals
- .1 Provide up-to-date copies of stone location recording system chart or card index.

1.4 CLOSEOUT SUBMITTALS

.1 Provide data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals. Include:
- .1 Photographically record stonework to be dismantled.
- .2 Drawing or chart indicating dimensions and location of each dismantled stone in removal area.

1.5 QUALITY ASSURANCE

.1 Quality assurance in accordance with Section 01 45 00 – Quality Control.

.2 Mock-ups
- .1 Construct mock-up in accordance with Section 01 45 00 – Quality Control.
- .2 Perform mock-up 1.0m x 1.0m to demonstrate dismantling procedures in location designated by Departmental Representative.
- .3 Notify Departmental Representative minimum 72 hours prior to construction of mock-up.
- .4 Work not to proceed prior to Departmental Representative giving approval of mock-up.
- .5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements and with manufacturer's written instructions.

.2 Protection and Storage
- .1 Store dismantled masonry units on wood pallets, protected from exposure to water, elements and potential mechanical damage, fully covered under polyethylene.
- .2 Submit storage and identification system to Departmental Representative for review.

.3 Packaging Waste Management
.1 Remove for reuse, pallets and packaging materials, in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.7 AMBIENT CONDITIONS

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

.2 In temperatures 5°C and below:
.1 Keep stones dry.
.2 Protect wet stones from freezing.

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 Departmental Representative in writing of conditions detrimental to acceptable and timely completion of Work.

.2 Refer to Section 01 14 25 - Designated Substance Report for procedures on working with designated materials.

.3 Refer to Section 02 41 16.02 - Selective Structure Demolition for additional direction.

3.2 SITE VERIFICATION OF CONDITIONS

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

3.3 PREPARATION

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

.2 Clean stone of dust and stone chips.

3.4 PROTECTION

.1 Prevent damage to structure, landscaping, pavement, utility lines which are to remain. Make good damage incurred.

.2 Protect surrounding components from damage during work.

.3 Make good damage to historic fabric.

.4 Obtain Departmental Representative’s approval for repair methodology.

3.5 SPECIAL TECHNIQUES

.1 Before dismantling stones, indicate location and dimensions of each stone in removal area on a enlarged photo, drawing or chart.

.2 Recording of stone location and dimensions is required for historic record.

3.6 STRUCTURAL SUPPORT

.1 Construct shoring and cradling, and other temporary framing work needed to support structure, or parts of it, during removal operations, according to approved shop drawings.

3.7 METHOD FOR LOOSENING STONES

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

.2 Use hand tools only.

3.8 DISMANTLING AND MOVING STONES

.1 Avoid damaging arrises of stone when removing mortar and freeing up.

.2 Remove excess mortar with the use of hand tools.

.3 Use wood wedges where required to remove or dislodge stone.
.1 Use flat pry bars protected with impact absorbing protection (burlap, cardboard).

.4 Use nylon hoisting belts, minimum 2 belts per stone.

.5 Protect stone from damage when hoisting and lifting from position.
.1 Use wood shims to isolate units from hoisting belts.

.6 Where damage occurs to stone, report to Departmental Representative.

3.9 HANDLING

.1 Place detached stones on wood surfaces during handling. Prevent contact with metal.

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

.3 Transport and keep stones on wooden platforms.

.4 Ensure that sharp edges of stones do not come in contact with hard objects.

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 CLEANING

.1 Do cleaning operations when temperatures are above freezing conditions.

.1 After cleaning, protect wet stones against freezing until dry.

.2 Clean stones by wet scrubbing with vegetable fibre brush, unless otherwise instructed by Departmental Representative.

.1 Do not use high pressure water jet.

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

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 04 03 07.02 – Historic- Masonry Repointing and Repair.

.2 Section 04 03 08.02 – Historic - Mortaring.

.3 Section 04 05 19.02 – Masonry Anchorage and Reinforcing.

.4 Section 04 05 23.02 - Masonry Accessories.

.5 Section 05 70 10.02 – Decorative Metal Restoration.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International).
- .1 CAN/CSA-A371-04, Masonry Construction for Buildings.

1.3 SUBMITTALS

.1 Product Data.
- .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 – Submittal Procedures.

.2 Shop Drawings.
- .1 Where existing masonry becomes laterally unsupported during construction, provide shop drawings for temporary bracing, stamped by a Professional Engineer registered in the Province of Ontario.
- .2 Prepare and provide shop drawings for final cut and tooled stone units after full-size plywood templates have been prepared with Section 05 70 10.02 – Decorative Metal Restoration.

.3 Samples.
- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit samples.
  - .1 One of each type of masonry anchor proposed for use.
  - .2 One of each type of Restoration mortar.
  - .3 One sample of stone to be used to replace existing stone, where stone has not been salvaged from site.
  - .4 One sample of each type of masonry accessory specified.
- .3 Submit samples to be tested to laboratories employing technicians certified/trained in procedures for testing masonry units.
- .4 The approved samples denote the standard material to be used.

.4 Manufacturer's Instructions.
- .1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Test Reports.
- .1 Submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Submit laboratory test reports in accordance Section 01 33 00 – Submittal Procedures.

.3 Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.

.4 For stone replacement units, submit test reports confirming compressive strength, density and porosity, to requirements set out in referenced CSA and ASTM Standards.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Mock-ups.

.1 Construct mock-up panel of exterior masonry wall construction 1500mm long x height of wall, incorporating one pier, showing colours and textures, full assembly including pier/wall facing and capstone, use of anchors, ties, dowels, cramps, dampproofing/waterproofing, drainage planes, weeping system, coursings, jointing, mortar, tooling, workmanship and cleaning procedures, *socket* cut out for iron fencing spear posts and general workmanship.

.2 For repointing, mock-up must include samples of saw-cut joints, raked joints, back pointed joints, and finish pointed joints, for both horizontal and vertical joints.

.3 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.4 Construct mock-up where directed.

.5 Allow 72 hours for inspection of mock-up by Departmental Representative before proceeding with work.

.6 When accepted by Departmental Representative, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

.7 Start work only upon receipt of written approval of the mock-up by the Departmental Representative.

.4 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Coordinate work with that of Division 03 for concrete and Division 05 for ironwork.

.5 The principal stone mason and site superintendent, engaged by the Masonry Contractor must have experience with historic masonry similar to this project, and can demonstrate an ability to pass a hands-on test of skills, if so administered by the Departmental Representative. These individuals must be identified prior to signing of Contract. Submit resume with project experience to Departmental Representative for approval prior to starting work on site. The Departmental Representative has the right to reject either of these individuals, if their qualifications cannot be substantiated. The Departmental Representative has the right to reject any mason who does not demonstrate the appropriate abilities or experience on the following tasks:

.1 Stone installation.

.2 Cutting stone.

.3 Carving and tooling 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.

.6 All masons employed on this project must demonstrate the ability to reproduce the mock up standards.

.7 All masons employed on this project throughout the course of the project must meet the above requirements. Where, during the course of the project, masons leave the work force, all replacement masons must also meet requirements.

.8 Coordinate and assist Section 05 70 10.02 – Decorative Metal Restoration in the preparation of full-size plywood templates representing the shape and orientation of capstones, pier stones, joints and holes for setting fence spear posts, before laying out wall and doing final stone cutting.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, handle and protect materials in accordance with manufacturer's requirements.

.2 Deliver materials to job site in dry condition.

.3 Storage and 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.

1.6 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, corrugated cardboard packaging material for recycling in accordance with local collection services.

.3 Unused metal materials are to be diverted from landfill to a metal recycling facility as approved by Departmental Representative.

.4 Unused or damaged masonry materials must be diverted from landfill to a local facility as approved by Departmental Representative.

1.7 SITE CONDITIONS

.1 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°C and 30°C until batch is used or becomes stable.
  - .2 Maintain ambient temperature between 5°C and 30°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°C, and insulated tarpaulins when temperature is forecast to fall below 0°C.
  - .4 Provide heating of masonry work when air temperature falls below -4°C.
  - .5 Maintain mean temperature of masonry above 0°C for a minimum of 7 days, after mortar is installed.
  - .6 Do not repoint if the temperature is forecast to drop below -7°C in the following 24 hours.
  - .7 Any unheated section of wall must be preheated in it's enclosure for a minimum period of 72 hours above 10°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 Protect masonry 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.

.1 Spray the mortar surface at intervals to keep it moist, for a minimum of three days after installation.

.3 Maintain minimum/maximum thermometers and relative humidity gauges on site and maintain a daily record of temperature and humidity.

1.8 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 leveling, 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.

1.9 COORDINATION

.1 Coordinate work before and during the project to ensure that alignments for concrete wall, stone work and ironwork.

.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 the preparation of full-size plywood templates representing the pier stones and the capstones, using the restored iron fence with Div 03 and Div 05, as a priority to allow Div 03 and Div 05 to prepare their shop drawings and work. Coordinate to ensure correct radii of wall are built.

.4 Coordinate installation with Div 05 for laying out holes in stone to receive spear posts before cutting holes.

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 PREPARATION

.1 Coordinate and assist Section 05 70 10.02 – Decorative Metal Restoration in the preparation of full-size plywood templates and cutting of holes in stones to receive spear posts.

.2 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

.3 Bracing must be approved by Departmental Representative.

.4 Winter Heating
- .1 Maintain ambient humidity levels.
- .2 The use of open flame to provide heating is strictly forbidden.

3.3 INSTALLATION

.1 Do masonry work in accordance with CAN/CSA A371 except where specified otherwise.
.2 Start construction at Pier 48 which is to align in height with Pier 47.

3.4 CONSTRUCTION

.1 Jointing: For joint finishing, see Section 04 03 07.02 – Historic – Masonry Repointing and Repair and as indicated.

.2 Stone to have full mortar bed raked back as indicated for finish pointing.

.3 Joint tooling and treatment to match location on Victoria Lookout capstones and as directed by the Departmental Representative

3.5 SITE TOLERANCES

.1 Tolerances: Conform to Clause 6.2 of CAN/CSA A371, unless otherwise noted.

3.6 FIELD QUALITY CONTROL

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

.2 Departmental Representative will pay costs for testing.

3.7 CLEANING

.1 Perform cleaning after installation and when mortar has fully cured, to remove construction dust and accumulated environmental soiling.

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

3.8 PROTECTION

.1 Protect masonry 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 SECTIONS

.1 Section 04 05 10.02 - Common Work Results for Masonry.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)
- .1 ASTM A496-07, Specification for Steel Wire, Deformed, for Concrete Reinforcement.
- .2 ASTM A666-03, Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar.
- .3 ASTM C881-10, Specification for Epoxy Resin Base Bonding Systems for Concrete.
- .4 ASTM C1242-05, Guide for Design, Selection, and Installation of Exterior Dimension Stone Anchors and Anchoring Systems.

.2 Canadian Standards Association (CSA International).
- .1 CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
- .2 CAN/CSA A179-04 (R2009), Mortar and Grout For Unit Masonry.
- .3 CSA A370-04, Connectors for Masonry.
- .4 CAN/CSA A371-04, Masonry Construction for Buildings.
- .5 CSA S304.1-04, Design of Masonry Structures.

1.3 SUBMITTALS

.1 Product Data:
- .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for epoxy coatings and galvanized protective coatings and touch-up products.
- .3 Submit product data on wire reinforcement, helical wall ties and stainless steel anchors.

.2 Shop Drawings:
- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop drawings consist of anchorage details, lists and placing drawings.
- .3 On placing drawings, indicate sizes, spacing, location and quantities of reinforcement and connectors.
- .4 Shop drawings must show details of the stone anchorage, 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 must be stamped and signed by a qualified Professional Engineer licensed to practice in the Province of Ontario.

.3 Manufacturer's Instructions:
- .1 Submit manufacturer's installation instructions.

1.4 FIELD MEASUREMENTS

.1 Make all field measurements necessary to ensure the proper fit of all members.

1.5 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: submit 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 Environmental Conditions: When the average daily ambient temperature is forecast to fall below 5°C, store masonry reinforcement or anchors anticipated to be in contact with fresh mortar, in an area pre-heated to 5°C minimum for 24 hours, prior to installation of anchors.

1.6 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, corrugated cardboard, packaging material for recycling in accordance with local collection services.

.3 Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Connectors: to CSA A370 and CSA S304.1.

.2 Dowels: threaded stainless steel, Grade 304.

.3 Anchors for Stone: Anchors to be Type 304 stainless steel conforming to ASTM A666.

.4 Anchorage for Stone Veneer: Stainless steel, Grade 304, single part anchoring system for kerf cut stones; 50 mm wide split tail anchor with slotted connection hole. Place at 400 mm on centre, unless otherwise noted.

.5 Epoxy Adhesive: 2-component, solvent free, cold cured, structural bonding agent conforming to ASTM C881.

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 Ship reinforcement and connectors, clearly identified in accordance with drawings.

2.3 SOURCE QUALITY CONTROL

.1 Provide Departmental Representative with certified copy of mill test report of masonry anchors, angles and connectors, showing physical and chemical analysis, minimum 2 weeks prior to commencing reinforcement work.

.2 Inform Departmental Representative of proposed source of material to be supplied.

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 GENERAL

.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, grout and Restoration Mortar, 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.

3.3 Reserved.

3.4 GROUTING

.1 Grout masonry in accordance with CSA S304.1, CAN/CSA A371 and CAN/CSA A179 and as indicated.

3.5 CRAMP ANCHORS

.1 Supply and install stainless steel anchors per shop drawings.

.2 Screws to be installed in holes drilled with matched tolerance carbide-tipped drill bits. Installation to be in accordance with manufacturer’s instructions.

3.6 LATERAL SUPPORT AND ANCHORAGE

.1 Supply and install lateral support and anchorage in accordance with CSA S304.1 and as indicated.

3.7 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.

3.8 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 04 05 10.02 - Common Work Results for Masonry.

.2 Section 07 13 52.02 - Modified Bituminous Sheet Waterproofing.

.3 Section 07 92 00.02 - Joint Sealants.

1.2 REFERENCES

.1 ASTM International Inc.

.1 ASTM D2240-05, Standard Test Method for Rubber Property - Durometer Hardness.

.2 ASTM D 4491 – Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

.2 Canadian Standards Association (CSA International)

.1 CAN/CSA A371-04 (R2009), Masonry Construction for Buildings.

.3 Federal Test Method Standard 191A, Method 5874 – Temperature, Low; Effect on Coated Cloth .

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. Include product characteristics, performance criteria, and limitations.

.3 Shop Drawings:

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

.2 Shop drawings consist of installation details. Indicate sizes, spacing, location and quantities.

.4 Samples:

.1 Provide masonry accessory samples in accordance with Section 01 33 00 - Submittal Procedures, supplemented as follows:

.1 Three samples of each accessory.

.5 Quality Assurance Submittals:

.1 Manufacturer's Instructions and data sheets.

.6 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.7 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 FIELD MEASUREMENTS

.1 Make field measurements necessary to ensure proper fit of members.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle masonry accessories in accordance with, Section 01 61 00 - Common Product Requirements supplemented as follows:

.1 Keep fillers and adhesives dry, protected against dampness, and freezing.

.2 Store packaged materials off ground and in accordance with manufacturer's written instructions.

.2 Packaging Waste Management:

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

Part 2 Products

2.1 MATERIALS

.1 Movement joint filler: sealant and backer rod, see Section 07 92 00.02 - Joint Sealants.

.2 Mechanical fasteners: recommended by flashing manufacturer to suit project requirements.

2.2 MOISTURE CONTROL

.1 Modified bituminous sheet waterproofing: See section 07 13 52.02 Modified Bituminous Sheet Waterproofing.

.2 Drainage plane matt system:

.1 Drainage plane with fabric attached to one side, proprietary manufacture drainage matt system for installation behind stone masonry.

.2 Drainage Plane: High-impact polystyrene plane, 0.6 mm thick, formed with corrugations 10 mm deep.

.3 Fabric: Spunbond polypropylene fabric with 4-inch (102-mm) overlapping skirt on 1 edge, Flux, Water Flow Rate, ASTM D 4491: 200 gallons per square foot per minute.

.4 Cold Crack Resistance, Machine Direction, Fed Standard 191A, Method 5874: No cracking, flaking, or other apparent damage to specimen.

.5 Nominal thickness: 10mm thick.

.6 Made from non-organic materials.

.7 Include drainage plane matt, accessory sill flashings, accessory weeps, and other accessories as recommended by the manufacturer.

.8 Include fasteners, with nylon plugs, and retention bars made from 304 stainless steel.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets, and as indicated.

3.2 INSTALLATION: MATERIALS

.1 Install movement joint fillers in movement joints at locations indicated on drawings.

.2 Mechanical fasteners: install fasteners to suit application and in accordance with manufacturer's written installation instructions.

3.3 INSTALLATION: MOISTURE CONTROL

.1 Install sheet membrane over concrete substructure and at other locations as indicated.

.2 See Section 07 13 52 Modified Bituminous Sheet Waterproofing.

3.4 INSTALLATION: DRAINAGE PLANE MATT SYSTEM

.1 Install per manufacturer’s directions and as indicated.

3.5 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

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

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 04 03 08.02 – Historic – Mortaring.

.2 Section 04 03 42.02 – Historic – Replacement of Stone.

.3 Section 04 05 10.02 – Common Work Results for Masonry.

.4 Section 04 05 19.02 – Masonry Anchorage and Reinforcing.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C568-03, Specification for Limestone Dimension Stone.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 19.24-M90, Multi-component, Chemical Curing Sealing Compound.

.3 Canadian Standards Association (CSA International)

.1 CAN/CSA A371-04, Masonry Construction for Buildings.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings: conduct pre-installation meeting in accordance with Section 04 05 10.02 - Common Work Results for Masonry to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.4 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 data sheet in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for joint fillers and sealants.

.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 Manufacturer's Instructions:

.1 Provide manufacturer's installation instructions in accordance with Section 04 05 10.01 - Common Work Results for Masonry.

.4 Shop Drawings:

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

.2 Indicate sizes and sections of stone veneer, arrangements of joints and bonding, anchoring, dowelling and cramping.

.3 Each section of stone indicated on shop drawings must bear corresponding number marked on its back or bed.

.5 Samples:

.1 Provide unit samples in accordance with Section 04 05 10.02 - Common Work Results for Masonry.

.6 Certificates: provide in accordance with Section 04 05 10.01 - Common Work Results for Masonry.

.7 Test and Evaluation Reports: provide certified test reports in accordance with Section 04 05 10.01 - Common Work Results for Masonry, supplemented as follows:

.1 Test Reports

.1 Submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.

.8 Mock-ups

.1 Construct mock-ups in accordance with Section 04 05 10.02 – Common Work Results for Masonry.

.9 Delivery, Storage, and Handling

.1 Deliver, store and handle stone veneer masonry in accordance with Section 04 03 42.02 – Historic - Replacement of Stone.

.10 Packaging Waste Management

.1 Separate and recycle waste materials in accordance with Waste Management Plan.

1.5 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data

.1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Limestone: Refer to Section 04 03 42.01 - Historic – Replacement of Stone.

.2 Anchors: Refer to Section 04 05 19.02 – Masonry Anchorage and Reinforcing.

.3 Joint Sealant: Multi-component polyurethane, non-sag, to CAN/CGSB-19.24, colour to approval of Departmental Representative.

2.2 GROUT

.1 Grout Materials to comply with Section 04 03 08.02 – Historic – Mortaring.

2.3 FINISHES

.1 Dress exposed surfaces of stone to finish to replicate existing limestone.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Verify that surfaces and conditions are ready to accept the work of this Section.

.2 Commencing installation means acceptance of existing substrates.

3.2 PREPARATION

.1 Protect adjacent finished materials from damage due to masonry work.

.2 Cut stone to shape and dimensions and full to square with joints as indicated. Dress exposed faces true. Cut stone for required sizes to lay on its natural quarry bed.

.3 Make joints as noted on Drawings.

.4 Execute moulded work from full size details. Make exposed arrises in true alignment and ease slightly to prevent snipping.

.5 Back-check stone contacting structural members as indicated. Allow minimum of 25 mm clearance between back of stone and steel and concrete structural members. Shape beds of stone resting on structural work to fit supports.

.6 Cut stones for spear posts, anchors, cramps, dowels and support systems. Provide Lewis pin and clamp holes in pieces which cannot be manually lifted. Do not cut holes in exposed surfaces.

3.3 INSTALLATION

.1 Construction in accordance with CAN/CSA A371.

.2 Apply asphalt emulsion to concrete surfaces, shelf angles, structural steel supports against which stone is to be applied.

.3 Waterproof exterior slabs on back prior to setting.

.4 Clean stone exposed surfaces by washing with stiff fibre brush and water.

.5 Drench dry stones with clean water just before setting.

.6 Install anchors, dowels and cramps.

.7 Set stones plumb, true, and level onto stone support system. Keep edges and faces aligned to respect indicated tolerances.

3.4 TOLERANCES

.1 To CAN/CSA A371.

3.5 FIELD QUALITY CONTROL

.1 Site Tests Inspection: in accordance with Section 04 05 10.02 - Common Work Results for Masonry.

3.6 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.2 Remove surplus materials, excess materials, rubbish, tools and equipment.

.3 At completion, wash stonework with stiff-fibre brushes and clean water.

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Waste Management Plan.

.5 Divert unused stone materials to reuse options where appropriate.

.6 Divert damaged or unused stone materials to recycling options.

3.7 PROTECTION

.1 Brace and protect quarried stone veneer cladding in accordance with Section 04 05 10.02 - Common Work Results for Masonry.

END OF SECTION