Part 1 GENERAL

1.1 RELATED DOCUMENTS

1. The General Conditions, the Supplementary Conditions, the Instructions to Bidders, and Section 01 01 00 - General Requirements, shall be read in conjunction with this Section.

2. The specification shall be read as a whole by all parties concerned. Sectioning of the specification is for convenience. Each Section may contain more or less than the complete work of any trade. The Contractor is solely responsible to make clear to the Subcontractors the extent of their work.

1.2 SUMMARY

1. Supply labour, materials, plant, tools, heating and equipment to complete the work as shown on the drawings and specified herein including, but not limited to the following procedures:

2. Cutting Out:

    1. Cutting out of deteriorated masonry.
    2. Cutting out of masonry to be rebuilt or altered.
    3. Masonry preparation work for mechanical and electrical trades.

3. Unit Repair Procedures:

    1. Removal, salvage and repair of cracked masonry units.

4. Masonry Rebuilding:

    1. Brickwork Rebuilding
    2. Rubblestone Foundation Wall Rebuilding
    3. Anchor Installation
    4. Wall Tie Installation
    5. Joint Finishing - raking back joints in rebuilt work for finish pointing
    6. Access openings in brick and concrete.

5. Related Sections

    1. Section 01 43 39 – Mock-up Requirements
    4. Section 04 04 05 – Mortar and Masonry Grout

6. System Description

7. Design Requirements

    1. The intent of this item of work is to repair the existing masonry and return it to a sound, durable condition.
    2. It is not intended that all missing or damaged faces and profiles should be

made perfect but that the building should still show its age and character when the work is completed.

1.3 SUBMITTALS

1. Product Data

    1. Provide technical information, manufacturer's application instructions and safety data sheets for the following:

        1. Paint removal system
        2. Epoxy repair system

2. Samples

    1. Submit samples and product data in accordance with the requirements of Section 01 33 00 - Submittals, and Section 04 03 05 01 - Masonry Procedures for the following:

        1. Replacement brick units

3. Record Drawings

    1. Provide record drawings of completed masonry work accurately showing the following:

        1. Locations of anchors and reinforcement.

4. Mock-ups

    1. Provide 10 sq. ft. mock-ups on site in a location approved by the consultant for each of the specified bricks and proposed alternate bricks. Mock-ups are to incorporate the specified mortar and masonry accessories.

1.4 QUALITY ASSURANCE

1. Prequalification

    1. The subcontractor for this work must be prequalified by the Consultant in accordance with the requirements of Section 04 03 05 - Masonry Procedures.

2. Personal Qualifications

    1. The work of this Section shall be done under the supervision and direction of a competent foreman-mason.
    2. Provide for work to be done by skilled and experienced tradesmen specializing in the type of work specified.

3. Affidavits

1. Submit affidavits stating that materials supplied are in accordance with this specification, for the following products:

    1. Epoxy repair system.
    2. Clay brick
    4. Limestone

Part 2 PRODUCTS

2.1 MANUFACTURERS

1. General

    1. Products named are to establish general performance and quality required and are not intended to restrict submission by other manufacturers.

    2. Acceptance of products by other manufacturers will be subject to review by the Project Manager and the Heritage Consultant for conformity with the specification.

2.2 MATERIALS

1. Acceptable Materials

    1. Where materials are specified by trade name refer to the Instructions to Tenderers for procedure to be followed in applying for approval of alternatives.

2. Bricks

    1. Reclaimed Brick Units:

        1. Salvaged, reviewed and accepted reclaimed units, structurally sound, matching the original in material size, shape, colour, texture and strength as closely as possible and free of excessive mortar accretions.

    2. New brick units: matching the original in size, shape, colour, texture and strength, moisture permeability.

        1. Obtain new bricks from a local source where possible.
        2. Conforming to CAN/CSA A82.1 M87.
        3. Replacement brick is to match the existing brick dimensions.
            1. Rogers Farmhouse: 8 ¾" length, 2 ½" height with 1/2" mortar joints, 4" depth
            2. Mulock Addition: 8 ¾" length, 2 ½" height with 1/2" mortar joints, 4" depth
            3. Porte Cochere Brick: 8 ½" to 8 ¾" length, 2 ½" height with ½" mortar joints, 4" depth.

2. Replacement brick is to match the physical properties of the existing brick as identified in the Hygothermal Analysis Report for Mulock Estate, dated June 13, 2023, by Entuitive (refer to specification section 00 31 25 Existing Material Information).
    1. Compressive Strength 5.2 to 6.3 (MPa)
    2. Dry Density 1400 to 1700 (kg/m^3)
    3. Absorption Coefficient 0.20 to 0.50 (kg/m^2 $S^{0.5}$)
    4. Porosity calculated based on vacuum saturation 0.34 to 0.48 (m^3/m^3)
    5. Thermal Conductivity 0.4 to 0.7 (W/mK)

4. Non-shrink Grout

    1. Ferrous Metallic: use a mix consisting of one part normal Portland cement and one part approved non-shrink metallic aggregate and one part well graded sand with enough water to make the grout place-able.

    2. Nonferrous Metallic: use a mix consisting of one part approved preblended cement containing expansive admixtures, one part finely graded clean sand and enough water to make the grout place-able.

        1. Acceptable material: All-purpose V3, Non-shrink Grout, as manufactured by Sternson Construction Products.

    3. Non-metallic cementitious grout suitable for dry-packing:

    4. Acceptable materials:

        1. M-Bed Standard by Sternson.
        2. Non-shrink Grout by CPD.
        3. Set Non-shrink Grout by Master Builders.
        4. Masterflow 713 Grout by Master Builders.
        5. Sika Grout 212 by Sika.
        6. Sonogrout by Sonneborn.

    5. Epoxy Resin

        1. Adhesive:

            1. Gel Type, High Modulus: a thixotropic, high modulus, moisture insensitive type epoxy resin conforming to the requirements of ASTM C-881.
            2. Use either neat or mixed with oven-dry aggregate only.
            3. Acceptable Material: Sikadur High Mod Gel 31, as manufactured by Sika Canada Ltd.

        2. Metal Removal:

            1. Remove deteriorated internal metal hangers cast into units as required by coring of units with diamond core drilling

equipment or drilling around the fittings with masonry bits.

2. Remove all metal cramps, anchors and the like from terra-cotta units. Clean out mortar from cramp pockets using drilling, picks and small chisels.
3. Remove all metal fixings, brackets, wire, bolts, nails and the like from units. Remove completely all anchors and plugs set into the units by coring.

3. Repair Joint Finishing:

1. Point visible crack joints with no-fines mortar when resin is set and cured. Pointing is specified in Section 04 03 05 - Masonry Procedures.

Part 3 EXECUTION

3.1 EXAMINATION

1. Verification of Conditions

1. Building Protection:

1. Verify that protection has been provided as described in the General Conditions Section 01 01 00.
2. Do not start work until protection has been reviewed and accepted by Consultant.
3. Immediately reinstall protection that has been temporarily removed during the course of the work.

3.2 GENERAL PROCEDURES

1. Cutting and Fitting

1. Prepare all chases, openings, sleeves, grounds, blocking, inserts and the like as required for all trades.
2. Do not saw openings into masonry. Build openings to the correct size by removing masonry units and building edges to give proper bonding, tying in with full headers, and proper coursing.
3. Build openings in brick masonry using proper bonding procedures, using not less than one-half units. Use king-closers where less than half unit bonding is appropriate. Do not use queen-closers.
4. Neatly saw conduit chases into plastered brickwork. Saw-cut depth into brick only to diameter and width of conduit. Do not overcut into wall.
5. When additional masonry loosens during, or as a result of, cutting-out and rebuilding, reset it at no additional cost to the contract.

2. Defective Masonry

1. Identify hollow-sounding, loose or otherwise unstable or unbonded masonry units and record location on project record drawings.

1. Mark the stones using a paint marker that does not contain a migrating stain substance (i.e. do not use alkyd paint or Magic markers).

2. Remove and cutback to the full depth, height and width of the complete unit, including all mortar bedding as specified in Section 04 03 05 - Masonry Procedures.

3. Remove defective units identified as follows:

    1. Masonry units indicated on the drawings for replacement.
    2. Masonry units noted in the drawings for salvage and resetting.
    3. Masonry units noted in the drawings to provide access to related work.
    4. Cracked masonry units identified on site by the Consultant. Epoxy repair of units is specified in Part 2 of this Section.
    5. Deteriorated masonry units as directed by the Consultant on site.

3. Cleaning-down

    1. When cutting-out is completed in each bay of the building, brush down the wall and clean all joints of loose material and grit.
    2. Hose down the entire wall area with mains-pressure water to remove dust.

3.3 MASONRY REBUILDING PROCEDURES

1. Brickwork Rebuilding

    1. Demolish deteriorated brickwork:

        1. Take down areas of severely deteriorated brickwork in maximum 1000 mm wide sections where load bearing.
        2. Remove old mortar and clean all units to be re-incorporated into the work.
        3. Salvage and pallet demolished brick units and store on site as directed by Consultant.
        4. Repair broken units with epoxy repair techniques specified herein.

    2. Backup Masonry:

        1. Solidly build the core of heavy masonry walls.
        2. Maintain a minimum of 80% brick rubble in the core of rebuilt rubble masonry.
        3. Keep mortar joints as thin as possible to allow aeration of the lime mortar.

    3. Rebuild solidly using approved brick units:

        1. Re-use original bricks where sound.

2. Lay or insert all units true to line and level, matching exactly the adjacent bond pattern and coursing.
3. Keep the bond true throughout the wall thickness, including all corners and reveals.
4. Build brick masonry using proper bonding procedures, using not less than one-half units. Use king-closers where not less than half unit bonding is appropriate. Do not use queen-closers.
5. Fill bed and vertical joints solidly and evenly with mortar, notwithstanding current trade practice. If this requirement has not been met, the entire panel shall be pulled down and rebuilt as specified at no extra cost.
6. Fully bond interior and exterior corners with full units.

4. Bonding Pattern:

1. Build brickwork to match existing bonding pattern.

5. Match existing jointing pattern:

1. Make joints uniform in thickness, matching existing work.
2. Joints are to be squeezed tight. Do not slush joints.

3. Lintels

1. Steel Lintels:

1. Take down stone masonry and remove existing steel lintels where shown on the drawings.
2. Obtain new hot-dip galvanized lintels from Section 05 12 00 – Structural Steel.
3. Install new lintels true and plumb in location of original lintels.
4. Rebuild masonry as specified herein.

2. Wood Lintels

1. Install wood lintels as detailed. Pocket ends with flexible through-flashing.
2. Dry-pack joint above lintel solidly with mortar. Do not exceed 12 mm depth of mortar joint.

4. Steel Bearing Plates

1. Remove existing brickwork as required for installing steel base plates or bearing plates at trusses, columns and beams.

2. Rebuild solidly with mortar and bricks under the plates such that no mortar joint is greater than 13 mm thick. Where thicker than 13 mm use Dry-Pack Grout. Dry-Pack shall not be thicker than 60 mm.

1. Install Dry-Pack Grout as specified herein under "Dry-Pack Grout Installation".

3. Drill holes for anchorage in masonry as shown on drawings.

    1. Set the anchors for steel bearing plates through the masonry as detailed.
    2. Anchor bolts are required where there is less than 600 mm of masonry above the base plate.

4. Clean bricks and reset into place around the columns and plates and rake back joints in preparation for joint repointing.

5. Repoint as specified in Section 04 03 05 01 - Masonry Procedures.

5. Dry-Pack Grout

    1. Preparation: remove grease, oil, ice or snow and foreign deposits from areas to be in contact with grout.

    2. Make masonry surfaces wet before installing grout.

    3. Provide formwork around the bearing plates sufficiently strong to withstand the ramming action of installing the grout mix. Rebuilding of the masonry work around the plate may be used as the formwork.

    4. Ram the grout mix under the plate using a flat ramming tool and hammer sufficiently to fill all voids. Do not ram so hard as to disturb the fixed steel plate location.

    5. Tool the edges of the grout as detailed.

6. Building-in

    1. Build in windows, doors, platforms, clocks and all other elements into the fabric of the brickwork as the work progresses.

        1. Measure the width and height of elements to be built in to ensure the masonry walls are the correct width at critical building-in locations.
        2. Submit shop drawings indicating the correct width and heights of all items to be built in. Indicate the dimensions between all masonry contact and anchorage points.

End of Section 04 03 21