

Specification Table of Contents

<u>Document Identification</u>	<u>Pages</u>	<u>Issued</u>
PROJECT MANUAL		
DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS		
00010	Specification Table of Contents	1 February 15, 2017
DIVISION 01 - GENERAL REQUIREMENTS		
01010	General Instructions	4 February 15, 2017
01311	Coordination	2 February 15, 2017
01312	Project Meetings	2 February 15, 2017
01323	Construction Photographs	1 February 15, 2017
01330	Submittals	9 February 15, 2017
01351	Special Procedures.....	4 February 15, 2017
01450	Quality Control	4 February 15, 2017
01500	Temporary Facilities and Controls	1 February 15, 2017
01600	Products and Workmanship	4 February 15, 2017
01732	Cutting and Patching.....	2 February 15, 2017
01741	Progressive Cleaning	1 February 15, 2017
01770	Contract Closeout Procedures and Submittals	5 February 15, 2017
01780	Warranties	1 February 15, 2017
DIVISION 03 - CONCRETE		
03430	Architectural Precast Concrete	5 February 15, 2017
DIVISION 04 – MASONRY		
04431	Stone Panels	4 February 15, 2017
DIVISION 07 - THERMAL AND MOISTURE PROTECTION		
07900	Joint Sealants	3 February 15, 2017
DIVISION 08 - OPENINGS		
08880	Tempered Glass Guards and Railings	5 February 15, 2017

END OF SECTION

General Instructions

PART 1 - GENERAL

1.1 General

- .1 Protective hoarding is to be provided by Contractor. Provide coordination and scheduling with Museum.
- .2 Dismantled work for reuse shall be coded with non-permanent markings.

1.2 Language of the Contract

- .1 The use of the words “include” or “including”, or variations thereof, within the Contract documents is not limiting.
- .2 The Contract documents have been prepared in both English and French languages. Communications, submittals and written correspondence shall be in the English and French language for the Work of this Contract.

1.3 The Contract documents

- .1 The Contract documents have been arranged into various divisions, sections, drawings, and schedules for the purpose of presenting the Work in a logical and organized form and to enable ease of reference and interpretation, and are not intended to be an arrangement of precise and independent Subcontractors, or jurisdiction of responsibility for the various parts of the Work. The Contractor shall be solely responsible for coordinating the execution of the Work of this Contract in accordance with the requirements of the Contract documents.
- .2 The drawings are based on existing conditions available from original documents and various on-site dimensions.
- .3 As a result, the Contracting Authority shall not be required to decide on questions arising with regard to agreements or contracts between the Contractor and Subcontractors or Suppliers, nor to the extent of the parts of the Work assigned thereto.
- .4 Further, no extra will be allowed as a result of the failure to coordinate and allocate the Work such that the Work is provided in accordance with the Contract documents.
- .5 Each section of Division 1 of the specifications is complementary to the other sections of Division 1 and shall be read together with other sections.
- .6 This section coordinates, relates, and governs the work of other sections of the specifications.

1.4 Laws, Notices, Permits and Fees

- .1 The building code – National Building Code of Canada – NBC 2015, including amendments, shall govern the Work. The Ontario Building Code will govern.
- .2 Comply with codes, by-laws, and regulations of authorities having jurisdiction over the Museum Properties. Codes and regulations form an integral part of the Contract documents.
- .3 The Contractor shall obtain and pay for all required permits, licenses, deposits and certificates of inspection as part of the Work, building permit (building permit not required).

General Instructions

- .4 Arrange for inspection, testing and acceptance of the Work required by the authorities having jurisdiction. Be responsible for necessary preparations, provisions and pay costs.

1.5 Examination of the Museum Properties, Documents, Surfaces and Conditions

- .1 Carefully examine the Museum Properties and investigate matters relating to the nature of the Work, means of access and egress, obstacles, rights and interests of other parties which may be interfered with during the execution of the Work, conditions and limitations including obstructions, existing structures or facilities, local conditions, actual levels, character and nature of the Work, and other consideration which may affect performance of the Work.
- .2 Carefully examine the extent of work to be performed and matters which are referred to in the Contract documents prior to start of the Work.
- .3 Examine work to which work is to be applied, anchored or connected, and relevant as-built conditions.
- .4 Each work operation following on a previous work operation of a differing Subcontractor, as in the case of finishing and surfacing work, shall include a thorough examination of the condition of the previous work. Conditions found unacceptable, either for the commencement of the new work or its satisfactory completion, shall be reported in writing to the Contracting Authority.
- .5 Do not commence work until unsatisfactory conditions are corrected. Commencement of work implies acceptance of surfaces and conditions and existing conditions will not be accepted as a contributing factor to subsequent failure or acceptability of the Work.

1.6 Quantity of Items

- .1 Where a component, device, item or part of materials or equipment is referred to in the singular number, such reference shall require the provision of as many components, devices, items or parts of material or equipment necessary to complete the Work.

1.7 Standards and Codes

- .1 Contract forms, codes, specifications, standards, manuals and installation, application and maintenance instructions referred to in these specifications, unless otherwise specified, amended or date suffixed, shall be latest published editions at Contract date.

1.8 Discrepancies and Clarifications

- .1 Advise Contracting Authority of discrepancies discovered in requirements of the Contract documents and request clarification in written form.
- .2 Advise Contracting Authority when clarifications are required pertaining to meaning or intent of requirements of Contract documents and request clarification from Contracting Authority in written form.
- .3 Do not proceed with related work until written clarification is provided by *Consultant*.
- .4 Failure to notify Contracting Authority shall result in Contractor incurring responsibility for resulting deficiencies and expense at no additional cost to the Museum.

General Instructions

- .5 Written instructions issued by Contracting Authority for the purpose of clarification, implicitly supersede applicable and relevant aspects of the Contract documents irrespective of whether or not these documents are explicitly or specifically cited in clarification requests or clarification instructions.

1.9 Work under the Contract

- .1 The intent of the Contract documents is to include the labour, products, and services necessary for the performance of the Work by the Contractor in accordance with the Contract documents.

1.10 Documents at the Museum Properties

- .1 Maintain at the Museum Properties, one copy of each of following:
 - .1 Contract documents including drawings, specifications, addenda, and other modifications to the Contract.
 - .2 'Reviewed' or 'Reviewed as Modified' shop drawings.
 - .3 Construction schedule.
 - .4 Supplemental instructions, proposed change orders, change orders, and change directives.
 - .5 Field Test Reports.
 - .6 Contracting Authority's field review reports and deficiency reports.
 - .7 Reports by authorities having jurisdiction.
 - .8 Building and other applicable permits, and related permit documents.
 - .9 Copy of Contractor's Site-Specific Health and Safety Plan (SSHSP) submitted to the Museum in accordance with Section 01330.
 - .10 As-built drawings.
- .2 Make above material available to Contracting Authority upon request.

1.11 Overloading

- .1 Protect the existing building from loads which may cause permanent deformation.
- .2 Protect the Work from loads which may cause permanent deformation.

1.12 Inserts, Anchors and Fasteners

- .1 Use only factory made, threaded or toggle type inserts as required for supports and anchors, properly sized for load to be carried.
- .2 Where inserts cannot be placed, use factory made expansion shields for light weights only.
- .3 Supply and locate inserts, holes, anchor bolts and sleeves during placement or fabrication of structural elements.
- .4 Fasteners stressed in withdrawal are not acceptable, except where otherwise indicated.

General Instructions

- .5 Metal fastenings shall be uniform to metals materials and components being anchored or of a metal which will not set up a galvanic action causing damage to the fastening or metal component under moist conditions.
- .6 Metal fastenings and accessories shall be same texture, colour and finish as material on which they occur, as selected by Contracting Authority.

1.13 Power Actuated Fasteners

- .1 Power actuated fasteners are not permitted.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

PART 1- GENERAL

1.1 Superintendence

- .1 Provide superintendent and necessary supporting staff personnel who shall be in attendance at the Museum Properties while Work is being performed, with proven experience in erecting, supervising, testing and adjusting projects of comparable nature and complexity.
- .2 The Contractor shall appoint a superintendent at the Museum Properties who shall have overall authority at the Museum Properties and shall speak for the Contractor and represent the Contractor's interest and responsibilities at meetings at the Museum Properties and in dealings with the Contracting Authority and the Museum.

1.2 Dimensions

- .1 Verify dimensions at the Museum Properties before commencing shop drawings. Before fabrication commences report discrepancies to Contracting Authority in writing. Incorporate accepted variances on shop drawings and as-built records.

1.3 Coordination

- .1 Coordinate and ensure workers, Subcontractors, and Suppliers cooperate to ensure that the Work will be carried out expeditiously and in proper sequence.

1.4 Building Dimension, Templates, Built-ins, and Coordination

- .1 Take necessary dimensions for the proper execution of the Work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for coordination.
- .2 Provide templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted in the Work and set in place or instruct separate Subcontractors as to their location.
- .3 Verify that the Work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by requirements of the Contract documents.
- .4 Do not scale directly from drawings. Obtain clarification from Contracting Authority if there is ambiguity or lack of information.
- .5 Details and measurements of any work which is to fit or to conform with work installed shall be taken at the Museum Properties.
- .6 Advise Contracting Authority of discrepancies and omissions in the Contract documents, that affect aesthetics, or that interfere with services, equipment or surfaces. Do not proceed with work affected by such items without clarification from Contracting Authority.
- .7 Prepare and submit setting drawings, templates and other information necessary for the location and installation of material, holes, sleeves, inserts, anchors, accessories, fastenings, connections and access panels.
- .8 Subcontractors shall direct related Subcontractors on site of specific locations required for sleeves and openings.

Coordination

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Project Meetings

PART 1 - GENERAL

1.1 Administrative

- .1 The Contractor shall schedule meetings as specified herein.
 - .1 Such scheduling shall be in consultation both with the Museum and with the Contracting Authority.
- .2 The Contracting Authority shall prepare agendas for meetings specified herein.
 - .1 Agendas shall include, as a minimum, the agenda items specified in the Contract documents.
- .3 The Contracting Authority shall chair and record the minutes of meetings specified herein.
- .4 Representatives of parties attending meetings shall be authorized to act on behalf of the parties they represent.
- .5 Subcontractors and Suppliers shall not attend meetings unless authorized by the Contracting Authority.
- .6 The Contractor shall prepare, and distribute to the Contracting Authority and the Museum in advance of next progress meeting date, the following:
 - .1 Meeting minutes, monthly progress reports containing updated schedules, shop drawing logs, agenda, and submittals.

1.2 Contract Start-Up Meeting

- .1 Within 5 days after award of Contract, request a meeting of parties in Contract to discuss and resolve administrative procedures and responsibilities prior to the commencement of the Work.
- .2 The Contracting Authority and the Contractor, shall be in attendance.

1.3 Pre-Installation Meetings

- .1 During the course of the Work prior to Final Certificate of Completion, schedule pre-installation meetings as required by the Contract documents and coordinated with the Contracting Authority.
- .2 As far as possible, pre-installation meetings shall be scheduled to take place on the same day as regularly scheduled progress meetings.
- .3 The following shall be in attendance:
 - .1 Contractor.
 - .2 Subcontractors affected by the work for which the pre-installation meeting is being conducted.
 - .3 Contracting Authority.
 - .4 Manufacturer's representatives, as applicable.
 - .5 Inspection and testing company, as applicable.

Project Meetings

1.4 Progress Meetings

- .1 During the course of the Work prior to Final Certificate of Completion, schedule progress meetings as directed by the Contracting Authority.
- .2 Attendees at progress meetings shall include the following:
 - .1 Contractor.
 - .2 Contractor's site superintendent(s).
 - .3 Contracting Authority.
 - .4 Museum.

1.5 Pre-Takeover Meeting

- .1 Prior to application for Final Certificate of Completion, schedule a pre-takeover meeting.

1.6 Post-Construction Meeting

- .1 Prior to application for completion of Contract, schedule a post-construction meeting. Four days prior to date for meeting, Contracting Authority shall confirm a date for meeting based on evaluation of completion requirements.

1.7 Special Meetings

- .1 Contracting Authority reserves the right to require special meetings which may be held on short notice and at which attendance by Contractor and representatives of affected Subcontractors and suppliers is mandatory.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Construction Photographs

PART 1 - GENERAL

1.1 General

- .1 Provide construction photographs in digital format in accordance with procedures and submission requirements specified in this section.

1.2 Digital Photographs

- .1 Equipment: Provide photographs using minimum 8 megapixel Digital Camera.
- .2 Submit the required photographs to the Contracting Authority and to the Museum.
- .3 Output: Supply date stamped maximum resolution colour photos to Contracting Authority in JPEG format, on CD-ROM format.
- .4 Number of photos required:
 - .1 Prior to construction: Provide necessary number of photographs, as required to document existing conditions and to document pre-existing damage to existing building and property: Minimum 50 photos.
 - .2 Each Progress draw: Provide 24 construction photographs each month to accompany each application for progress draw to document the stage of the Work from points selected by the Contracting Authority showing as much as possible of the Work installed during the previous month.
 - .3 Provide minimum of 8 photographs on each meeting report and for each progress meeting.
 - .4 Completion: When the Work is completed, arrange to take final photographs of the Work from a minimum of 8 points of view.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Submittals

PART 1 - GENERAL

1.1 General Requirements

- .1 Submit submittals as requested by the Contract documents, as specified herein, and in accordance with the conditions of the Contract.
- .2 In addition to submittals specifically requested by the Contract documents, submit other submittals as may be reasonably requested by the Contracting Authority, or as are required to coordinate the Work and to provide the Museum with choices available, within the scope of Contract documents.
- .3 Contractor shall submit the Contractor's Site-Specific Health and Safety Plan (SSHSP) to the Museum, with a copy to remain on site.
- .4 Procedures and requirements for Contract closeout submittals shall be in accordance with the following sections:
 - .1 Section 01770 - Contract Closeout Procedures and Submittals.
 - .2 Section 01780 - Warranties.
- .5 Contractor's review of submittals:
 - .1 Review submittals for conformity to Contract documents before submitting to Contracting Authority. Submittals shall bear stamp of Contractor and signature of a responsible official in Contractor's organization indicating in writing that such submittals have been checked and coordinated by Contractor. Contractor's review shall be performed by qualified personnel who have detailed understanding of those elements being reviewed and of the conditions at the Museum Properties proposed for installation.
 - .2 Check and sign each submittal and make notations considered necessary before submitting to Contracting Authority for review. Where submittal is substantially and obviously in conflict with requirements of Contract documents, reject submittal without submitting to Contracting Authority and request resubmission. Note limited number of reviews of each submittal covered under Contracting Authority's services as specified below.
 - .3 Contractor shall assume sole responsibility for any conflicts occurring in the Work that result from lack of comparison and coordination of submittals required for the Work.
 - .4 Submittals that have not been reviewed, checked, and coordinated by Contractor prior to submission to Contracting Authority, will be rejected.
 - .5 Notify Contracting Authority in writing of changes made on submittals from Contract documents. Contracting Authority's review of submittals shall not relieve Contractor of responsibility for changes made from Contract documents not covered by written notification to Contracting Authority.
- .6 Contracting Authority's review of submittals:

Submittals

- .1 Review of submittals by Contracting Authority is for the sole purpose of ascertaining conformance with the general design concepts and the general intent of the Contract documents. This review shall not mean that Contracting Authority approves the detail design inherent in the submittals, responsibility for which shall remain with the Contractor. Such review shall not relieve the Contractor of responsibility for errors or omissions in the submittals, or responsibility for meeting requirements of Contract documents.
- .2 Contractor shall be responsible for dimensions to be confirmed and correlated at the Museum Properties for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the Work.
- .3 Contracting Authority's review and markings on submittals do not authorize changes in the Work or the Contract time, and will be accommodated at no additional cost to the Museum. If, in the opinion of the Contractor, the Contracting Authority's markings on submittals constitute a change in the Work or will effect a change in the Contract time, then the Contractor shall so notify the Contracting Authority in writing and request an interpretation. If the Contracting Authority finds that the Contracting Authority's markings on submittals do constitute a change in the Work or will effect a change in the Contract time, then a Change order will be prepared therefore. The time taken to process such a request for interpretation shall not, in and of itself, constitute a change in the Work nor increase the Contract time.
- .4 Submittals received but not required by the Contract documents or requested by the Contracting Authority will not be reviewed by the Contracting Authority and will be marked 'NOT REVIEWED' by the Contracting Authority and returned to the Contractor.
- .7 Make submittals with reasonable promptness and in an orderly sequence so as to cause no delay in the Work. Be responsible for delays, make up time lost and pay added costs, at no additional cost to the Museum, incurred because of not making submittals in due time to permit proper review by Contracting Authority.
- .8 Submittals that contain substitutions will be rejected. Substitutions are permitted only with prior acceptance of the Consultant.
- .9 Do not proceed with work affected by a submittal, including ordering of Products, until relevant submittal has been reviewed by Contracting Authority.
- .10 Prepare submittals using SI (metric) units.
- .11 Contractor's responsibility for errors and omissions in submittals is not relieved by Contracting Authority's review of submittals.
- .12 Contractor's responsibility for deviations in submittal from requirements of Contract documents is not relieved by Contracting Authority's review of submittal, unless Contracting Authority gives written acceptance of specific deviations.
- .13 Engineered submittals:
 - .1 Submittals for items required to be engineered shall be prepared under the direct control and supervision of a qualified professional engineer registered in the Museum Properties, and having minimum of \$2,000,000 professional liability insurance, who shall also apply professional seal and signature to submittals prepared under their direct control and supervision.

Submittals

- .2 A certificate of insurance indicating that the professional engineer under whose direct control and supervision the submittal has been prepared has the required professional liability insurance is to be submitted with submittals required to be sealed by professional engineer (or as otherwise indicated as engineered).
- .3 Design includes life safety, sizing of supports, anchors, framing, connections, spans, and as additionally required to meet or exceed requirements of applicable codes, standards, regulations, and authorities having jurisdiction.
- .4 Engineered submittals shall include design calculations, complete with references to codes and standards used in such calculations, supporting the proposed design represented by the submittal. Prepare calculations in a clear and comprehensive manner.
- .5 The professional engineer responsible for the preparation of engineered submittals shall undertake periodic field review, including review of associated mock-ups, at locations wherever the work as described by the engineered submittal is in progress, during fabrication and installation of such work, and shall submit a field review report after each visit. Field review reports shall be submitted to the Contracting Authority, to authorities having jurisdiction as required, and in accordance with the building code.
- .6 Field reviews shall be at intervals as necessary and appropriate to the progress of the work described by the submittal to allow the engineer to be familiar with the progress and quality of such work and to determine if the work is proceeding in general conformity with the Contract documents, including reviewed shop drawings and design calculations.
- .7 Upon completion of the parts of the Work covered by the engineered submittal, the professional engineer responsible for the preparation of the engineered submittal and for undertaking the periodic field reviews described above, shall prepare and submit to the Contracting Authority and authorities having jurisdiction, as required, a letter of general conformity for those parts of the Work, certifying that they have been Provided in accordance with the requirements both of the Contract documents and of the authorities having jurisdiction over the Museum Properties.
- .8 Costs for such field reviews and field review reports and letters of general conformity are included in the Contract Price.
- .14 Keep copies of reviewed submittals at the Museum Properties in a neat, orderly condition. Only submittals that have been reviewed by the Contracting Authority's and are marked with Contracting Authority's review stamp, as applicable, are permitted at the Museum Properties.
- .15 The Work shall conform to reviewed submittals subject to the requirements of this section. Remove and replace materials or assemblies not matching reviewed submittals at no increase in the Contract time and at no additional cost to the Museum.

1.2 Schedule of Submittals

- .1 Before commencement of the Work, submit to the Contracting Authority a detailed schedule of submittals required by the Contract documents.
- .2 Indicate dates for submitting, review time, resubmission time, float time, and last date for meeting construction schedule.

Submittals

- .3 Contracting Authority will review submittal schedule and advise Contractor if volume and timing of submittals will permit timely review and response. Contracting Authority may require modifications to submittals schedule in order to allow adequate time for review of submittals. Adjust submittals schedule and construction schedule as required to comply with Contracting Authority's needs.
- .4 Make provisions in schedule for at least 10 Days for Contracting Authority's review of submittals. When submittals have to be reviewed by one or more of Contracting Authority's subconsultants, add 5 more Days for a total 15 Day review period.
- .5 If the Contracting Authority requires resubmission of submittals, allow for an additional 10 Days review for each resubmission.
- .6 If, at any time, the Contractor submits a large enough number of submittals such that the Contracting Authority cannot process these submittals within 10 Days, the Contracting Authority, in consultation with the Contractor within 3 Days of receipt of such submittal, will provide the Contractor with an estimate of the time necessary for processing same. The Contractor shall accommodate such necessary time at no increase in the Contract time and at no additional cost to the Museum.
- .7 The Contractor shall periodically resubmit the submittal schedule to correspond to changes in the construction schedule. Such resubmissions shall maintain the minimum 10 Day period for the Contracting Authority's review.
- .8 Schedule submissions of submittals well in advance of scheduled dates for installation, to provide lead time for reviews and possible resubmissions and for placing orders and securing delivery so as to avoid delays in the Work.

1.3 Submission Procedures

- .1 Coordinate each submittal with requirements of the Work and Contract documents. Individual submittals shall include related information.
- .2 Distribute copies of submittals to parties whose work is affected by submittals except Contracting Authority and Museum before final submission for review by Contracting Authority.
- .3 Accompany submittals with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Contract title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each submittal.
 - .5 Other pertinent data.
- .4 Each submittal shall be identified numerically by relevant specification section number with a numeric indicator for multiple submittals by that section followed by revisions number, for example 04080-01-R0.
- .5 Make any changes in submittal that Contracting Authority may require, consistent with Contract documents, and resubmit as directed by Contracting Authority.
- .6 Notify Contracting Authority, in writing, when resubmitting, of any revisions other than those requested by Contracting Authority.
- .7 After Contracting Authority's review, distribute copies to affected parties.

Submittals

1.4 Schedules

- .1 Schedules required in addition to the schedule of submittals specified above:
 - .1 Construction schedule.
 - .2 Product delivery schedule.
 - .3 Inspection and testing schedule.
 - .4 Mock-up schedule.
- .2 Format:
 - .1 Prepare schedules in the form of a PERT or GANTT or Microsoft Project chart method.
 - .2 Include horizontal time scale identifying the first Day of each week.
 - .3 Format for listings: The chronological order of the start of each item or part of the Work.
 - .4 Identification of listings: By systems description.
- .3 Construction schedule:
 - .1 Include the complete sequence of construction activities.
 - .2 Include the dates for the commencement and completion of each major element of the Work parallel to the sections of the specifications.
 - .3 Show projected percentage of completion for each item as of the first Day of each week.
 - .4 Submit draft schedule for review, and incorporate responses to comments identified by Contracting Authority.
 - .5 Show dates for the commencement and completion of inspection and testing
 - .6 At each date of submission of schedule, indicate progress of each activity.
 - .1 Show changes occurring since previous submission of the construction schedule:
 - .1 Major changes in scope.
 - .2 Change orders and change directives.
 - .3 Activities modified since previous submission.
 - .4 Revised projections of progress and completion.
 - .5 Other identifiable changes.
 - .2 Include a narrative report to define:
 - .1 Problem areas, anticipated delays, and the impact on the schedule.
 - .2 Corrective action recommended and its impact on the schedule.
 - .7 Submit revised construction schedule with each application for payment.
- .4 Product delivery schedule:
 - .1 Include dates for delivery of products and manufactured items. Show last dates for order, shipment, and delivery in order to meet construction schedule.

Submittals

- .5 Inspection and testing schedule:
 - .1 Prepare schedule for inspection and testing by advance discussion with the selected inspection and testing company to determine the time required for the inspection and testing company to perform its tests and to issue each of its findings, and allow for required time in the construction schedule.
 - .2 Refer to Section 01450 for additional requirements for inspection and testing scheduling.
- .6 Mock-up schedule:
 - .1 Include the dates for the commencement and completion of each mock-up parallel to the sections of the specifications and correlated to the construction schedule.
 - .2 Submit draft schedule for review, and incorporate responses to comments identified by Contracting Authority.

1.5 Product Data Sheets

- .1 Submit product data sheets on 3 prints.
- .2 Submit product data sheets for requirements requested in the Contract documents and as the Contracting Authority may reasonably request where shop drawings will not be prepared due to a standardized manufacture of a product. Manufacturers' catalogue cuts will be acceptable in such cases, providing that they are 213 mm x 275 mm (8-1/2" x 11") originals, and that they indicate choices including sizes, colours, model numbers, options and other pertinent data, including installation instructions. Submissions showing only general information are not acceptable.
- .3 Where requirements of Contract documents are more stringent than design proposed on product data sheets, the requirements of the Contract documents take priority.
- .4 Upon completion of review by Contracting Authority, 1 marked set of Product data sheets will be returned to Contractor for reproduction and distribution.
- .5 Retain 1 complete set of prints of reviewed Product data sheets for issuance to Museum immediately prior to Final Certificate of Completion, in an acceptable, bound manner and in accordance with Section 01770.

1.6 Shop Drawings

- .1 Submit shop drawings on 3 prints.
- .2 Lettering on shop drawings shall be not less than 3mm (1/8") high.
- .3 Where requirements of Contract documents are more stringent than design proposed on shop drawings, the requirements of the Contract documents take priority.
- .4 Contracting Authority markings and resulting action required:
 - .1 Shop drawings requiring no changes will be marked 'REVIEWED', and shall be submitted for as-built drawings purposes.
 - .2 Shop drawings requiring several changes will be marked 'REVIEWED as NOTED' and shall be revised and submitted for as-built drawings purposes.

Submittals

- .3 Shop drawings requiring substantial changes will be marked 'REVISE AND RE-SUBMIT' and shall be revised and resubmitted until Contracting Authority stamps drawings with 'REVIEWED' or 'REVIEWED as NOTED'.
- .5 Shop drawing size shall be multiple of 213 mm and 275 mm (8-1/2" and 11") excluding 38 mm (1-1/2") binding margin and not larger than 838 mm x 1117 mm (33" x 44"). Leave minimum 150 mm x 100 mm (6" x 4") clear space for Contracting Authority's comments.
- .6 Upon completion of review by Contracting Authority, 1 marked set of shop drawings will be returned to Contractor for reproduction and distribution.
- .7 Retain 1 complete set of prints of reviewed shop drawings for issuance to Museum immediately prior to Final Certificate of Completion, in an acceptable, bound manner and in accordance with Section 01770.
- .8 Submit copies of reviewed shop drawings to authorities having jurisdiction as required.
- .9 Shop drawings shall include:
 - .1 Fabrication and erection dimensions.
 - .2 Plans, sections, elevations, arrangements and sufficient full size details which indicate complete construction, components, methods of assembly as well as interconnections with other parts of the Work.
 - .3 Design calculations prepared by professional engineer, as required, substantiating sizes for members and connections based on design loads.
 - .4 Clear definition of the division of responsibility for the work described thereon. No Products, items or equipment, or description of work, shall be indicated to be supplied, or work to be done, "By Others" or "By Purchaser". Shop drawings marked with either of these phrases will be rejected without having been reviewed by the Contracting Authority.
 - .5 Location and type of exposed anchors, attachments and locations and types of fasteners, including concealed reinforcements to accept mounted fasteners.
 - .6 Adhesives, joinery methods and bonding agents.
 - .7 Kinds and grades of materials, their characteristics relative to their purpose, detailed description of finishes and other fabrication information.
 - .8 Configurations, types and sizes required; identify each unit type on drawing and on Product.
 - .9 Descriptive names of equipment and mechanical and electrical characteristics when applicable.
 - .10 Data verifying that superimposed loads will not affect function, appearance and safety or work shown on shop drawings, as well as other interconnected work.
 - .11 Assumed design loadings, dimensions of elements and material specifications for load-bearing members.
 - .12 Proposed chases, sleeves, cuts and holes in structural members.
 - .13 Wall thicknesses of metals.
 - .14 Location and types of welds. For structural welds use AWS symbols and clearly show net weld lengths and sizes.

Submittals

- .15 Materials, gauges, and sizes being supplied including connections, attachments, reinforcement, anchorage and locations of exposed fastenings.
 - .16 Installation instructions and details for products to be installed by separate Subcontractors, including function of each part.
 - .17 A list of products covered by, or included on, the shop drawing. List of products shall be complete and show manufacturer's name, product name, generic description, standard certification where specified, manufacturer's complete installation data and precautions against wrong installation, operation and maintenance.
 - .18 Refer to individual sections of the specifications for more particular requirements for shop drawings.
- .10 Compatibility statement: Include with each shop drawing a statement that each Product and material indicated on the shop drawing is compatible with each other Product and material with which it comes into contact.

1.7 Samples

- .1 Deliver 3 samples to Contracting Authority's office with expenses, including carrying costs, prepaid, unless otherwise instructed.
- .2 Identify samples or assemblies by Contract number and name, name of Contracting Authority, Contractor and Subcontractor, and date of submission. Identify location, specified material reference and any other pertinent information. Show construction by layered method if necessary, clearly displaying textures and patterns.
- .3 Resubmit samples until written acceptance is obtained from Contracting Authority.

1.8 Mock-Ups

- .1 Provide field or shop erected example of work complete with specified materials and workmanship.
- .2 Erect mock-ups at locations as specified and as acceptable to Contracting Authority. Do not proceed with work for which mock-ups are required prior to Contracting Authority's review of mock-ups.
- .3 Protect and maintain mock-ups until directed to be removed. Commence work demonstrated in mock-up only after review and acceptance of workmanship. If possible, mock-up may become part of finished work, at sole discretion, and with prior written acceptance, of Contracting Authority.
- .4 Reviewed and accepted mock-ups will become standards of workmanship and material against which installed work will be compared.
- .5 Remove and replace materials or assemblies not matching reviewed mock-ups.
- .6 Resubmit mock-ups until written acceptance is obtained from Contracting Authority.

PART 2 - PRODUCTS

Not applicable.

Submittals

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Special Procedures

PART 1 - GENERAL

1.1 General Procedures

- .1 For the purposes of this section:
 - .1 The words “worker” or “workers” shall mean the Contractor, Contractor’s staff or employees, Subcontractors, Subcontractor’s staff or employees, Suppliers, Supplier’s staff or employees, or anyone engaged for the Work, directly or indirectly, by the Contractor, unless otherwise indicated.
 - .2 The words “make good” or “making good” shall mean that, when a finish or material has been altered, the material or finish shall be repaired or replaced, and refinished to match existing quality and appearance to acceptance of Contracting Authority, and that repaired or replaced and refinished Work shall not be discernible from existing materials or finishes when judged by the Contracting Authority from a viewing distance of 1830 mm (6’), and that such work is included in the Contract Price.
- .2 Operational limitations:
 - .1 The existing building will remain in full use and occupancy throughout the Work, except for such parts of the building that have made available to perform the Work.
 - .2 Contractor’s use of the Museum Properties is limited to permit regular use of existing Museum’s facilities to continue with the least amount of interference and disruptions possible.
 - .3 Use assigned access to the place of the Work and access routes through occupied areas of the existing building are as designated by the Contracting Authority.
 - .4 Store materials in locations designated the Contracting Authority.
 - .5 Cut stone materials off-site.
 - .6 Locate site office where designated the Contracting Authority.
 - .7 Temporary power for the Work shall be provided by the Contracting Authority.
 - .8 Provide dust tight temporary enclosures for the Work unless otherwise indicated by the Contracting Authority.
 - .9 The Contractor shall provide protection for railing work at The Colonnade and the Great Hall Stair.
- .3 Dust tight enclosure and partition doors and entrance doors to the Museum Properties shall remain closed.
- .4 Areas of the existing building adjacent to the Museum Properties or areas affected by the Work, including circulation and access routes, shall be maintained in a clean state equivalent to the level of cleanliness maintained in the existing building, and as follows:
 - .1 Clean and vacuum the Museum Properties and areas surrounding the Museum Properties daily or more frequently as required.
 - .2 Wet mop floor areas in vicinity of access doors to the Museum Properties daily, or more frequently as required.

Special Procedures

- .3 Vacuum carpeted areas daily or more frequently as required.
- .4 Wet clean carpets in accordance with manufacturer's recommendations once work in such areas is complete.
- .5 Final cleaning shall be in accordance with Section 01770.
- .5 Waste protection and removal:
 - .1 Transport waste in containers with tightly fitting lids or cover waste with a wet sheet, and deposit in applicable containers provided by Contracting Authority. At loading dock location.
 - .2 Remove waste as it is created. Debris shall be contained and covered if it can not be removed immediately.
 - .3 Do not transport waste through occupied areas of existing building.
 - .4 Remove waste at the end of each Day through construction access routes.
- .6 Document condition of the existing building in areas immediately adjacent to the *Place of the Work* by means of construction photographs in accordance with Section 01323.

1.2 Security

- .1 Provide security for the Museum Properties by methods compatible with the security system for the existing building.
- .2 Contractor shall coordinate the Work carefully with the Contracting Authority in order to ensure no disruption to the existing building's security system.
- .3 Where existing building's security system is breached due to Contractor's negligence, be responsible for any damage or theft of property, regardless if area where damage or theft occurred is under Contractor's control or not.

1.3 Use of Existing Facilities

- .1 Refer also to Appendix B Site Protocol.
- .2 Restrict access, parking, material deliveries, execution of work, operations and procedures to designated locations and times and do not deviate from designated procedures without prior acceptance by the Contracting Authority.
- .3 Periodically review proposed construction operations with the Contracting Authority and cooperate as required to ensure that Museum's interests and requirements are not unduly compromised with regard to the normal operation and function of occupied areas on the existing building.
- .4 Traffic through occupied areas of the existing building shall be kept to a minimum. Travel within occupied areas of the existing building shall be via the most direct route.
- .5 Noise, dust and debris, and odours shall be minimized to ensure building occupants in adjacent areas are disturbed as little as possible. Corrective action to cease or limit disagreeable annoyances to building occupants shall be implemented immediately upon notification by the Contracting Authority or the Museum.
 - .1 Cutting of stone shall be performed to the exterior of Museum Properties in location designated by the Contracting Authority.
- .6 Existing fire protection equipment:

Special Procedures

- .1 Existing fire protection equipment shall only be used in an emergency situation.
 - .2 Do not remove existing fire protection equipment.
 - .3 If any existing fire protection equipment is used or interfered with in any way, the Museum's fire equipment inspector shall be retained to inspect, test, recharge, and otherwise repair such equipment at no additional cost to the Museum.
- .7 The *Owner* will designate existing washrooms for use of workers. Regularly maintain and clean these washroom facilities, in compliance with applicable regulations, codes and by-laws, for the duration of the Work. At Final Certificate of Completion, turn over to Museum, clean washroom facilities, in same condition facilities were prior to commencement of the Work. Arrange and pay for repairs, making good and replacement if necessary, as directed by Contracting Authority. Provision of such access to existing washrooms does not relieve the Contractor of the responsibility to Provide and maintain, in compliance with applicable regulations, codes and by-laws, sufficient sanitary temporary water closets and washbasins for use of workers as required by applicable regulations, codes and by-laws. Additional sanitary temporary water closets and washbasins for use of workers, as required, shall be provided at no additional cost to the Museum.

1.4 Existing Services

- .1 Service interruptions:
 - .1 Connection or disconnection of services that will interfere with the operation of the Museum's facilities shall not be done without the prior written acceptance of the Contracting Authority and during the times designated by the Museum. Premium charges associated with such work shall be included in the Contract Price.
 - .2 Provide at least 10 Days prior written notice to the Contracting Authority of requirement or intention to interrupt services, and obtain written permission of the Contracting Authority prior to commencing such interruption.

1.5 Emergency and Fire Protection

- .1 Provide and maintain ready access to fire protection equipment.
- .2 Provide temporary fire resistant closures at existing building openings exposed to construction areas.
- .3 Contractor shall coordinate the work carefully with the Museum in order to ensure no disruption to the existing fire detection and annunciation systems. Failure to provide such coordination shall result in the Contractor incurring the responsibilities and expenses associated with disruption to the existing fire detection and annunciation systems at no additional cost to the Museum.
 - .1 Provide fire watch when existing fire detection and annunciation systems are not operational or on bypass.
 - .2 Whenever a changeover time occurs, which is an outage time of at least a portion of the fire alarm system, the municipal fire department shall be notified of the temporary shutdown and alternative measures shall be devised.

Special Procedures

- .4 Contractor shall coordinate the work carefully with the Contracting Authority in order to prevent unapproved disruptions to the existing sprinkler system, standpipe system, or other fire protection systems.
 - .1 Where temporary shut-down is necessitated, such shut down shall be in accordance with the requirements of authorities having jurisdiction and the National Building Code.
- .5 Obtain 'Hot Work Permit' from Contracting Authority prior to hot work operation, which may cause the building's fire alarm system to be activated or create an unwarranted fire risk condition. The prevention of fires and false fire alarms caused by hot work operations is the primary goal of this procedure. Gas hoses, backflow preventers, fire resistive tarpaulins, curtains and other cutting and welding equipment must be in good repair before the permit is issued.
 - .1 'Hot Work' is defined as work using open flames or sources of heat that could ignite materials in the work area.
- .6 Fire department access:
 - .1 Do not obstruct access route designated for fire department equipment.
 - .2 If it is necessary that existing access routes be obstructed or deleted, alternative access routes acceptable to the fire department and in accordance with the requirements of the Contract documents and authorities having jurisdiction shall be Provided prior to commencement of work that will obstruct or delete existing access.
- .7 Combustible materials:
 - .1 Stockpiling of combustible materials adjacent to the Museum shall not be acceptable.

1.6 Temporary Stair Hoarding

- .1 Plywood construction, designed and constructed to meet guard loads and combustibility requirements of the building code. Plywood: Good Two Sides.
- .2 Fire retardant treatment: Treated plywood to CAN/CSA O80 with flame-spread rating of not more than 25 to CAN/ULC-S102-03.
- .3 Finish: Acrylic house paint, Benjamin Moore 2126-50 Gray Timber Wolf colour.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Quality Control

PART 1 - GENERAL

1.1 Related Requirements

- .1 Materials and workmanship quality, reference standards - under Section 01600.

1.2 Independent Inspection and Testing

- .1 From time to time during progress of the Work, the Museum may require that inspection and testing be performed to determine that materials provided in the Work meet the requirements of the Contract documents.
 - .1 Subcontractors shall verify with Contractor, in writing, portions of the *Work* that will require inspection and /or testing, prior to commencing such affected work.
 - .2 Inspection and testing services shall be required for, but not limited to, the following:
 - .1 Railings and anchorages.
- .2 The Museum will appoint inspection and testing companies, representing, reporting and responsible to the Museum. Payment will be by Museum, unless otherwise specified.
- .3 Additional testing required because of changes in materials, proportions of mixes requested by Contractor or Subcontractors as well as any extra testing of materials occasioned by lack of identification or by failure of such materials being replaced to meet requirements of the Contract documents or testing of structure or elements including load testing, shall be carried out at no additional cost to the Museum.
- .4 Inspection and tests required by codes or ordinances, or by an authority having jurisdiction, and made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor and not be paid by Museum, unless otherwise specified in the Contract documents.
- .5 Inspection or testing performed exclusively for Contractor's convenience shall be sole responsibility of Contractor, and will not be paid by Museum.
- .6 Where evidence exists that defective workmanship may have occurred or that the Work may have been carried out incorporating defective materials, the Contracting Authority reserves the right to have tests, inspections or surveys performed, analytical calculation of structural strength made and the like in order to help determine the extent of defect and whether such work must be replaced. Tests, inspections or surveys carried out under these circumstances will be made at the Contractor's expense, and will not be paid by Museum, unless the results indicate that the work so tested, inspected or surveyed is not defective or that, in Contracting Authority's opinion, the work so tested, inspected, or surveyed may be accepted, in which case tests, inspections or surveys will be paid by Museum.
- .7 Inspection and testing shall be performed by qualified and/or certified personnel under professional supervision or performed directly by a professional engineer qualified in conformance with applicable codes and certification programs.
- .8 Requirements of regulatory agencies:
 - .1 Testing shall be conducted in accordance with requirements of the building code.
 - .2 Obtain certification where required by the building code and standards.

Quality Control

- .9 Cooperation with inspection and testing company:
 - .1 Provide inspection company with materials and installation information as required and /or requested.
 - .2 Provide access to the Work for representatives of inspection and testing companies.
 - .3 Cooperate with inspection and testing companies and give adequate notification of any changes in source of supply, additional work shifts and any other proposed changes.
 - .4 No Product nor part of the Work shall be installed before it is tested when a test is specified or required, nor shall work be executed where a test or inspection is required and the inspector cannot attend.
 - .5 Cooperate in permitting access to the Work for inspection and testing company wherever the Work is in progress, or wherever Products, materials, or equipment are stored prior to shipping.
 - .6 Supply labour required to assist inspection and testing company in sampling and making tests.
 - .7 Repair work damaged as a result of inspection and testing work.
 - .8 Cost of above labour and material shall be borne by applicable Subcontractors.
 - .9 The inspection and testing service does not relieve the Contractor of responsibility for normal shop and site inspection, and quality control of production.
- .10 Prepare schedule for inspection and testing in accordance with Section 01330 and as follows:
 - .1 Establishing schedule:
 - .1 By advance discussion with the selected testing laboratory, determine the time required for the laboratory to perform its tests and to issue each of its findings.
 - .2 Allow required time within construction schedule.
 - .2 Adherence to schedule:
 - .1 Contractor shall advise testing laboratory in advance when testing of the Work is required.
 - .2 When testing laboratory is ready to test according to predetermined schedule, but is prevented from testing or taking specimens due to incompleteness of the parts of the Work scheduled for inspection and testing, extra costs for testing attributable to the delay may be back-charged to Contractor at no additional cost to the Museum.
 - .3 Notify Contractor and inspection company at least 3 Days before work required to be inspected commences, and arrange for a meeting at the Museum Properties, to be held 1 Day before the work starts with the following present:
 - .1 Contractor, a principal of the Subcontractor whose work is to be inspected and/or tested, inspection and testing company, manufacturer's representative and Contracting Authority.

Quality Control

- .4 Give 2 Days prior notice to inspection company of the commencement of each phase of the Work requiring inspection, and provide inspection company with materials and installation information.
- .11 Reports and documents
- .1 Inspection and testing companies shall submit shop inspection and site inspection reports within 5 Days of each inspection.
 - .2 Distribute reports as follows:
 - .1 Museum; 2 copies
 - .2 Contracting Authority; 1 copy.
 - .3 Contractor; 2 copies
 - .4 Consulting engineers, as applicable; 1 copy each.
 - .3 Inspectors shall submit a written report on each inspection or test, including pertinent data such as conditions at the Museum Properties, dates, test references, locations of tested materials, actual Product identification, procedures and descriptions, site instructions given, recommendations and/or any other information required by standard applicable to reporting of tests and inspections.
 - .4 Clearly indicate in report failure of Product or procedures to meet applicable standards, give recommendations for retesting or correction. Contact Contracting Authority immediately when Product or procedure fails to meet applicable standards.
 - .5 Upon completion of those parts of the Work subject to independent inspection and testing, submit to the Contracting Authority duplicate certificates of acceptance of the installation issued by the independent inspection and testing company.
- .12 Inspection and test specimens
- .1 Inspection and testing will, generally, consist of procedures listed in the following paragraphs, but additional tests may be performed as required to verify conformance to Contract documents.
 - .2 Specimens and samples for testing, unless otherwise specified in the Contract documents, will be taken by the testing laboratory; sampling equipment and personnel will be provided by the testing laboratory; and deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.
 - .3 Inspection and testing company shall take samples necessary to verify quality as specified by applicable standards or as specified herein. Taking of samples shall not endanger the structure or life, and shall be taken so as to best represent the Work as a whole.
 - .4 Samples shall be handled, packaged, stored and delivered so as to best ensure the validity of tests that will be performed on them. Sample handling where required shall duplicate conditions at the Museum Properties (such as site-cured concrete cylinders).

Quality Control

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

PART 1 - GENERAL

1.1 General Instructions

- .1 Temporary facilities and controls specified in this section shall be supplemented as applicable in accordance with Section 01351.

1.2 Temporary Enclosures and Protection

- .1 Museum will provide temporary enclosures for the Work, coordinate requirements with Contracting Authority.
- .2 Supplement these requirements in accordance with Section 01351.

1.3 Signs and Notices

- .1 Do not exhibit at the Museum Properties signs or advertisements other than mandatory warning signs and regulations, unless otherwise approved by Contracting Authority and Museum.
- .2 Maintain signs in good condition for the duration of Contract.
- .3 Obtain approvals from authorities having jurisdictional for temporary signs.

1.4 Plant, Machinery and Scaffolding

- .1 Provide formwork, scaffolding, equipment, tools, machinery and incidental appurtenances necessary for the proper execution of the Work.
- .2 Erect plant, machinery and scaffolding to permit access to building and the Work.
- .3 Use scaffolds in such manner as to interfere as little as possible with other trades' operations.
- .4 Support scaffolds from finished surfaces only after taking precautions to prevent damage. No supports, clips, brackets, or similar devices shall be welded, bolted, or otherwise affixed to any finished member or surface without prior permission.

1.5 Site Storage

- .1 Handle and store materials so as to prevent damage or defacement to the Work and surrounding property.
- .2 Museum is not responsible for securing Products or materials at the Museum Properties.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

PART 1 - GENERAL

1.1 Availability of Products

- .1 In the event of delays in supply of products, and should it subsequently appear that the Work may be delayed for such reason, Contracting Authority reserves the right to substitute more readily available Products of similar character, at no additional cost to the Museum.

1.2 Product Handling

- .1 Handle and store Products in a manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's and Supplier's recommendations and so as to ensure preservation of their quality and fitness for the Work, and protect from vandalism and theft.
- .2 Store packaged or bundled Products in original and undamaged condition with manufacturer's seals and labels intact, facing to outside. Do not remove from packaging or bundling until required in the Work.
- .3 Carefully handle materials to preclude damaging and soiling of existing surfaces.
- .4 Remove and replace damaged Products.
- .5 Transportation:
 - .1 Pay cost of transportation of Products required in performance of Work.
 - .2 Reject Products damaged during transport.
 - .3 Transportation of Products must be undertaken to suit construction schedule. Contractor is responsible for determining mode of transport to ensure delivery, obtaining shop drawings, placement of orders, and on-time premium costs, air freight, and the like.

PART 2 - PRODUCTS

2.1 Product Requirements and Quality

- .1 Products used for temporary facilities may have been previously used, providing they are sound in structural qualities.
- .2 Specified options: The Work is based on materials, Products and systems specified by manufacturer's catalogued trade names, references to standards, by prescriptive specifications and by performance specifications.
 - .1 Where only one manufacturer's catalogued trade name is specified for a Product, the Product is single sourced and shall be supplied by the specified manufacturer.
 - .2 Where more than one manufacturer's catalogue trade name is specified for a Product, supply the Product from any one of those manufacturers specified.
 - .3 When a Product is specified by reference to a standard, select any Product from any manufacturer that meets or exceeds the requirements of the standard.

Products and Workmanship

- .4 When a Product or system is specified by prescriptive or performance specifications, Provide any Product or system that meets or exceeds the requirements of the prescriptive or performance specifications.
- .5 The onus is on the Contractor to prove compliance with governing published standards, prescriptive specifications and with performance specifications.
- .3 Products, materials, equipment and articles (referred to as Products throughout the Contract documents) incorporated in the Work shall be new, not damaged or defective, and of the quality standards specified, for the purpose intended. If requested, furnish evidence as to type, source and quality of Products Provided.
- .4 Where Contract documents list acceptable Products or acceptable manufacturers, select as applicable, any one Product from any one manufacturer meeting performance of specifications.
- .5 Where Contract documents require design of a Product or system, and minimum material requirements are specified, the design of such Product or system shall employ materials specified within applicable section. Where secondary materials or components are not specified, augment with materials meeting applicable code limitations, and incorporating compatibility criteria with adjacent work.
- .6 Defective Products, whenever identified prior to completion of the Work, will be rejected, regardless of previous reviews. Review of the Work by the Contracting Authority or inspection and testing companies does not relieve the Contractor of the responsibility for executing the Work in accordance with the requirements of the Contract documents, but is a precaution against oversight or error. Remove and replace defective Products and be responsible for delays and expenses caused by rejection at no additional cost to the Museum.
- .7 Should any dispute arise as to quality or fitness of Products, the decision rests strictly with Contracting Authority based upon the requirements of the Contract documents.
- .8 Unless otherwise indicated in the Contract documents, maintain uniformity of manufacturer for any like item, material, equipment or assembly for the duration of the Work.
- .9 Products exposed in the finished work shall be uniform in colour, texture, range, and quality, and be from one production run or batch, unless otherwise indicated.
- .10 Quality control:
 - .1 Implement a system of quality control to ensure compliance with Contract documents.
 - .2 Notify Contracting Authority of defects in the Work or departures from intent of Contract documents that may occur during construction. Contracting Authority will recommend appropriate corrective action in accordance with requirements of the Contract.

PART 3 - EXECUTION

3.1 Manufacturer's Instructions

- .1 Unless otherwise indicated in the Contract documents, install or erect Products in accordance with manufacturer's printed instructions. Do not rely on labels or enclosures supplied with Products. Obtain printed instructions directly from manufacturers.

Products and Workmanship

- .2 Notify Contracting Authority in writing, of conflicts between the Contract documents and manufacturer's instructions.
- .3 Improper installation or erection of Products, due to failure in complying with these requirements, authorizes Contracting Authority to require removal and re-installation at no additional cost to the Museum.
- .4 Manufacturers' representatives shall have access to the Work at all times. Contractor shall render assistance and facilities for such access in order that the manufacturers' representatives may properly perform their function.

3.2 Galvanic/Dissimilar Metal Corrosion

- .1 Insulate dissimilar metals from each other by suitable plastic strips, washers or sleeves to prevent galvanic corrosion where conductive liquid or electrolyte (rainwater or condensation) exists.

3.3 Workmanship

- .1 General:
 - .1 Execute the Work using workers experienced and skilled in the respective duties for which they are employed.
 - .2 Workmanship shall match existing in every respect.
 - .3 Do not employ an unfit person or anyone unskilled in required duties.
 - .4 Decisions as to the quality or fitness of workmanship in cases of dispute rest solely with Contracting Authority, whose decision is final.
- .2 Coordination:
 - .1 Ensure cooperation of workers in layout of the Work. Maintain efficient and continuous supervision.
 - .2 Be responsible for coordination and placement of openings, sleeves and accessories.
- .3 Concealment:
 - .1 Before installation, inform Contracting Authority of any contradictory situation. Install as directed by Contracting Authority.
- .4 Fastenings:
 - .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
 - .2 Prevent electrolytic action and corrosion between dissimilar metals and materials.
- .5 Protection of work in progress:
 - .1 Take reasonable and necessary measures, including those required by authorities having jurisdiction, to Provide protection.
 - .2 Adequately protect parts of the Work completed or in progress. Parts of the Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by the Contracting Authority, at no additional cost to the Museum.

Products and Workmanship

- .3 Protect work of other Subcontractors from damage while doing subsequent work. Damaged work shall be made good by appropriate Subcontractors but at expense of those causing damage.
- .6 Construction tolerances:
 - .1 Match existing tolerances in every respect.

END OF SECTION

Cutting and Patching

PART 1 - GENERAL

1.1 Cutting, Patching and Remedial Work

- .1 Submittal Items:
 - .1 Comply with administrative requirements of Section 01330.
 - .2 Submit written request in advance of cutting, coring, and alteration that affects:
 - .1 Structural integrity of any element of Work.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of any operational element.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Museum or work of other contractors.
 - .3 Include in request:
 - .1 Identification of Contract.
 - .2 Location and description of affected work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed work, and Products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Museum or work of other contractors.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be performed.
 - .9 Location of reinforcement in concrete structure confirmed by non-destructive, positive method other than X-ray.
 - .4 Do not commence cutting, patching, or remedial work until request has been reviewed by Contracting Authority.
- .2 Preparation:
 - .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
 - .2 After uncovering, inspect conditions affecting performance of the Work.
 - .3 Beginning of cutting or patching means acceptance of existing conditions.
 - .4 Provide supports to assure structural integrity of surroundings; devices and methods to protect other portions of the Work from damage.
 - .5 Where uncovering of area exposes local deterioration, cracking, structural settlement, previous modifications, or other unexpected conditions, advise Contracting Authority immediately in writing and leave conditions exposed until receipt of Contracting Authority's written instructions.
- .3 Execution:

Cutting and Patching

- .1 Execute cutting, fitting, and patching to complete the Work. Under no circumstances will overcutting of corners of opening be accepted. Ensure corners of openings to be cut are predrilled or sawed.
- .2 Remove and replace defective and non-conforming work.
- .3 Remove samples of installed work for testing if directed by Contracting Authority.
- .4 Shop drawings identifying precise locations and size of openings to be cored and cut are to be submitted for review by Contracting Authority. Coring and cutting work locations shall be reviewed by Contracting Authority for acceptance before proceeding.
- .5 Provide openings in non-structural elements of the Work for penetrations of mechanical and electrical work
- .6 Perform work by methods to avoid damage to other work, and which will Provide proper surfaces to receive patching and finishing.
- .7 Employ qualified installer with at least 3 years of relevant experience to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Restore work with new Products in accordance with requirements of Contract documents.
- .9 Completely seal voids of penetrations of fire rated wall, ceiling, and floor constructions with firestopping and smoke seals.
- .10 Refinish surfaces to match adjacent finishes. Refinish continuous surfaces to nearest intersection. Refinish entire assembly units.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

PART 1 - GENERAL

1.1 Environmental Controls

- .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- .2 Store volatile wastes in covered metal containers, and remove from Museum Properties daily.
- .3 Prevent accumulation of wastes that create hazardous conditions.
- .4 Provide adequate ventilation during use of volatile or noxious substances.

1.2 Materials

- .1 Use only cleaning materials recommended by manufacturer of surface to be cleaned and as recommended by cleaning material manufacturer.

1.3 Cleaning During Construction

- .1 Clean-up the Museum Properties daily. Maintain clean and clear egress routes at all times.
- .2 Maintain Museum Properties, grounds and public properties free from accumulations of waste materials and rubbish.
- .3 Provide containers at the Museum Properties for collection of waste materials and rubbish. Remove waste materials and rubbish from the Museum Properties when containers become full. Transfer to applicable containers at loading area in accordance with Section 01351.
- .4 Vacuum and clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until Final Certificate of Completion.
- .5 Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- .6 Promptly as the Work proceeds, on a daily basis and upon completion, clean up and remove rubbish, surplus materials and equipment.

1.4 Final Cleaning

- .1 Perform final cleaning in accordance with requirements of Section 01770.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Contract Closeout Procedures and Submittals

PART 1 - GENERAL

1.1 General Instructions

- .1 The procedures for completing Contract and acceptance by the Museum shall be in accordance with the methods described in OAA/OGCA Document 100 (June 1997) and any additional requirements described below.
- .2 Stages will be reviewed at the Contract start-up meeting to ensure that parties understand their responsibilities. Refer to Section 01312 for procedures and requirements for Contract start-up meeting.
- .3 Within 4 weeks of commencement of the Work, submit to the Contracting Authority a list of closeout submittals required by the Contract documents.

1.2 Final Cleaning

- .1 Environmental controls:
 - .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - .2 Store volatile wastes in covered metal containers, and remove from Museum Properties daily.
 - .3 Prevent accumulation of wastes that create hazardous conditions.
- .2 Materials:
 - .1 Use only cleaning materials recommended by manufacturer of surface to be cleaned and as recommended by cleaning material manufacturer.
- .3 Final cleaning:
 - .1 Immediately prior to Contracting Authority's review to determine if Final Certificate of Completion has been achieved, remove surplus products and construction machinery and equipment not required for the performance of the remaining Work.
 - .2 Remove waste products and debris other than that caused by the Museum, and leave the Work clean and suitable for use by Museum.
 - .3 When the Contract is completed, remove surplus products, tools, construction machinery and equipment.
 - .4 Clean surfaces in accordance with recommendations of Product manufacturer.

1.3 Closeout Submittals

- .1 Collect reviewed submittals, and assemble required closeout submittals executed by Subcontractors, Suppliers, and manufacturers. Prior to submitting closeout submittals to the Contracting Authority, undertake the following:
 - .1 Review maintenance manual contents (operating, maintenance instructions, as-built drawings, materials) for completeness.
 - .2 Review in relation to Contract Price, change orders, change directives, holdbacks and other adjustments to the Contract Price.

Contract Closeout Procedures and Submittals

- .3 Review inspection and testing reports to verify conformance to intent of Contract documents and that changes, repairs or replacements have been completed.
- .4 Submit a final statement of accounting giving total adjusted Contract Price, previous payments, and monies remaining at time of application for completion of the Contract. Contracting Authority will issue a final change order reflecting approved adjustments to Contract Price not previously made.
- .2 No later than 10 Days prior to submitting request for Contracting Authority's review to determine if Final Certificate of Completion has been achieved, submit to the Contracting Authority the closeout submittals specified in this section, including, but not limited to, reviewed shop drawings, Product data sheets, samples, as-built records, fully executed warranties and guarantees.
- .3 For equipment put into use with Museum's permission during the Work, submit required closeout submittals within 10 Days after start-up.
- .4 For items of the Work delayed materially beyond date of *Substantial Performance of the Work*, provide updated closeout submittals within 10 Days after acceptance, listing date of acceptance as start of warranty period.
- .5 Neither the Contracting Authority's review to determine if Final Certificate of Completion has been achieved, nor acceptance of the Work, will take place until receipt, by the Contracting Authority, of acceptable copies of the closeout submittals required herein and by the Contract documents.
- .6 As-built records:
 - .1 Museum will provide 1 reproducible set of Contract documents to the Contractor for as-built drawing purposes.
 - .2 Accurately record changes to the Work and deviations from Contract documents as the Work progresses.
 - .3 Mark changes in red ink.
 - .4 Record, without being limited to, the following:
 - .1 Field changes of dimensions/details.
 - .2 Changes by change orders, change directives, and supplemental instructions.
 - .3 In project manuals / specifications: Record as-built Products, including manufacturer, manufacturer's model or system number and finish / finish system.
 - .5 As-built drawings:
 - .1 Submit 3 copies of as-built drawings.
 - .6 As-built project manuals:
 - .1 Submit 3 copies of as-built project manuals.
- .7 Shop drawing manuals:
 - .1 Submit 4 copies of operation and maintenance manuals, consisting of the following general components:
 - .1 Shop drawing manuals,

Contract Closeout Procedures and Submittals

- .2 Warranty manuals, and
- .3 Contract data book
- .2 Shop drawing manuals:
 - .1 Submit one copy of each final accepted shop drawing issued for the Work on which have been recorded changes made during fabrication and installation caused by unforeseen conditions.
 - .2 Engineered shop drawings shall include copies of the certificate of insurance, the engineer's field review reports, and the engineer's letters of general conformity that were provided as part of the engineered submittal in accordance with Section 01330 appended to the pertinent engineered shop drawing in the shop drawing manual.
- .3 Warranty manuals:
 - .1 Submit copies of bonds, guarantees, warranties and extended warranties together in one report binder, complete with an indexed summary list of warranties and expiration dates. Warranties shall be in accordance with Section 01780.
- .4 Contract data book: shall include the following information supplemented by additional required data specified elsewhere in the Contract documents:
 - .1 Maintenance instructions.
 - .2 Names, addresses and phone numbers of Subcontractors and Suppliers, as applicable.
 - .3 Additional material used in the Work listed under various sections showing name of manufacturer and source of supply.
 - .4 Key construction photos.
 - .5 Permits and forms:
 - .1 Workplace Safety & Insurance Board certificate of clearance.
 - .2 Certificates of approval of the Work by local building department (if available).

1.4 Substantial Performance

- .1 Deficiency review:
 - .1 Neither Museum nor Contracting Authority will be responsible for preparation or issuance of extensive lists of deficiencies. Contractor assumes prime responsibility for ensuring that items shown and described in the Contract documents are complete. Any reviews to approve the certificate of Substantial Performance will be immediately cancelled if it becomes obvious to the Contracting Authority that extensive deficiencies are outstanding.

Contract Closeout Procedures and Submittals

- .2 The Contractor shall conduct an inspection of the Work to identify deficiencies and defects, which shall be repaired. When the Contractor considers that the Work is substantially performed, the Contractor shall prepare and submit to the Contracting Authority a comprehensive list of items to be completed or corrected and apply for a review of the Work by the Contracting Authority to determine if Substantial Performance has been achieved.
 - .3 The Contractor's request described above shall include a statement by Contractor that the Work to be reviewed by Contracting Authority for deficiencies is, to the best of the Contractor's knowledge, in compliance with Contract documents, reviewed shop drawings, and samples, and that deficiencies and defects previously noted by Contracting Authority have been repaired.
 - .4 No later than 10 Days after the receipt of the Contractor's request described above, but contingent upon the prior receipt, by the Contracting Authority, of the closeout submittals in the manner and form specified in this section, the Contracting Authority and the Contractor will review the Work to identify any defects or deficiencies. If necessary, the Contractor shall tabulate a list of deficiencies to be corrected prior to Substantial Performance being certified by the Contracting Authority. During review, the Contracting Authority and the Contractor will decide which deficiencies or defects must be rectified before Substantial Performance can be certified, and which defects are to be treated as warranty items.
 - .5 Provide a schedule of planned deficiency review having regard to the foregoing.
- .2 Certification of Substantial Performance:
- .1 When the Contracting Authority considers that the deficiencies and defects have been completed and that it appears that the requirements of the Contract documents have been substantially performed, the Contracting Authority shall issue a certificate of Substantial Performance to the Contractor, stating the date of Substantial Performance.
 - .2 The certificate of Substantial Performance shall be prepared in form required by Construction Lien Act.
- .3 Final Inspection for completion of the Contract:
- .1 Deficiencies and defects shall be made good before the Contractor submits a written request for final review of the Work and before the Contract is considered complete.
 - .2 When Contractor is satisfied that the Work is complete, and after the Contractor has reviewed the Work to verify its completion in accordance with the requirements of the Contract documents, the Contractor shall submit a written request for a final review by the Contracting Authority, who in turn will notify the Museum.
 - .3 If there are any deficiencies identified as a result of this review, they shall be listed by the Contracting Authority and submitted to the Contractor. This list shall be recognized as the final deficiency list for purposes of acceptance of the Work under the Contract.

Contract Closeout Procedures and Submittals

- .4 Such deficiencies shall be corrected by a date mutually agreed upon between Contracting Authority and the Contractor, unless a specific date is required by Contract, and a further review by the Contracting Authority shall be called for by the Contractor following his own review to take place within 7 days from date of request.
- .5 Contractor shall thereafter submit invoice for final payment.
- .6 Money shall be withheld for deficiency work and will be released only when all deficiencies have been completed. No partial payment to be recognized until all work is completed.

1.5 Warranty Period

- .1 Provide on-going review and attendance to call-back, maintenance and repair problems during the warranty periods.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Warranties

PART 1 - GENERAL

1.1 Warranties

- .1 Warranties shall be in accordance with the general conditions, as amended, and as follows:
 - .1 Warranties shall commence at date of Final Certificate of Completion.
 - .2 Submit warranties for applicable items, signed by the applicable company responsible for each warranty.
 - .3 Submit warranties on form approved by Museum including, but not limited to, the following information:
 - .1 Name and address of Contract.
 - .2 Warranty commencement date (date of Final Certificate of Completion).
 - .3 Duration of warranty.
 - .4 Clear indication of what is being warranted and what remedial action will be taken under warranty.
 - .5 Authorized signature and seal of company providing each warranty.
 - .4 Museum shall be named in manufacturer's product warranties. Submit on relevant product manufacturer's standard warranty or guarantee form.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

PART 1 – GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the Contract and sections of Division 1.

1.2 Section Includes

- .1 Precast panels:
 - .1 Removal and reuse of the existing precast on the balustrade of the Colonnade mezzanine edge and Main Stair and new precast infill between the existing coping and the relocated glass balustrade on the curb that was originally a seat.
 - .2 Reinstall the existing precast at the new elevation height. Support on back-to-back galvanized steel angles and longer pins set in to the existing ferrule inserts.
 - .3 Finish, colour, and texture on exposed surfaces of new precast concrete work shall match existing.
- .2 Steel support and retention connections for precast.
- .3 Installation of precast.

1.3 Quality Assurance

- .1 Qualifications:
 - .1 Provide the work of this section, executed by competent installers with a minimum of 5 years experience in the application of the Products, systems, and assemblies specified, and with approval and training of the Product manufacturers.
 - .2 Manufacturer shall be qualified in accordance with CCSA A23.4-05.
- .2 Conduct a pre-installation meeting in accordance with Section 01312.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 Shop drawings:
 - .3 Submit shop drawings to the requirements of Section 01330:
 - .1 Location and dimensions of each unit in the completed structure.
 - .2 Location and layout for threaded rod dowels.
 - .3 Reinforcing details and grade of reinforcing.
 - .4 Concrete strength and admixtures used.
 - .5 Jointing clearances and clearances between the units and adjacent materials.
 - .6 Identifying marks for each precast unit.
 - .7 Special precautions to be taken by other sections affecting the work of this section.

Architectural Precast Concrete

.8 Comprehensive face mix design.

.4 Samples:

.1 Submit 305 mm x 305 mm (12" x 12") precast concrete sample.

1.5 Design Requirements

.1 Manufacturer shall be responsible for the design, connections and installation of the precast concrete units and shall direct the placing of items to be cast in concrete work.

.2 Design precast concrete panel system, associated components, connections and anchorages in accordance with CAN/CSA A23.1-14, CSA A23.4-09, CAN/CSA S16-14, CAN/CSA G40.20-13/G40.21-13, ASTM A123-13, CSA W59-13, and the building code.

.3 Maximum deflection shall be not more than 1/360th of the span for any unit under weight of dead and live loads.

.1 Mechanical connections: hot dipped galvanized and shall be clearly shown and detailed on shop drawings.

.2 Design mechanical connections, such as bolts, inserts and special manufactured items to provide means of compensating for deviations in dimensions or thickness of unit in field.

.3 Connections shall have ultimate strength such that when precast units are installed under most unfavourable permissible conditions of construction tolerance, they will support 1.6 times total loads for which units are designed.

.4 Allowance for movement shall be as specified in CSA A23.4-09.

.5 Connections indicated are suggestions only. Be responsible for complete structural design and checking of anchorage and connections.

1.6 Coordination

.1 Coordinate the work of this section with Sections 04431 and 08880 to ensure proper scheduling for dismantling, fabrication, and installation of the work.

.2 Coordinate with glass work as specified in Sections 04431 and 08880 to ensure that proper provisions are made for the installation of the work.

.3 Provide cutouts, templates, anchors, and other accessories that are required for coordination of work of Sections 04431 and 08880.

.4 Coordination: Work specified under this section requires close coordination with work of Sections 04431 and 08880. This section is responsible for ensuring correct installation procedures and results.

1.7 Handling, Storage and Protection

.1 Design and cast lifting devices into the units to ensure that they will be safely and efficiently handled. Lifting devices shall be so arranged that they do not have to be removed or, if they must be removed, they shall be arranged so that they are readily filled by this section.

.2 Stack units on properly cushioned supports to protect the edges.

.3 Do not permit units to contact earth or other staining influences or to rest on corners.

Architectural Precast Concrete

- .4 Protect the work of other sections during erection and final cleaning.
- .5 Transport, handle and store units to prevent staining, chipping, cracking, spalling, distortion, warping or other physical damage.

1.8 Warranty

- .1 Warrant work of this section for a period of 2 years in accordance with Section 01780.

PART 2- PRODUCTS

2.1 Materials

- .1 Precast concrete units:
 - .1 Cement, water reducer, air entrainment, pigment, sand, aggregates, water admixture: to CSA A23.4-09 and CAN/CSA A23.1-14. Use white cement in face mix.
 - .2 Aggregate: in conformance with CAN/CSA A23.1/A23.2-00 and shall be tested for soundness prior to manufacture in accordance with CSA A23.4-09.
 - .3 Use same brand and source of materials used for facing throughout the Work to ensure uniformity of colouration and other mix characteristics.
 - .4 Admixture: in accordance with CAN/CSA A23.1-14. Introduce admixtures to concrete at time of batching in accordance with the manufacturer's recommendations. Under no circumstances, use calcium chloride on an admixture containing calcium chloride. Admixtures shall be subject to the acceptance of the Contractor.
 - .5 Reinforcing steel: billet steel bars conforming to CSA G30.18-09. Reinforcing larger than 6mm diameter shall be deformed bars conforming to the same standard.
 - .6 Water: in accordance with CAN/CSA A23.1-14.
 - .7 Structural steel: new material conforming to CSA G40.21-13.
 - .8 Concrete mix:
 - .1 Use concrete mix designed to produce minimum of 35 MPa compressive strength at 28 days, with a maximum water/cement ratio to CSA A23.4-09.
 - .9 Forms: to CSA A23.4-09.
 - .10 Form release agent: Commercially produced liquid release agent that will not bond with, stain or adversely affect precast concrete surfaces. Form release agent must be compatible with sealants.
 - .11 Hardware: shall be cleaned prior to fabrication of precast units.
- .2 Joint sealants: in accordance with Section 07900.

2.2 Fabrication

- .1 Fabricate precast concrete wall panels in accordance with CSA A23.4-09.

Architectural Precast Concrete

- .2 Precast concrete exposed surface finish shall match approved samples. Colour and texture shall be uniform and consistent throughout, free from air pockets, imperfections, blemishes and discolourations.

PART 3 - EXECUTION

3.1 Preparation

- .1 The Colonnade/Great Hall Stair balustrade: Remove necessary existing precast by cutting existing dowel anchors.

3.2 Dimensions

- .1 Check dimensions at Museum Properties before commencing shop drawings and before fabrication and report discrepancies to Contracting Authority and Contractor.

3.3 Welding

- .1 Perform welding in accordance with CSA W59-13 and CSA W186-M1990(R2016). Organization undertaking welding shall be fully approved by Canadian Welding Bureau under requirements of CSA W47.1-09(R2014).
- .2 Provide fit-up plates or angles to compensate for deviations alignment or location of inserts.
- .3 Exercise care to minimize effect of welding heat. Design welds to prevent tearing at end of weld which would cause progressive failure.
- .4 Detailed welding procedure covering specified welds on erection and shop drawings may be requested for review by the inspection and testing company.

3.4 Installation

- .1 Erect precast concrete units in accordance with CSA A23.4-09.
- .2 Install precast concrete units so that joints are accurate within tolerances listed as follows:
 - .1 Face width of joint to vary not more than +/- 1.5 mm.
 - .2 Faces of adjacent precast sections offset not more than 1.5 mm.
 - .3 Edge alignment: alignment of panels edges not to exceed 1.5 mm.
 - .4 Bowed panels, within allowable bowing tolerances, arranged so offset between adjacent panels does not exceed 6 mm.

3.5 Joint Sealants

- .1 Provide in accordance with Section 07900.

3.6 Clean-Up

- .1 Remove, as the Work progresses, excess or foreign materials which would set up, stain, or become difficult to remove from finished surfaces.
- .2 At completion, clean exposed surfaces of precast units. Remove dirt and other extraneous matter. Do not use acidic cleaners.

- .3 Take precautions to prevent staining the material of others during cleaning operations.

END OF SECTION

Stone Panels

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the Contract and sections of Division 1.

1.2 Section Includes

- .1 Stone panels; removal and reworking existing removed panels and the provision of new stone.
 - .1 Removal of stone to gain access for work of Section 08880.
 - .2 Removal and reuse of existing stone, new matching stone where required.
- .2 Steel support and retention connections for stonework.
- .3 Mock-ups; epoxy-mitred corner.
- .4 Installation of stonework.

1.3 Quality Assurance

- .1 Manufacturer/Fabricator/Installer: Provide work of this section, executed by competent installers with minimum 10 years experience in application of Products, systems and assemblies specified and with approval and training of Product manufacturers.
- .2 Manufacturer/Fabricator and Installer shall be a member in good standing of the Canadian Stone Association.
- .3 Single-Source Manufacturing and Installation responsibility: Engage a qualified manufacturer to assume undivided responsibility for the work of this section, including fabrication, finishing, and installation.
- .4 Regulatory Requirements: Materials and workmanship shall conform to requirements of jurisdictional authorities and the building code.
- .5 Conduct a pre-installation meeting in accordance with Section 01312.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 Product data sheets:
 - .1 Submit manufacturer's Product data sheets for Products proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Indicate both existing stone to be reworked and new stone. Identify reused stone based on dismantling shop drawings.
 - .2 Submit cutting and setting drawings of reworked and new stone work specified herein.
 - .3 Indicate locations of inserts for stone anchors and supports which are to be built-in, and locations and dimensions of cut-outs, holes, openings.

Stone Panels

- .4 Indicate on shop drawings the setting number of each removed and new piece of stone and each piece shall bear the corresponding number in a non-staining paint marked on its back or bed.
 - .5 Show sizes and sections of stone, arrangements of joints and bonding, anchoring, dowelling and cramping details.
 - .6 Indicate cutting list on shop drawings.
 - .7 Follow arrangement of jointing shown in Contract documents unless modifications are agreed in writing or indicated on reviewed shop drawings.
 - .8 Measure existing dimensions at the Museum Properties and be responsible for adjusting stone sizes to suit conditions at the Museum Properties.
 - .9 Submit design of stone anchorage system.
- .4 Mock-up:
- .1 Submit one 300 mm x 300 mm dusted epoxy-mitred corner piece mock-up.

1.5 Design Requirements

- .1 Design, fabricate, and install stonework to withstand normal loads from gravity, movement of building structure, and thermally induced movement, without failure.
- .2 Comply with requirements of CSA A371, CSA A370, and CSA S304.1, unless otherwise indicated.
- .3 Connections and attachments for stone; support and retention steel: Design steel shapes, plates and straps to carry the design loads with safety factors and allowable stresses in accordance with the Canadian Institute of Steel Construction (CISC) except that steel supports carrying gravity loads shall be stressed not more than 50% of the yield stress in bending.

1.6 Site Conditions

- .1 Field Measurements: Fit to existing construction, check actual dimension of other construction by accurate field measurements before manufacturing stone; show recorded measurements on final shop drawings.

1.7 Coordination

- .1 Coordinate the work of this section with Sections 03430 and 08880 to ensure proper scheduling for dismantling, fabrication, and installation of the work.
- .2 Coordinate with glass work as specified in Sections 03430 and 08880 to ensure that proper provisions are made for the installation of the work.
- .3 Provide cutouts, templates, anchors, and other accessories that are required for coordination of work of Sections 03430 and 08880.
- .4 Coordination: Work specified under this section requires close coordination with work of Sections 03430 and 08880. This section is responsible for ensuring correct installation procedures and results.

1.8 Warranty

- .1 Warrant work of this section for a period of 2 years, in accordance with Section 01780.

Stone Panels

PART 2 - PRODUCTS

2.1 Support, Framing, and Accessory Materials

- .1 Provide anchors and attachments of type and size required to support the stonework fabricated from the following metals for conditions indicated below:
 - .1 Stainless Steel, AISI Type 304.
- .2 Setting Shims: Lead, stainless steel, or plastic shims, non-staining to stone, sized to suit joint thicknesses and bed depths of stonework involved without intruding into required depths of joint sealants.
- .3 Epoxy: Two-component non-shrink epoxy, 100% solids, 0 VOC, colour matched to specified stone.
- .4 Stone dust: Pulverized granite dust manufactured from specified stone.
- .5 Sealant pointing: in accordance with Section 07900.

2.2 Stone

- .1 Stone shall be sound, durable and free of cleavage planes, uniform in composition, texture, structure, evenly coloured and free of visible defects or concentrations of materials which could cause unsightly staining or weakening under environmental conditions in the specified use.
- .2 Granite:
 - .1 Granite to ASTM C615 Standard Specification for Granite Dimension Stone.
 - .2 Colour: Granicor 'Tadoussac', to match existing.

2.3 Cutting

- .1 Site measure for each new and reworked existing stone required for the work.
- .2 Cut stone accurately to shape and dimensions indicated on reviewed shop drawings and as specified above. Dress exposed faces true.
- .3 Cut stone pieces for anchors, cramps, dowels. Do not cut holes in exposed surfaces.
- .4 Provide local milling of stone at rear side of anchor as required to accommodate joint sizes indicated.

2.4 Fabrication - Epoxy-Mitred Corners

- .1 Factory fabricate epoxy-mitred corners at Granicor.
- .2 Remove dirt from joints using pressure air stream.
- .3 Closely calibrate joint to maintain tight joint and arris within true alignment within 1 mm tolerance.
- .4 Provide mitred corners with stone dusted epoxy adhesive to match existing, to match workmanship approved mock-up.

2.5 Finish

- .1 Machine finish exposed surfaces of stone to indicated finishes, including returned end cuts, where visible. Finish without tool marks or ridges, uniform and non-directional.

Stone Panels

- .1 Finish: Flamed to match existing.
- .2 Stone dusted epoxy-mitred corners: to match existing.

2.6 Dimensional and Flatness Tolerances

- .1 Joint size; as indicated, to match existing. Tolerance: to match existing.

PART 3 - EXECUTION

3.1 Examination

- .1 Maintain existing reworked stone within close proximity to locations where existing prior to dismantling.
- .2 Carefully inspect the stone for colour variation. Stone presenting noticeable variations shall be carefully selected, set aside and used in areas where they fit in the pattern homogeneously. Provide for appropriate lighting equipment in addition to existing lighting in the immediate area where the installation is being performed so that any shade differences which are normally very slight can be identified easily.

3.2 Setting

- .1 Setting shall be done by competent stone setters under adequate supervision and in accordance with the reviewed shop drawings.
- .2 Units with chips, cracks, stains, or other defects that might be visible in the finished work shall not be used.
- .3 Before setting, stone shall be clean and free of dirt and foreign matter. Stone shall be dry before setting.
- .4 Stone shall be set true to the required lines and grades. Joints shall be uniform in thickness to match existing.
- .5 Clean stone exposed surfaces by washing with stiff fibre brush and water.
- .6 Attach anchors dowels and cramps to metal framing backup in sequence required by support system, with four support points per stone piece, minimum.
- .7 Install stone pieces plumb, true and level on support system.

3.3 Sealant Pointing

- .1 Remove dirt from joints using pressure air stream.
- .2 Maintain dry joints for sealant pointing.
- .3 Install backer rod to joints.
- .4 Point joints with sealant when stone is installed. Do work in accordance with Section 07900.

3.4 Protection and Clean-Up

- .1 Wash stone work with stiff-fibre brushes and clean water taking care not to disturb fresh sealant.

END OF SECTION

Joint Sealants

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the Contract and sections of Division 1.

1.2 Section Includes

- .1 Building sealants.

1.3 Quality Assurance

- .1 Qualifications: Provide work of this section, executed by competent installers with minimum 5 years experience in application of Products, systems and assemblies specified and with approval and training of Product manufacturers. Installer to comply with quality assurance articles referenced in ASTM C1193 for installation of joint sealants.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 Submit manufacturer's and Product name for each sealant which will be used in the Work prior to commencing the Work.
- .3 Product data sheets:
 - .1 Submit manufacturer's Product data sheets for Products proposed for use in the work of this section.
- .4 Submit "wet sample" sealant colour samples for each sealant Product and colour.

1.5 Warranty

- .1 Warrant work of this section for a period of 3 years, in accordance with Section 01780.

PART 2 - PRODUCTS

2.1 Sealants

- .1 Acceptable Products:
 - .1 Tremco - Spectrem 4-TS Field-Tintable Silicone Sealant.
 - .2 Colour: Aluminum Stone.

2.2 Accessories

- .1 General: Provide component joint sealant primers, backings and fillers that are compatible with joint substrates and other sealants or joint fillers specified and approved for applications indicated under joint sealant schedule.
- .2 Cylindrical sealant backings: Provide joint backings that meet ASTM C1330, Type O (open-cell polyurethane), or Type B (non-absorbent bi-cellular backing materials with surface skin), sized 25 percent or greater than joint opening with proper density to control sealant depth and profile. Follow joint sealant manufacturer's recommendations with backing selections for optimum joint sealant performance, in accordance with the following schedule:

Joint Sealants

- .1 Use open cell foam with non-absorbing closed cell skin (Sof-Rod) for vertical joints; round shape for open joints and triangular shape for angular joints.
- .2 Use closed cell foam for horizontal joints.
- .3 Bond-breaker tape: Polyethylene tape or other approved plastic tape as recommended by joint sealant manufacturer to prevent 3-sided joint adhesion to rigid, inflexible joint fillers or joint surfaces at back of joint where such adhesion would restrict proper sealant movement or result in sealant failure.
- .4 Masking Tape: Non-staining, non-absorbent and compatible with joint sealants and adjacent surfaces.
- .5 Sealant primers: Use primers only as recommended by sealant manufacturer where required to enhance adhesion of sealant to specific joint substrates indicated and as determined for use from pre-construction mock-up testing. Select primers in consultation with sealant manufacturer and manufacturer of substrate material which do not have a detrimental effect on sealant adhesion or in-service performance.
- .6 Cleaners for nonporous surfaces: Provide non-staining, chemical cleaners of type which are acceptable to manufacturer of sealant and sealant backing material, which are not harmful to substrates and adjacent nonporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in-service performance.
 - .1 Provide cleaner conditioner required for glass and glazed surfaces as recommended by sealant manufacturer.

PART 3 - EXECUTION

3.1 Manufacturer's Recommendations

- .1 Unless specified otherwise herein, comply with the recommendations and directions of the manufacturer whose materials are being used in the work of this section.

3.2 Installation

- .1 Review the complete Contract documents for extent of sealant work required.
- .2 Comply with joint sealant manufacturer's installation instructions for products, primers and applications indicated unless more stringent project-specific instructions or requirements apply.
- .3 Joint sealant tooling is required for non-sag joint sealant installations. Immediately after placing fresh sealants and before skinning or curing begins, tool sealants using metal spatulas designed for this purpose in accordance with manufacturer's recommendations. Provide a smooth, uniform sealant finish, eliminating air pockets and ensuring good contact for optimum sealant adhesion within each side of the joint opening.
 - .1 Provide slightly recessed joint configuration to match existing.

Joint Sealants

3.3 Cleaning

- .1 Clean off excess sealant or sealant residue adjacent to sealant joint installations as the work progresses by methods approved by joint sealant manufacturer. Do not damage adjacent surfaces with harmful removal techniques and protect finished surfaces beyond those that have been masked. Protect installed sealants during and after final curing from damage resulting during construction. Remove and replace damaged joint sealants.
- .2 Remove temporary coverings and masking protection from adjacent work areas upon completion. Remove construction debris from the project site on a planned and regular basis.

END OF SECTION

Tempered Glass Guards and Railings

PART 1 - GENERAL

1.1 General Instructions

- .1 Read and be governed by conditions of the Contract and sections of Division 1.

1.2 Section Includes

- .1 Glass guards and railings:
 - .1 Remove existing stainless steel railings and glass as required to remove stone to expose steel shoe to allowing this section to cut one leg of the steel angles and remove glass for reuse in new position.
 - .2 Reuse existing railings; modify in manner to blend with existing design and appearance.
- .2 New stainless steel railings where required.

1.3 Quality Assurance

- .1 Qualifications: Provide the work of this section by a Subcontractor who has adequate plant, equipment, and skilled workers to perform the work expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past 5 years, who is completely familiar with referenced standards and requirements of the work of this section, and with approval of Product manufacturers.
- .2 Conduct a pre-installation meeting in accordance with Section 01312.

1.4 Submittals

- .1 Submit required submittals in accordance with Section 01330.
- .2 Product data sheets:
 - .1 Submit manufacturer's Product data sheets for Products proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Submit engineered shop drawings in accordance with Section 01330.
 - .2 Submit shop drawings illustrating construction of tempered glass guards and railings, glass thicknesses, supports, methods of joining, details of field connections and anchorage, layout showing locations of glass joints, interfacing with other parts of the Work, fastening and sealing methods.
 - .3 Submit design calculations to support drawing details. Prepare calculations in a clear and comprehensive manner so that they can be easily reviewed. Incomplete or haphazard calculations will be rejected.
- .4 Mock-ups:
 - .1 Provide mock-up of stainless steel railing installation, including minimum of 2 full size sections of glass and railings. Locate mock-up where approved by Contracting Authority.

Tempered Glass Guards and Railings

1.5 Coordination

- .1 Coordinate the work of this section with Sections 03430 and 04431 to ensure proper scheduling for dismantling, fabrication, and installation of the work.
- .2 Coordinate with glass work as specified in Sections 03430 and 04431 to ensure that proper provisions are made for the installation of the work.
- .3 Provide cutouts, templates, anchors, and other accessories that are required for coordination of work of Sections 03430 and 04431.
- .4 Coordination: Work specified under this section requires close coordination with work of Sections 03430 and 04431. This section is responsible for ensuring correct installation procedures and results.

1.6 Design Requirements

- .1 Work of this section that functions to resist forces imposed by dead and live loads shall conform to requirements of jurisdictional authorities and the building code.
- .2 Design guards, railings, and supports, in accordance with the building code, CAN/CGSB-12.1, CSA A500-16, and CAN/CGSB-12.20. Make adequate provision for differential movement of component parts of system and fastenings, to prevent breakage of glass, undue stress on fastenings or other detrimental effects.
- .3 Design glazing to withstand metal railings loads as calculated in accordance with the building code.
- .4 Design and shop drawings for glass guards and railings shall be carried out by a professional engineer licensed to practice engineering in the place of the work experienced in this type of engineering, and in accordance with Section 01330.

PART 2 - PRODUCTS

2.1 Materials

- .1 General:
 - .1 Unless detailed or specified otherwise, standard Products will be acceptable if construction details and installation meet intent of the Contract documents.
 - .2 Include materials, Products, accessories, and supplementary parts necessary to complete assembly and installation of the work of this section.
 - .3 Incorporate only metals that are free from defects which impair strength or durability, or which are visible. Install only new metals of best quality, and free from rust or waves and buckles, and that are clean, straight, and with sharply defined profiles.
- .2 Glass:
 - .1 Tempered to CAN/CGSB 12.1, glazing quality, 19 mm (3/4") thick minimum unless otherwise indicated or required by design, with clean cut edges, without wings, convolutions, sharks teeth, serration hackle, flare, bevel and chips.
 - .2 Exposed edges of panels at vertical joints shall have slight arrises and be polished to match existing.
 - .3 Wherever balustrades finish with exposed glass at end, the face edge and arrises shall be polished.

Tempered Glass Guards and Railings

- .3 Spacers and Setting Blocks: Silicone compatible neoprene or silicone, to ASTM C542, 70 to 90 Durometer Shore 'A' hardness, of sizes required, exposed colour as selected by Contracting Authority.
- .4 Stainless steel:
 - .1 Material and finish: Type 304, Excelsior Blend 'S' finish to match existing.
 - .2 Stainless steel plate: ASTM A167.
 - .3 Stainless steel bar stock: ASTM A276.
 - .4 Stainless steel tubing: ASTM A269.
- .5 Ferrous Metals: Steel, structural shapes, plate, bars: hot-rolled, to meet specified requirements of CAN/CSA-G40.21, Grade 300W or acceptable alternative.
- .6 Bolts, Screws and Fasteners: Non-magnetic, stainless steel, countersunk, tamperproof.
- .7 Grout: Non-shrink, 60 MPa 28 day compressive strength in accordance with ASTM C109/C109M.
- .8 Structural glazing adhesive; meeting the following:
 - .1 One-part, neutral-cure elastomeric sealant.
 - .2 ASTM C920, Type S, Grade NS, Class 50, Use NT, G and A.
 - .3 ASTM C1184.
 - .4 SWRI Validation.
 - .5 Colour: as selected by Contracting Authority from manufacturer's full colour range.

2.2 Fabrication

- .1 Alter existing railings as indicated on drawings. Workmanship shall match existing in every respect.
- .2 Fabricate anchors and devices to be built into or attached to structure which are necessary for adequate anchorage and attachment of the work of this section.
- .3 Fabricate with materials, component sizes, metal gauges, reinforcing, anchors, and fasteners of adequate strength to withstand intended use, and within allowable design factors imposed by jurisdictional authorities. Fabricate items from stainless steel unless otherwise noted.
- .4 Ensure that tempered glass guards and railings will remain free of warping, buckling, opening of joints and seams, distortion, and permanent deformation to expansion and contraction forces and loads.
- .5 Accurately cut, machine and fit joints, corners, copes and mitres so that junctions between components fit together tightly and in true planes.
- .6 Fasten with concealed methods unless otherwise indicated.
- .7 Continuous weld, grind welds smooth and flat where exposed to view and polish to match metal finish.
- .8 Allow for differential movements within assemblies and at junctions of assemblies with surrounding work.

Tempered Glass Guards and Railings

- .9 Cleanly and smoothly finish exposed edges of materials including holes.
- .10 Cap open ends of sections exposed to view.
- .11 Connected tubular railing sections with set screws concealed from view.
- .12 Glass to be pre-drilled to accept mechanical fastenings.
- .13 Provide separation of stainless steel or non-ferrous metals fabrication areas from mild steel fabrication areas.
- .14 Grinders, wire brushes, and tools used on stainless steel or non-ferrous metals shall be free of materials which will leave or produce dissimilar material or metal oxides deposits. Tools previously used on mild steel shall not be used on stainless steel or non-ferrous metal work.
- .15 Do not bring iron or mild steel surfaces into contact with stainless steel or non-ferrous metals, including lifting tools, steel tables, storage racks, and other storage and handling equipment.
- .16 Cutting or grinding debris from iron or mild steel materials shall not be permitted to settle on stainless steel or non-ferrous materials and fabrications.
- .17 Perform water-wetting and drying tests during finishing indicating free iron on finished stainless work in accordance with ASTM A380-06.

2.3 Welding

- .1 Do welding work in accordance with CAN/CSA W59 and CAN/CSA W59.2, ANSI/AWS D1.6/D1.6M-2007 as applicable, unless specified otherwise.
- .2 Weld structural components in steel, to conform to requirements of CSA W59, and by a fabricator fully certified by the Canadian Welding Bureau to conditions of CSA W47.1 and CSA W55.3 as applicable.
- .3 Exposed welds shall be indiscernible from metals being welded. Fill welds, grind flat, and polish to match welded metal finish.

PART 3 - EXECUTION

3.1 Examination

- .1 Inspect surfaces into which the work of this section is dependent for any irregularities detrimental to installation and performance of the work of this section. Confirm conditions satisfactory before proceeding.

3.2 Installation

- .1 Erect members and component parts plumb, level and true to building lines, in correct relation to the work of other sections and established lines, curves and levels indicated.
- .2 Securely bolt steel framing to concrete by means of bolts and expansion anchors, shim and pack to true straight lines and levels.
- .3 Glass shall be in lengths shown, cut to shapes and conditions indicated and to provide vertical joints. Set glass plumb and true to line with no variation in face plane between sections of glass at joints.

Tempered Glass Guards and Railings

3.3 Cleaning

- .1 Clean and polish glass and metal surfaces after installation is complete. Use only materials that won't scratch or mar finished surfaces and as approved by material manufacturers.

END OF SECTION