

BID SPECIFICATIONS

PROJECT

FORT MISSISSAUGA - STABILIZATION PHASE II PROJECT NO. PRO000808

**OWNER:
PARKS CANADA AGENCY
SOUTH WESTERN FIELD UNIT**

**DESIGN CONSULTANT:
Parsons Inc.**

SUB-CONSULTANTS:
Architect: Barry Padolsky Associates Inc., Architects
Landscape Architect: CSW Limited
Geotechnical Engineer: Golder Associates Ltd.

Issued for Tender: May 12, 2016

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EXCAVATION AND REMOVAL DRAWINGS			
D1	Site Plan (Excavation and Removals)	100%	May 12,2016
D2	Main Entrance Gate – Plans (Excavation and Removals)	100%	May 12,2016
D3	Main Entrance Gate – Sections & Elevations Excavation and Removals)	100%	May 12,2016
D4	Powder Magazine (North) - Plans	100%	May 12,2016
D5	Powder Magazine (South) - Plans	100%	May 12,2016
D6	Powder Magazine (North) – Sections & Elevations 1	100%	May 12,2016
D7	Powder Magazine (North) – Sections & Elevations 2	100%	May 12,2016
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D9	Powder Magazine (South) – Sections & Elevations 2	100%	May 12,2016
D10	Sally Port – Plans (Excavation and Removals)	100%	May 12,2016
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ARCHITECTURAL / HERITAGE MASONRY DRAWINGS			
A1	Site Plan	100%	May 12,2016
A2	Main Entrance Gate - Plans	100%	May 12,2016
A3	Main Entrance Gate – Sections & Elevations	100%	May 12,2016
A4	Main Entrance Gate – Details	100%	May 12,2016
A5	Powder Magazine (North) - Plans	100%	May 12,2016
A6	Powder Magazine (South) - Plans	100%	May 12,2016
A7	Powder Magazine (North) – Sections & Elevations 1	100%	May 12,2016
A8	Powder Magazine (North) – Sections & Elevations 2	100%	May 12,2016
A9	Powder Magazine (South) – Sections & Elevations 1	100%	May 12,2016
A10	Powder Magazine (South) – Sections & Elevations 2	100%	May 12,2016
A11	North Powder Magazine – Parapet Wall Details	100%	May 12,2016
A11.1	South Powder Magazine – Parapet Wall Details	100%	May 12,2016
A11.2	North Powder Magazine – Passageway Details	100%	May 12,2016
A11.3	South powder Magazine - Passageway Details	100%	May 12,2016
A12	Sally Port - Plans	100%	May 12,2016
A13	Sally Port - Sections & Elevations 1	100%	May 12,2016
A14	Sally Port - Sections & Elevations 2	100%	May 12,2016
A15	Sally Port - Sections & Elevations 3	100%	May 12,2016
A16	Sally Port - Details	100%	May 12,2016
LANDSCAPING			
L0	Fort Mississauga Landscape Restoration	100%	May 12,2016
L1	Main Entrance Gate Landscape Restoration	100%	May 12,2016
L2	North Powder Magazine Landscape Restoration	100%	May 12,2016
L3	South Powder Magazine Landscape Restoration	100%	May 12,2016
L4	Sally Port Landscape Restoration	100%	May 12,2016
L5	Sally Port Landscape Restoration	100%	May 12,2016
L6	Observation Deck Landscape Plan	100%	May 12,2016
L7	Details	100%	May 12,2016
STRUCTURAL			
S1	General Notes	100%	May 12,2016
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S3	Plans and Sections – Main Entrance Gate	100%	May 12,2016
S4	Plans and Sections – North Powder Magazine	100%	May 12,2016

S5	Details – North Powder Magazine	100%	May 12,2016
S6	Plans and Sections – South Powder Magazine	100%	May 12,2016
S7	Details – South Powder Magazine	100%	May 12,2016
S8	Plans and Sections – Sally Port	100%	May 12,2016
S9	Observation Deck	100%	May 12,2016

END OF SECTION

PRICE BREAKDOWN (Form to be submitted with Bid Form). This is a combined Lump Sum contract, however, the bidders are requested to submit breakdown of bid/contract price in details in this table. After approval, award of contract, such cost breakdown will be used as basis of progress payment. Prices include supply of all material required for installation, labour and equipment, connections, statutory charges, overhead and profit.

No	Work Description	Quantity (estimated)	Unit of Measure	Unit Rate	Total amount \$
1	Administration, Site Supervision, Hoarding	1	LS		
2	Removals and Disposal off-Site	1	LS		
3	Temporary Shoring & Bracing	1	LS		
4	Cast in Place Concrete: Wing Walls Foundations – Main Entrance	1	LS		
5	Cast in Place Concrete: Wing Walls Foundations – Sally Port	1	LS		
6	Cast in Place Concrete: Strut beams, Powder Magazines	1	LS		
7	Cast in Place Concrete: Strut beams, Sally Port	1	LS		
8	New Masonry Construction: Parapet Wall/Vent Shaft Extensions, Powder Magazine	1	LS		
9	Masonry Repairs: Sally Port Alcove (Cash allowance)				<u>\$40,000.00</u>
10	Masonry Repairs including steel formwork and dowels: Powder Magazines Outer Vaults assuming 1.0 m ² per Powder Magazine	1	LS		
11	General Masonry Repairs: Main Entrance Gate, Powder Magazines, Sally Port (Cash allowance)				<u>\$50,000.00</u>
12	Main Entrance Gate: Gate Removal and Storage: wood gates/posts,	1	LS		
13	Powder Magazines: Sally Port Gate Restoration and Reinstallation: metal gates,	1	LS		
14	Stone Dust 75 mm, including supply and installation.	48.68	m ²		
15	Pressure Treated Wood Support Systems in Powder Magazines: includes timbers and miscellaneous work to complete the work of this item.	1	LS		
16	Observation Deck: Durisol Retaining Wall Structure: including excavations, panels, foundations, structural	1	LS		

	steel, concrete cap beam, drainage course, granular backfill and miscellaneous items as required to complete the work of this item.				
17	Observation Deck: Flag Pole Foundation	0.1	m ³		
18	Sally Port: Pressure Treated Wood Crib Walls includes timbers, backfill, topsoil, planting, and miscellaneous work to complete the work of this item.	1	LS		
19	Excavation – Main Entrance Gate, including behind wall to accommodate temporary shoring	7.5	m ³		
20	Excavation – Powder Magazines, including all interior excavation	39.0	m ³		
21	Excavation – Sally Port	6.0	m ³		
22	Excavation – Crib Walls, as required for proposed works	1	LS		
23	Masonry Dismantling and Reconstruction: Stone, North Interior Wing Wall – Main Entrance Gate including drainage pipes	2.0	m ³		
24	Masonry Dismantling and Reconstruction: Brick Coping, North Interior Wing Wall – Main Entrance Gate.	2.0	m ²		
25	Structural Crack Repairs: Stone Walls/Copings (sealant) - Main Entrance Gate	25.0	m		
26	Structural Crack Repairs: Brick Copings (sealant) – Main Entrance Gate, Powder Magazines, Sally Port	6.0	m		
27	Structural Crack Repairs: Brick Walls (sealant) - Powder Magazines, Sally Port	50.0	m		
28	Structural Crack Repairs: Brick Ceiling (grout) - Sally Port Tunnel	9.0	m		
29	Structural Steel Frames in Powder Magazines	4	ea		
30	Granular A Main Entrance Gate, Powder Magazines, Sally Port, Crib Walls,	16.0	m ³		
31	Backfilling using Native Material Main Entrance Gate, Sally Port	8.0	m ³		
32	Seeding	600.0	m ²		
33	Topsoil	80.0	m ³		
34	Waterproofing Membrane above exterior arches of Powder Magazines	5.0	m ²		
35	Moisture Barrier Above Powder Magazines	90.0	m ²		

36	Moisture Barrier Behind Wing Wall at Main Entrance Gate, MiraDrain	4.0	m ²		
37	Observation Deck – Railing System	25.0	m		
38	HD Insulation 100 mm	12.0	m ²		
39	HD Insulation 50 mm	65.0	m ²		
40	Soil Anchors (Manta ray MR-SR) with 25 M rod, for Crib retaining wall structure at Sally Port	20	ea		
41	Site Access Road Modifications, to complete the work and bring it back to original condition after completion of construction	800	tonnes		
42	Mobilization and Demobilization	1	LS		
43	Other Miscellaneous Construction Items (not included above) To be identified: _____ _____ _____				

Sub-Total \$ _____

Overhead and Profit \$ _____

HST \$ _____

Total \$ _____

END OF SECTION

The bidders are advised to submit the unit price in the table prescribed below. This unit price will only be used as a basis of cost calculation in the change management process in any cases of extra works over and above the work specified in bid package.

UNIT PRICES FOR ADDITIONS ARE NOT TO EXCEED PRICES FOR DEDUCTIONS BY MORE THAN 25%.

Unit Prices include supply, installation, connection, statutory charges, overhead and profit.

Unit Prices shall not include H.S.T.

The Departmental Representative reserves the right to accept or reject all Unit Prices.

No	Item	Additions	Deductions	Unit
1	Excavation – Main Entrance Gate, Powder Magazines, Sally Port, Crib Walls.			1 m ³
2	Masonry Dismantling and Reconstruction North Interior Wing Wall – Main Entrance Gate – stone			1 m ³
3	Masonry Dismantling and Reconstruction North Interior Wing Wall – Main Entrance Gate – brick coping			1 m ²
4	Structural Crack Repairs Stone walls/copings (sealant) - Main Entrance Gate			1 m
5	Structural Crack Repairs Brick Copings (sealant) – Main Entrance Gate, Powder Magazines, Sally Port			1 m
6	Structural Crack Repairs Brick Walls (sealant) - Powder Magazines, Sally Port			1 m
7	Structural Crack Repairs Brick Ceiling (grout) - Sally Port Tunnel			1 m
8	Granular A Main Entrance Gate, Powder Magazines, Sally Port, Crib Walls.			1 m ³
9	Backfilling using Native Material Main Entrance Gate, , Sally Port, Crib Walls, Observation Deck			1 m ³
10	Seeding			1 m ²
11	Topsoil			1 m ²
12	Waterproofing Membrane above exterior arches of Powder Magazines			1 m ²
13	Moisture Barrier Above Powder Magazines			1 m ²
14	Moisture Barrier Behind Wing Wall at Main Entrance Gate			1 m ²
16	HD Insulation 100 mm			1 m ²

17	HD Insulation 50 mm			1 m ²
18	Soil Anchors (Manta ray MR-SR) with 25 M rod, for Crib retaining wall structure at Sally Port			1 ea

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Departmental Representative or Designate means a Parks Canada Representative responsible for administration of the works.

1.2 RELATED REQUIREMENTS

- .1 National Historic Site – Excavation: The site is a National Historic Site recognized in Canada and must be treated as such. Excavation beyond the immediate work area as outlined by the Engineer is strictly prohibited. Buildings on site cannot be used.
- .2 National Historic Site - Existing Features: The project is located in a National Historic Site of Canada, therefore, it is essential all existing features remain as found. Consequently, standards for environmental protection and for visual aesthetics of final product shall be of a quality standard. Contact limits shall be strictly adhered to and Contractor is to take special care to minimize damage and disruption and protect existing features. The Departmental Representative or Designate is to be notified immediately if any historic or natural resources are located during construction.
- .3 National Historic Site – Buried Artifacts: Buried artifacts, the remains and evidence of ancient persons and peoples, and any objects of historic value and worth remain the property of the Crown. Any and all such objects shall be protected and immediately brought to the knowledge of the Departmental Representative or Designate or Designate.
- .4 National Historic Site – Archeologist: Archaeologist will be on site to monitor work to ensure no archaeology resources are damaged. Advise Departmental Representative or Designate and receive direction regarding protecting such resources should any be discovered by either archaeology or the contractor. The contractor should be prepared to stop work on the area and redirect work elsewhere until the issue is resolved to the Departmental Representative or Designate's or satisfaction.
- .5 Contractor Qualifications: The contractor must have a minimum of five (5) years of Previous Projects experience in doing projects in recognized Historic Sites and have references from the owner confirming that the work was done in a professional manner respecting the heritage nature of the site. This should be submitted with the tender.
- .6 Relics and Antiquities: Buried artifacts, the remains and evidence of ancient persons and peoples, and any objects of historic value and worth remain the property of the Crown. Any and all such objects shall be protected and immediately brought to the knowledge of the Departmental Representative or Designate.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

Work of Fort Mississauga Stabilization – Phase II includes Entrance Gate, Powder Magazines, Sally Port and construction of new Observation Deck at Fort Mississauga in the Niagara-on-the-Lake. The scope of work includes but it is limited to:

- .1 Wing Wall Entrance Gate: Removal and rebuilding of the end portion of the interior north wing wall, construction of new concrete footings and concrete caissons, installation of insulation, landscaping repairs.

- .2 North and South Powder Magazines: Installation of steel frames in passageways as identified in previous specification concrete strut beams, installation of insulation, stone dust in magazines and access to magazines, increase the height of the parapet walls and introduce new vent holes in front face of parapet walls, masonry repairs, repointing, cleaning and structural crack repairs of various exposed exterior masonry walls, repairs and reinstallation of metal gates at entry walls, installation of moisture barrier over Powder Magazines, landscaping repairs, regarding access path to the magazines.
- .3 Sally Port: Repairs of footing of north exterior wing wall, construction of log crib wall with anchoring system at the lake side entrance, excavation above alcove and repairs to masonry work at alcove from inside and outside, injecting of grout in the longitudinal crack in the ceiling from inside of the Sally Port, construction of reinforced concrete strut beams between wall foundations, installation of insulation and stone dust at floor.
- .4 Construction of New Observation Deck: Construct new observation deck using Durisol retaining wall system, or accepted alternative, install hand rail, flag pole, landscaping repairs.

1.4 CONTRACT METHOD

- .1 Construct Work under single stipulated combined Lump Sum price contract.

1.5 WORK BY OTHERS

- .1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from Departmental Representative or Designate.
- .2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative or Designate, in writing, any defects which may interfere with proper execution of Work.

1.6 WORK SEQUENCE

- .1 Construct Work in stages to accommodate Parks Canada and golf course users continued access of premises during construction.
- .2 Co-ordinate Progress Schedule and co-ordinate with Parks Canada and Golf Course during construction.
- .3 Construct Work in coordination with Parks Canada and Golf Course to eliminate disturbance to golf Gold Course operations.
- .4 Contractor should be prepared for adjustments in work sequence as result of archeological findings and investigation. In such cases work is to be carried out at the locations not impacted by archeological investigations.
- .5 Maintain fire access/control.

1.7 CONTRACTOR USE OF PREMISES

- .1 Unrestricted use of site until final completion as the Contractor needs to have access until the deficiency corrections.
- .2 Limit use of premises for Work, for storage, for access, to allow:

- .1 Work by other contractors.
- .2 Golf Course operations.
- .3 Co-ordinate use of premises under direction of Departmental Representative or Designate.
- .4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative or Designate.
- .7 At completion of work condition of existing work area: equal to or better than that which existed before new work started.

1.8 OWNER FURNISHED ITEMS

- .1 Schedule of Owner furnished items:
 - .1 Bricks in the North Powder Magazine.

1.9 EXISTING SERVICES

- .1 The work site has no services so the Contractor will be required to provide any electrical, water, and sanitary services required to complete the work.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative or Designate 48 hours' notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to vehicular traffic.
- .3 Provide alternative routes for personnel and vehicular traffic.
- .4 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative or Designate of findings.
- .5 Submit schedule to and obtain approval from Departmental Representative or Designate for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .6 Provide temporary services when directed by Departmental Representative or Designate to maintain critical building systems.
- .7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .8 Where unknown services are encountered, immediately advise Departmental Representative or Designate and confirm findings in writing.
- .9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

- .10 Record locations of maintained, re-routed and abandoned service lines.
- .11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.10 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Change Orders.
 - .7 Other Modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Approved Work Schedule.
 - .10 Health and Safety Plan and Other Safety Related Documents.
 - .11 Other documents as specified.
 - .12 Contractors Environmental Procedure

END OF SECTION

Part 1 General

1.1 ACCESS AND EGRESS

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative or Designate to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Contractor is to provide temporary sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .5 Use of path through the Golf Course is to be coordinated with the Golf Course. The path is not to interfere with Golf Course operations.
- .6 Protect walls and structures along access path and within the Fort Mississauga to approval of Departmental Representative or Designate prior to use.
- .7 Closures: protect work temporarily until permanent enclosures are completed.

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to public and normal use of premises. Arrange with Departmental Representative or Designate to facilitate execution of work.

1.4 EXISTING SERVICES

- .1 Notify, Departmental Representative or Designate and utility companies of intended interruption of services and obtain required permission.
- .2 Provide access for Parks personnel and pedestrian and vehicular traffic.
- .3 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.5 SPECIAL REQUIREMENTS

- .1 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .2 Keep within limits of work and avenues of ingress and egress.
- .3 Deliver materials outside of peak traffic hours 17:00 to 07:00 unless otherwise approved by Departmental Representative or Designate.

- .4 Work will be carried out at significant historic site and may be interrupted if archeological investigation is required due to encountering historic artefacts. Contractor should plan the Work in a way to avoid delays if archeological investigation is required, by carrying out work at the location not impacted by archeological investigation.
- .5 Where large vehicles are required to access the site, ground guides are to be utilized to guide such vehicles to and from the site.

1.6 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is not permitted.

END OF SECTION

Part 1 General

1.1 MOBILIZATION AND DEMOBILIZATION

Under this item the contractor shall

- .1 Mobilize all equipment to site.
- .2 Obtain necessary permits/approval.
- .3 Remove all equipment and surplus materials up on completion of the work.
- .4 Cleanup and remove all debris for proper offsite disposal.
- .5 All other work required to mobilize and demobilize to/from the site not covered under other pay items.
- .6 Install, maintain and remove temporary erosion and sediment control measures.

1.2 MEASUREMENT OF PAYMENT

There will be no measurement of payment

1.3 BASIS OF PAYMENT

Payment at the contract lump sum price shall include full compensation for all labour, equipment and materials to complete this work. 60% of the total bid price for this item will be paid in the first monthly progress payments. The remaining 40% will **be paid upon final completion.**

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative or Designate.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative or Designate.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants and, affected parties not in attendance and Departmental Representative or Designate.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 PCA Departmental Representative or Designate and other senior officials and Consultant as applicable, Contractor, major Subcontractors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of submission of shop drawings, samples. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .3 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
 - .4 Delivery schedule of specified equipment in accordance with Section 01 33 00 - Submittal Procedures.
 - .5 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
 - .6 Proposed changes, change orders, procedures, approvals required, mark-up request for information, percentages permitted, time extensions, overtime, administrative requirements.

- .7 Parks Canada Agency provided products.
- .8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .9 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .11 Monthly progress claims, administrative procedures, photographs, hold backs.
- .12 Appointment of inspection and testing agencies or firms.
- .13 Insurances, transcript of policies.
- .14 Attestation and proof of compliance with Occupational Health and Safety (OHS).

1.3

PROGRESS MEETINGS

- .1 During course of Work and 2 weeks prior to project completion, schedule progress meetings every two weeks.
- .2 Contractor, major Subcontractors involved in Work Departmental Representative or Designate are to be in attendance.
- .3 Notify parties minimum 3 days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Review of request for information's status
 - .4 Field observations, problems, conflicts.
 - .5 Problems which impede construction schedule.
 - .6 Review of off-site fabrication delivery schedules.
 - .7 Corrective measures and procedures to regain projected schedule.
 - .8 Revision to construction schedule.
 - .9 Progress schedule, during succeeding work period.
 - .10 Review submittal schedules: expedite as required.
 - .11 Maintenance of quality standards.
 - .12 Review proposed changes for effect on construction schedule and on completion date.
 - .13 Other business.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Schedules, form, content, submission.
- .2 Critical Path Scheduling
- .3 Progress photographs and video
- .4 Submittals schedule.

1.2 RELATED SECTIONS

- .1 Section 01 10 00 – Summary of Work
- .2 Section 01 33 00 – Submittal Procedures
- .3 This section describes requirements applicable to all Sections

1.3 SCHEDULES

- .1 Submit schedules as follows:
 - .1 Submittal Schedule for Shop drawings, and Product Data.
 - .2 Submittal Schedule for Samples, including any required mock-ups.
 - .3 Submittal Schedule for timeliness of Parks Canada Agency – furnished Products.
 - .4 Product Delivery schedule
 - .5 Cash Allowance Schedule for acquiring Products only or Products and Installation, or Installation only.
 - .6 Shutdown or closure activity.
 - .7 Highest critical staging of work as described in Section 01 10 00 Summary of Work.
- .2 Schedule Format
 - .1 Prepare schedule in form of horizontal Gantt bar chart.
 - .2 Provide a separate bar for each major item of work.
 - .3 Split horizontally for projected and actual performance.
 - .4 Provide horizontal time scale identifying first Working day of each week.
 - .5 Format for listings: Table of Contents of the Project Manual.
 - .6 Identification of listings: By specification Section numbers.
- .3 Schedule Submission
 - .1 Submit initial format of schedules within 15 days after award of Contract.
 - .2 Submit schedules in electronic format, forward disc as *.pdf files.
 - .3 Submit one (1) opaque reproduction, plus two (2) copies to be retained by Departmental Representative or Designate.
 - .4 Departmental Representative or designate will review schedule and return review copy within 10 days after receipt.

- .5 Resubmit finalized schedule within 7 days after return of review copy.
- .6 Submit revised progress schedule with each application for payment.
- .7 Distribute copies of revised schedule to:
 - .1 Job site office
 - .2 Subcontractors
 - .3 Other concerned parties.
- .8 Instruct recipients to report to Contractor within 10 days, any problems anticipates by timetable shown in schedule.

1.4 CONSTRUCTION PROGRESS & CRITICAL PATH SCHEDULING

- .1 Submit initial schedule in duplicate within fifteen (15) days after date to Parks Canada Agency – Contractor Agreement.
- .2 Revise and resubmit as required.
- .3 Submit revised schedules with each Application for payment, identifying changes since previous version.
- .4 Submit analysis diagram using critical path method.
- .5 Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates and duration.
- .6 Indicate estimated percentage of completion for each item of Work at each submission.
- .7 Indicate submittal dates required for shop drawings, product data, samples and product delivery dates, including those furnished by Parks Canada Agency and required Allowances.
- .8 Include dates for commencement and completion of each major element of construction as follows:
 - .1 Site cleaning
 - .2 Site utilities
 - .3 Entrance Gate Works
 - .4 North Powder Magazine Works
 - .5 South Powder Magazine Works
 - .6 Sally Port Works
 - .7 Observation Deck Works
 - .8 Cleaning
 - .9 Closeout submittals
 - .10 Parks Canada Occupancy
- .9 Indicate projected percentage of completion of each item as of first day of month.
- .10 Indicate changes occurring since previous submission of schedule:
 - .1 Major change in scope

- .2 Activities modified since previous submission
- .3 Revised projections of progress completion
- .4 Other identifiable changes
- .11 Provide a narrative report to define:
 - .1 Problem areas, anticipated delays, and impact to schedule
 - .2 Corrective action recommended and its effect

1.5 PROGRESS PHOTOGRAPHS

- .1 Digital Photography
 - .1 Submit electronic and hard copy of colour digital photography in *.jpeg format, (1.4 MB resolution plus or minus 600 mega pixels).
 - 2. Identification: name and number of project and date of exposure indicated.
- .2 Number of viewpoints: two. Location of viewpoints determined by Departmental Representative or Designate.
- .3 Frequency: monthly with progress statement.
- .4 In addition, the Contractor shall keep record photos of additional work, existing conditions prior to construction and other concealed work as necessary to support completion and proper sequencing and/or quality of the work.

1.6 SUBMISSION SCHEDULE

- .1 Include schedule for submitting shop drawings, product data and samples.
- .2 Indicate dates for submitting, review time, resubmission time, and last date for meeting fabrication schedule.
- .3 Include dates when submittals will be required for Parks Canada Agency – furnished products.
- .4 Include dates when reviewed submittals will be required from Departmental Representative or Designate.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

- .1 Submit to Departmental Representative or Designate submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative or Designate. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Departmental Representative or Designate, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's or Designate's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative or Designate review.
- .10 Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario of Canada.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow 10 days for Consultant's review of each submission.

- .5 Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample. Other pertinent data.
- .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .9 After Departmental Representative's or Designate's review, distribute copies.
- .10 Submit 1 hard copy and an electronic copy (*.pdf format) of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .11 Submit 1 one copy and 1 electronic copy (*.pdf format) of product data sheets or brochures for requirements requested in specification Sections and as requested by

- Departmental Representative or Designate where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit 1 hard copy and 1 electronic copy (*.pdf format) of test reports for requirements requested in specification Sections and as requested by Departmental Representative or Designate.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
 - .13 Submit 1 hard copy and 1 electronic copy (*.pdf format) of certificates for requirements requested in specification Sections and as requested by Departmental Representative or Designate.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
 - .14 Submit 1 hard copy and 1 electronic copy (*.pdf format) of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative or Designate.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
 - .15 Submit 1 hard copy and 1 electronic copy (*.pdf format) of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative or Designate.
 - .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
 - .17 Submit 1 hard copy and 1 electronic copy of (*.pdf format) Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative or Designate.
 - .18 Delete information not applicable to project.
 - .19 Supplement standard information to provide details applicable to project.
 - .20 If upon review by Departmental Representative or Designate, no errors or omissions are discovered or if only minor corrections are made, electronic copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.3 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

- .2 Deliver samples prepaid to Consultant's business address.
- .3 Notify Departmental Representative or Designate in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative or Designate are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative or Designate prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative or Designate may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 MOCK-UPS

- .1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

1.5 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of colour digital photography in jpg format, fine resolution monthly with progress statement as directed by Departmental Representative or Designate
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Electronic – format *.jpeg 300 dpi or better.
- .4 Frequency of photographic documentation: monthly as directed by Departmental Representative or Designate.
 - .1 Upon completion of: excavation, foundation, framing and services before concealment, of Work, as directed by Departmental Representative or Designate.

1.6 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit [Workers' Compensation Board status].
- .2 Submit transcription of insurance immediately after award of Contract.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Health and Safety requirements to ensure that Parks Canada shows due diligence towards health safety on construction sites.

1.2 RELATED REQUIREMENTS

- .1 Section 01 11 00 – Summary of Work.
- .2 Section 01 33 00 – Submittal Procedures.

1.3 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Ontario
 - .1 Occupational Health and Safety Act, R.S.O. 1990 Updated 2005.
- .4 Designated Substances Assessment – Parks Canada Fort Mississauga, Ontario Environmental & Safety Network, March 3, 2016.
- .5 Departmental Representative or designate is to be alerted as soon as possible of any serious incident on site.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3 Submit 3 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative or Designate weekly.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 – Hazardous Materials.
- .7 Departmental Representative or Designate will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental

Representative or Designate within 5 days after receipt of comments from
Departmental Representative or Designate.

1.5 FILING OF NOTICE

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

1.6 SAFETY ASSESSMENT

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

1.7 MEETINGS

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

1.8 REGULATORY REQUIREMENTS

- .1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

1.9 PROJECT/SITE CONDITIONS

- .1 Parks Canada Agency to provide Contractor with copy of Evacuation Plan and Designated Substances Assessment (DSA) Report to allow Contractor to develop site specific Health and Safety Plan.

1.10 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative or Designate may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.11 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 It will be responsibility of the Contractor to ensure health and safety of staff working on the project.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.12 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act, General Safety Regulation, Ontario.

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

1.13 UNFORSEEN HAZARDS

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

1.14 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have site-related working experience specific to activities associated with general construction.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work and report directly to and be under direction site supervisor.

1.15 POSTING OF DOCUMENTS

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

1.16 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative or Designate.
- .2 Provide Departmental Representative or Designate with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative or Designate may stop Work if non-compliance of health and safety regulations is not corrected.

1.17 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 Definitions:
 - .1 Environmental Pollution and Damage: presence of chemical, physical, biological or agents which adversely affect human health and welfare, unfavourably alter ecological balances of importance to humans; or degrade environment aesthetically, culturally and/or historically.
 - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.
- .2 Reference Standards:
 - .1 Canadian Construction Document Committee (CCDC)
 - .1 CCDC 2-2008 Stipulated Price Contract

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures
- .2 Product data:
 - .1 Submit manufacturer`s instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two (2) copies of WHMIS MSDS in accordance with Section 01 35 43 Environmental Procedures.
- .3 Before commencing construction activities or delivery of materials to site, submit Environmental protection Plan for review and approval by Departmental Representative or Designate.
- .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .5 Address topics at level of detail commensurate with environmental issues and required construction tasks.
- .6 Include in environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
 - .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.

- .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial and Municipal laws and regulations and EPA 832/R-92-005, Chapter 3.
- .6 Drawings indicating locations of temporary excavations and / or embankments for access roads, water / stream crossings, material storage areas, structures sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .7 Traffic Control Plans including measures to reduce erosion of temporary access road and roadbeds by construction traffic, especially during wet weather.
- .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
- .9 Spill control plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .10 Non-Hazardous solid waste disposal including clearing debris.
- .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash are contained on project site.
- .12 Contaminant prevention Plan identifying potentially hazardous substances to be used or encountered on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial and Municipal laws and regulations for storage and handling of these materials.
- .13 Waste water Management Plan identifying methods and procedures for management and or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, dewatering of ground water, disinfection water and water used in flushing of lines.
- .14 Historical, archeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archeological, cultural resources, biological resources and wetlands.
- .15 Pesticide treatment plan to be included and updated as required.

1.3 FIRES

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

1.4 SITE AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties.
- .2 Protect trees and shrubs adjacent to construction work, storage area and trucking lines, and encase with protective wood framework from grade level to height of 2 m minimum.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.

Minimize stripping of topsoil and vegetation.

1.5 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities 'emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures where directed by Departmental Representative or Designate.
- .4 Cover or wet down dry material and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.6 NOTIFICATIONS

- .1 Departmental Representative or Designate will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor`s Environmental Protection Plan.
- .2 Contractor after accepting such notice, inform Departmental Representative or Designate of proposed corrective action and take such action for approval by Departmental Representative or Designate.
 - .1 Take action only after receipt of written approval by Departmental Representative or Designate

PART 2 PRODUCTS

- .1 Not used

PART 3 EXECUTION

3.1 CLEANING

- .1 Progress cleaning: clean in accordance with Section 01 74 11 Cleaning.
 - .1 Leave Work are clean at end of each day.
- .2 Final cleaning: Upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section.01 74 11 Cleaning.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 Construction Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.3 WORK ADJACENT TO WATERWAYS

- .1 Do not operate equipment in waterways.
- .2 Do not use waterway beds for borrow material.

- .3 The Contractor shall ensure that no contamination, waste or other substances which may be detrimental to marine life or quality of water shall enter the river as either a direct or indirect result of construction and the Contractor Shall meet all requirements of Government authorities or agencies with respect to environmental protection.
- .4 The Contractor shall be prepared to immediately clean up any spills of contamination, waste or other substances, which may be either detrimental to marine life or quality of water. In the event of a spill, the Contractor shall immediately commence a clean-up operation. The Contractor shall be liable for all damages and/or charges laid which result, either directly or indirectly, from the spill, or contamination of any kind, which results from his construction operations.

3.4 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Definitions:
 - .1 Environmental Pollution and Damage: presence of chemical, physical, biological or agents which adversely affect human health and welfare, unfavourably alter ecological balances of importance to humans; or degrade environment aesthetically, culturally and/or historically.
 - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.
- .2 Reference Standards:
 - .1 Canadian Construction Document Committee (CCDC)
 - .1 CCDC 2-2008 Stipulated Price Contract

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures
- .2 Product data:
 - .1 Submit manufacturer`s instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two (2) copies of WHMIS MSDS in accordance with Section 01 35 43 Environmental Procedures.
- .3 Before commencing construction activities or delivery of materials to site, submit Environmental protection Plan for review and approval by Departmental Representative or Designate.
- .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .5 Address topics at level of detail commensurate with environmental issues and required construction tasks.
- .6 Include in environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
 - .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial and Municipal laws and regulations and EPA 832/R-92-005, Chapter 3.
 - .6 Drawings indicating locations of temporary excavations and / or embankments for access roads, water / stream crossings, material storage areas, structures sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
 - .7 Traffic Control Plans including measures to reduce erosion of temporary access road and roadbeds by construction traffic, especially during wet weather.
 - .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.

- .9 Spill control plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .10 Non-Hazardous solid waste disposal including clearing debris.
- .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash are contained on project site.
- .12 Contaminant prevention Plan identifying potentially hazardous substances to be used or encountered on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial and Municipal laws and regulations for storage and handling of these materials.
- .13 Waste water Management Plan identifying methods and procedures for management and or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, dewatering of ground water, disinfection water and water used in flushing of lines.
- .14 Historical, archeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archeological, cultural resources, biological resources and wetlands.
- .15 Pesticide treatment plan to be included and updated as required.

1.3 FIRES

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

1.4 SITE AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties.
- .2 Protect trees and shrubs adjacent to construction work, storage area and trucking lines, and encase with protective wood framework from grade level to height of 2 m minimum.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
- .4 Minimize stripping of topsoil and vegetation.

1.5 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities 'emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures where directed by Departmental Representative or Designate.
- .4 Cover or wet down dry material and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.6 NOTIFICATIONS

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

- .2 Contractor after accepting such notice, inform Departmental Representative or Designate of proposed corrective action and take such action for approval by Departmental Representative or Designate.
 - .1 Take action only after receipt of written approval by Departmental Representative or Designate

Part 2 Execution

2.1 CLEANING

- .1 Progress cleaning: clean in accordance with Section 01 74 11 Cleaning.
 - .1 Leave Work are clean at end of each day.
- .2 Final cleaning: Upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section.01 74 11 Cleaning.
- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 Construction Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

2.2 WORK ADJACENT TO WATERWAYS

- .1 Do not operate equipment in waterways.
- .2 Do not use waterway beds for borrow material.
- .3 The Contractor shall ensure that no contamination, waste or other substances which may be detrimental to marine life or quality of water shall enter the river as either a direct or indirect result of construction and the Contractor Shall meet all requirements of Government authorities or agencies with respect to environmental protection.
- .4 The Contractor shall be prepared to immediately clean up any spills of contamination, waste or other substances, which may be either detrimental to marine life or quality of water. In the event of a spill, the Contractor shall immediately commence a clean-up operation. The Contractor shall be liable for all damages and/or charges laid which result, either directly or indirectly, from the spill, or contamination of any kind, which results from his construction operations.

2.3 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 29 06 Health and Safety Requirements.

1.2 REFERENCES AND CODES

- .1 Perform Work in accordance with Ontario Building Code (OBC) including amendments up to tender closing date and other codes of national or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Perform work in accordance with the Standards and Guidelines for the Conservation of Historic Places in Canada (SGCHPC) which can be accessed through the link <http://www.historicplaces.ca/en/pages/standards-normes.aspx>
As this structure is a National Historic Site of Canada (NHSC) and is classified as a cultural resource of National significance the SGCHPC must be reviewed and adhered to as required for the significance of this historic structure.
- .3 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.

1.3 HAZARDOUS MATERIAL DISCOVERY

- .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative or Designate. Refer to Section 01 35 29 06 Health and Safety Requirements.
- .2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Departmental Representative or Designate. Refer to Section 01 35 29 06 Health and Safety Requirements.
- .3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Departmental Representative or Designate. Refer to Section 01 35 29 06 Health and Safety Requirements.

1.4 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions and municipal by-laws.

END OF SECTION

Part 1 General

Departmental Representative or Designate will engage, as required, independent inspection/testing agencies for the purpose of "Quality Assurance" only, that is, verify contractor's quality control process for timber, concrete, steel, environmental protection, waste disposal etc.

Contractor is responsible for quality control. Employment of independent inspection/testing agencies does not relax responsibility to perform work in accordance to contract documents.

1.1 INSPECTION

- .1 Allow Departmental Representative or Designate access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative or Designate instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative or Designate will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative or Designate shall pay cost of examination and replacement.

1.2 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.3 PROCEDURES

- .1 Notify Departmental Representative or Designate 10 days in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.4 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative or Designate as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good any damage related to the required work.
- .3 If in opinion of Departmental Representative or Designate it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative or Designate.

1.5 REPORTS

- .1 Submit 4 copies of inspection and test reports to Departmental Representative or Designate.
- .2 Provide copies to subcontractor of work being inspected or tested or manufacturer or fabricator of material being inspected or tested.

1.6 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative or Designate and may be authorized as recoverable.

1.7 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations acceptable to Departmental Representative or Designate.
- .3 Prepare mock-ups for Departmental Representative or Designate review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 If requested, Departmental Representative or Designate will assist in preparing schedule fixing dates for preparation.
- .6 Mock-ups may remain as part of Work.
- .7 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.8 MILL TESTS

- .1 Submit mill test certificates as required of specification Sections and as requested.

1.9 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

END OF SECTION

Part 1 General

1.1 INSTALLATION AND REMOVAL

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.2 WATER SUPPLY

- .1 Provide continuous supply of potable water for construction use.
- .2 Arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.
- .3 Pay for utility charges at prevailing rates.

1.3 TEMPORARY VENTILATION

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

1.4 TEMPORARY POWER AND LIGHT

- .1 Contractor will be responsible for all labour or disbursements associated with utilities need to complete the work.
- .2 Provide and pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 230 volts 30 amps.
- .3 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal if required.
- .4 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx.
- .5 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Departmental Representative or

Designate provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than 3 months.

1.5 TEMPORARY COMMUNICATION FACILITIES

- .1 Provide and pay for temporary telephone, data hook up, lines and equipment necessary for own use.

1.6 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

Part 2 Execution

2.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Construction aids
- .2 Office and sheds
- .3 Parking
- .4 Project Identification

1.2 REFERENCES

- .1 Testing Standards as indicated under the appropriate sections for materials and works
- .2 Standards and Guidelines for the Conservation of Historic Places in Canada, 2nd Edition
- .3 Applicable workplace signs and symbols as per Section 1.12 Construction Signage.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be gravelled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use.

1.5 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, temporary stairs.

1.6 HOISTING

- .1 Provide, operate and maintain hoists required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2 Hoists to be operated by qualified operator.

1.7 SITE STORAGE/LOADING

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.8 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.
- .3 Clean runways and taxi areas where used by Contractor's equipment.

1.9 OFFICES

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.

1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.11 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.12 CONSTRUCTION SIGNAGE

- .1 Provide and erect project sign, within three weeks of signing Contract, in a location designated by Departmental Representative or Designate.
- .2 Construction sign 0.6 x1.2 m, of wood frame and plywood construction painted with exhibit lettering produced by a professional sign painter.
- .3 Indicate on sign, name of Owner, Contractor of design style as approved by Departmental Representative or Designate.
- .4 No other signs or advertisements, other than warning signs, are permitted on site.
- .5 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier as directed by Departmental Representative or Designate.

1.13 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads and Golf Course during construction period except as otherwise specifically directed by Departmental Representative or Designate.

- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads and pathways, as well as Fort Mississauga site caused by construction operations.
- .7 Construct access and haul roads necessary.
- .8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .10 Dust control: adequate to ensure safe operation at all times.
- .11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative or Designate.
- .12 Remove, upon completion of work, haul roads designated by Departmental Representative or Designate

1.14 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 74 21 – Construction/Demolition Waste Management And Disposal.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
 - .2 CAN/CGSB 1.189-00], Exterior Alkyd Primer for Wood.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-O121-M1978(R2003), Douglas Fir Plywood.

1.3 INSTALLATION AND REMOVAL

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.4 HOARDING

- .1 Erect temporary site enclosure using new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m on centre. Provide one lockable truck gate. Maintain fence in good repair.
- .2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.5 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.
- .2 Provide as required by governing authorities as indicated.

1.6 ACCESS TO SITE

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.
- .2 The site is a National Historic Site recognized in Canada and must be treated as such. Excavation beyond the immediate work area as outlined by the Engineer or Departmental Representative is strictly prohibited. If Roads/Routes require modification, confirm with Departmental Representative or Designate prior to proceeding. Submit a detailed Site markup plan for the construction access roads as well as protection procedures and methods. Contractor is required to prevent damage to site assets and protect as required. These requirements are listed in the project specifications and the general conditions of the contract. Present to Departmental Representative or Delegate method proposed to ensure acceptable, however, no delays in production will be accepted with regards to protecting assets where greater protection is required.

- .3 Roadway/Route damage criteria limit is based on 15cm or six (6) inch depression from finished grade to bottom of depression and no further depression shall be permitted and additional protection will be required.
- .4 Sample: A site protection method of geofabric and granular fill for exterior roadway. Where areas are not protected, traffic loads will be limited to lightweight vehicles ie. Gators, light tracked equipment and pickups. Protection methods and roadway modifications require acceptance by Departmental Representative or Delegate.
- .5 If heavy equipment is required the timber mats or other acceptable method will be used to protect the site from damage.
- .6 Protection of entrance gate and masonry walls and structures will be protected by plywood or other acceptable method as required.
- .7 Provide and maintain ramps and construction runways as may be required for access to Work.

1.7 PUBLIC TRAFFIC FLOW

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.
- .2 If works is of nature requiring public restriction to site, notify Departmental Representative or Designate.

1.8 FIRE ROUTES

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

1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.10 PROTECTION OF BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Departmental Representative or Designate locations and installation schedule 3 days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

1.11 WASTE MANAGEMENT AND DISPOSAL

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

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Within text of each specifications section, reference may be made to reference standards.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative or Designate reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be born by Departmental Representative or Designate in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.2 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of site salvaged recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative or Designate based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative or Designate.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative or Designate's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.4 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Parks Canada Agency will be paid for by Parks Canada Agency. Unload, handle and store such products.

1.5 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative or Designate in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative or Designate will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative or Designate to require removal and re-installation at no increase in Contract Price or Contract Time.

1.6 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative or Designate if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative or Designate reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative or Designate, whose decision is final.

1.7 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.8 CONCEALMENT

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation inform Departmental Representative or Designate if there is interference. Install as directed by Departmental Representative or Designate.

1.9 REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.10 LOCATION OF FIXTURES

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Departmental Representative or Designate of conflicting installation. Install as directed.

1.11 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.12 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.13 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative or Designate.

1.14 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 74 21 – Construction/Demolition Waste management and Disposal.

1.2 MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.3 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Remove samples of installed Work for testing.
- .6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .8 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .10 Restore work with new products in accordance with requirements of Contract Documents.

- .11 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

1.5 WASTE MANAGEMENT AND DISPOSAL

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 74 21 – Construction/Demolition Waste Management And Disposal.

1.2 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-94, Stipulated Price Contract.

1.3 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Parks Canada agency or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative or Designate. Do not burn waste materials on site, unless approved by Departmental Representative or Designate.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .7 Dispose of waste materials and debris off site.
- .8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.4 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris other than that caused by Parks Canada Agency or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative or Designate. Do not burn waste materials on site, unless approved by Departmental Representative or Designate.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Remove stains, spots, marks and dirt from decorative work, furniture fitments, walls, floors.
- .8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .9 Remove dirt and other disfiguration from exterior surfaces.
- .10 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .11 Sweep and wash clean paved areas.
- .12 Clean roofs, downspouts, and drainage systems.
- .13 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .14 Remove snow and ice from access to building.

1.5 WASTE MANAGEMENT AND DISPOSAL

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

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measurement and Payment:

- .1 Construction demolition waste management and disposal will be paid as a Lump Sum item.

1.2 WASTE MANAGEMENT GOALS

- .1 Prior to start of Work conduct meeting with Departmental Representative or Designate to review and discuss Parks Canada Agency's waste management goal and Contractor's proposed Waste Reduction Workplan for Construction, Renovation and /or Demolition (CRD) waste to be project generated.
- .2 Parks Canada Agency's waste management goal: to divert a minimum 75 percent of total Project Waste from landfill sites. Prior to project completion provide Departmental Representative or Designate documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.
- .3 Accomplish maximum control of solid construction waste.
- .4 Minimize amount of non-hazardous solid waste generated by project and accomplish maximum source reduction, reuse and recycling of solid waste produced by CRD activities.
- .5 Protect environment and prevent environmental pollution damage.

1.3 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures.

1.4 REFERENCES

- .1 LEED Canadian Green Building Council (CGBC), Green Building Rating System, For New Construction and Major Renovations LEED Canada-NC, Version 1.0 - December 2004.

1.5 DEFINITIONS

- .1 Class III: non-hazardous waste - construction renovation and demolition waste.
- .2 Construction, Renovation and/or Demolition (CRD) Waste: Class III solid, non-hazardous waste materials generated during construction, demolition, and/or renovation activities
- .3 Cost/Revenue Analysis Workplan (CRAW): based on information from Waste Reduction Workplan, and intended as financial tracking tool for determining economic status of waste management practices (Schedule E).
- .4 Inert Fill: inert waste - exclusively asphalt and concrete.

- .5 Waste Source Separation Program (WSSP): implementation and co-ordination of ongoing activities to ensure designated waste materials will be sorted into pre-defined categories and sent for recycling and reuse, maximizing diversion and potential to reduce disposal costs.
- .6 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .7 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .8 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
 - .2 Returning reusable items including pallets or unused products to vendors.
- .10 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .11 Separate Condition: refers to waste sorted into individual types.
- .12 Source Separation: act of keeping different types of waste materials separate beginning from the point they became waste.
- .13 Waste Audit (WA): detailed inventory of estimated quantities of waste materials that will be generated during construction, demolition, deconstruction and/or renovation. Involves quantifying by volume/weight amounts of materials and wastes that will be reused, recycled or landfilled. Refer to Schedule A.
- .14 Waste Diversion Report: detailed report of final results, quantifying cumulative weights and percentages of waste materials reused, recycled and landfilled over course of project. Measures success against Waste Reduction Workplan (WRW) goals and identifies lessons learned.
- .15 Waste Management Co-ordinator (WMC) : contractor representative responsible for supervising waste management activities as well as co-ordinating required submittal and reporting requirements.
- .16 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials generated by project. Specifies diversion goals, implementation and reporting procedures, anticipated results and responsibilities. Waste Reduction Workplan (Schedule B) information acquired from Waste Audit.

1.6 DOCUMENTS

- .1 Post and maintain in visible and accessible area at job site, one copy of following documents:
 - .1 Waste Audit (Schedule A).
 - .2 Waste Reduction Workplan (Schedule B).

- .3 Waste Source Separation Program.
- .4 Schedules A, B completed for project.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare and submit following prior to project start-up:
 - .1 Two copies of completed Waste Audit (WA): Schedule A.
 - .2 Two copies of completed of Waste Reduction Workplan (WRW): Schedule B.
 - .3 Two copies of completed Demolition Waste Audit (DWA) – Schedule C.
 - .4 Two copies of completed of Waste Source Separation Program (WSSP).
- .3 Submit prior to final payment the following:
 - .1 Waste Diversion Report, indicating final quantities in tonnes by material types salvaged for reuse, recycling or disposal in landfill and recycling centres, re-use depots, landfills and other waste processors that received waste materials (See Schedule C).
 - .2 Provide receipts, scale tickets, waybills, waste disposal receipts that confirm quantities and types of materials reused, recycled or disposed of and destination.
 - .3 For each material reused, sold or recycled from project, include amount in tonnes and the destination.
 - .4 For each material land filled or incinerated from project, include amount in tonnes of material and identity of landfill, incinerator or transfer station.

1.8 WASTE AUDIT (WA)

- .1 Conduct WA prior to project start-up.
- .2 Prepare WA: Schedule A.
- .3 .3 Record, on WA - Schedule A, extent to which materials or products used consist of recycled or reused materials or products.

1.9 WASTE REDUCTION WORKPLAN (WRW)

- .1 Prepare and submit WRW prior to project start-up.
- .2 WRW identifies strategies to optimize diversion through reduction, reuse, and recycling of materials and comply with applicable regulations, based on information acquired from WA.
- .3 WRW should include but not limited to:
 - .1 Applicable regulations.
 - .2 Specific goals for waste reduction, identify existing barriers and develop strategies to overcome them.
 - .3 Destination of materials identified.
 - .4 Deconstruction/disassembly techniques and schedules.
 - .5 Methods to collect, separate, and reduce generated wastes.

- .6 Location of waste bins on-site.
- .7 Security of on-site stock piles and waste bins.
- .8 Protection of personnel, sub-contractors.
- .9 Clear labelling of storage areas.
- .10 Training plan for contractor and sub-contractors.
- .11 Methods to track and report results reliably (Schedule D).
- .12 Details on materials handling and removal procedures.
- .13 Recycler and reclaimer requirements.
- .4 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .5 Post WRW or summary where workers at site are able to review content.
- .6 Monitor and report on waste reduction by documenting total volume (in tonnes) and cost of actual waste removed from project (Schedule D).

1.10 COST/REVENUE ANALYSIS WORKPLAN (CRAW)

- .1 Prepare CRAW (see Schedule E) and include the following:
 - .1 Cost of current waste management practices.
 - .2 Implementation cost of waste diversion program.
 - .3 Savings and benefits resulting from waste diversion program.

1.11 WASTE SOURCE SEPARATION PROGRAM (WSSP)

- .1 As part of Waste Reduction Workplan, prepare WSSP prior to project start-up.
- .2 WSSP will detail methodology and planned on-site activities for separation of reusable and recyclable materials from waste intended for landfill.
- .3 Provide list and drawings of locations that will be made available for sorting, collection, handling and storage of anticipated quantities of reusable and recyclable materials.
- .4 Provide sufficient on-site facilities and containers for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .5 Locate containers to facilitate deposit of materials without hindering daily operations.
- .6 Provide training for workers in handling and separation of materials for reuse and/or recycling.
- .7 Locate separated materials in areas which minimizes material damage.
- .8 Clearly and securely label containers to identify types/conditions of materials accepted and assist workers in separating materials accordingly.
- .9 Monitor on-site waste management activities by conducting periodic site inspections to verify: state of signage, contamination levels, bin locations and condition, personnel participation, use of waste tracking forms and collection of waybills, receipts and invoices.

- .10 On-site sale of salvaged materials is not permitted unless authorized in writing by Departmental Representative or Designate and provided that site safety regulations and security requirements are adhered to.

1.12 STORAGE, HANDLING AND PROTECTION

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative or Designate.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Protect structural components not removed and salvaged materials from movement or damage.
- .4 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative or Designate.
- .5 Protect surface drainage, mechanical and electrical from damage and blockage.
- .6 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials.
- .7 Separate and store materials produced during project in designated areas.
- .8 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off site processing facility for separation.
 - .3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.
 - .4 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.

1.13 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner into waterways, storm, or sanitary sewers.
- .3 Keep records of construction waste including:
 - .1 Number and size of bins.
 - .2 Waste type of each bin.
 - .3 Total tonnage generated.
 - .4 Tonnage reused or recycled.
 - .5 Reused or recycled waste destination.
- .4 Remove materials on-site as Work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in the waste audit.

- .6 Hazardous Material should be disposed separately in accordance with legislation requirements.

1.14 SCHEDULING

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

Part 2 Execution

2.1 APPLICATION

- .1 Do Work in compliance with WRW and WSSP.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

2.2 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.
- .3 Waste Management: separate waste materials for [reuse] [recycling] in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
 - .2 Source separate materials to be reused/recycled into specified sort areas.

2.3 DIVERSION OF MATERIALS

- .1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative or Designate, and consistent with applicable fire regulations.
 - .1 Mark containers or stockpile areas.
 - .2 Provide instruction on disposal practices.
- .2 On-site sale of salvaged, recovered, reusable, recyclable materials is not permitted.

2.4 WASTE DIVERSION REPORT

- .1 At completion of Project, prepare written Waste Diversion Report indicating quantities of materials reused, recycled or disposed of as well as the following:
 - .1 Identify final diversion results and measure success against goals from Waste Reduction Workplan.
 - .2 Compare final quantities/percentages diverted with initial projections in Waste Audit and Waste Reduction Workplan and explain variances.
 - .1 Supporting documentation.

- .2 Waybills and tracking forms.
- .3 Description of issues, resolutions and lessons learned.

2.5 WASTE AUDIT (WA)

.1 Schedule A - Waste Audit (WA)

(1) Material Category	(2) Material Quantity Unit	(3) Estimated Waste %	(4) Total Quantity of Waste (unit)	(5) Generation Point	(6) % Recycled	(7) % Reused
Wood and Plastics Material Description						
Off-cuts						
Warped Pallet Forms						
Plastic Packaging						
Cardboard Packaging						
Other						
Doors and Windows Material Description						
Painted Frames						
Glass						
Wood						
Metal						
Other						

2.6 WASTE REDUCTION WORKPLAN (WRW)

.1 Schedule B

(1) Material Category	(2) Person(s) Responsible	(3) Total Quantity of Waste (unit)	(4) Reused Amount (units) Projected	Actual	(5) Recycled Amount (unit) Projected	Actual	(6) Material(s) Destination
Wood and Plastics Material Description							
Chutes							

Warped Pallet Forms							
Plastic Packag ing							
Card-board Packag ing							
Other							
Doors and Windows Material Description							
Painted Frames							
Glass							
Wood							
Metal							
Other							

2.7 COST/REVENUE ANALYSIS WORKPLAN (CRAW)

.1 Schedule E - Cost/Revenue Analysis Workplan (CRAW)

(1) Material Description	(2) Total Quantity (unit)	(3) Volume (cum)	(4) Weight (kg)	(5) Disposal Cost/Credit \$(+/-)	(6) Category Sub-Total \$(+/-)
Wood					
Wood Stud					
Plywood					
Baseboard - Wood					
Door Trim - Wood					
Cabinet					\$
Doors and Windows					
Panel Regular					
Slab Regular					
Wood Laminate					
Byfold - Closet					
Glazing					\$
		(7) Cost (-) / Revenue (+)			\$

2.8 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

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

Province	Address	General Inquires	Fax
Ontario	Ministry of Environment and Energy, 135 St. Clair Avenue West Toronto ON M4V 1P5	416-323-4321 800-565-4923	416-323-4682
	Environment Canada Toronto ON	416-734-4494	

2.9 SCHEDULES

.1 Following Schedules are attached to this Specification:

- .1 Waste Audit - Schedule A.
- .2 Waste Reduction Workplan Form - Schedule B.
- .3 Waste Diversion Report Form - Schedule C.
- .4 Waste Materials Tracking Form - Schedule D.
- .5 Cost/Revenue Analysis Workplan - Schedule E.
- .6 Market Research Report - Schedule F (When Available).

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 74 11 - Cleaning
- .2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative or Designate in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative's or Designate's inspection.
 - .2 Departmental Representative or Designate Inspection:
 - .1 Departmental Representative or Designate, Design Consultant and Contractor to inspect Work and identify defects and deficiencies. Departmental Representative or Designate to issue the substantial (interim) completion certificate with the list of deficiency to the Contractor.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Equipment and systems: tested, adjusted, balanced and fully operational.
 - .4 Certificates required by Fire Commissioner and Utility companies: submitted.
 - .5 Operation of systems: demonstrated to PCA's personnel.
 - .6 Work: complete and ready for final inspection.
- .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Departmental Representative or Designate and Contractor.
 - .2 When Work incomplete according to Departmental Representative or Designate complete outstanding items and request re-inspection.
- .5 Declaration of Final Completion: when Departmental Representative or Designate considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Final Completion.

- .6 Commencement of Lien and Warranty Periods: date of Parks Canada Agency's acceptance of submitted declaration of Final Completion to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7 Final Payment:
 - .1 When Departmental Representative or Designate considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
 - .2 Refer to CCDC 2: when Work deemed incomplete by Departmental Representative or Designate, complete outstanding items and request re-inspection.

1.3 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 31 19 – Project Meetings.
- .2 Section 01 33 00 – Submittal Procedures.
- .3 Section 01 45 00 – Quality Control
- .4 Section 01 71 00 – Examination and Preparation

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting on two weeks prior to contract completion with Contractor's representative, Design Engineer(s) and Departmental Representative or Designate in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify Project standard operation and maintenance requirements.
 - .2 Review warranty requirements, and manufacturer's installation instructions.
 - .2 Departmental Representative or Designate to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative or Designate four final copies of operating and maintenance manuals in English.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.

1.4 **FORMAT**

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf [219 x 279] mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide [1:1] scaled CAD files in dwg format on CD.

1.5 **CONTENTS - PROJECT RECORD DOCUMENTS**

- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Departmental Representative or Designate and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- .6 Training: provide list of trainings.

1.6 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative or Designate one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative or Designate.

1.7 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative or Designate.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

- .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
- .4 Field changes of dimension and detail.
- .5 Changes made by change orders.
- .6 Details not on original Contract Drawings.
- .7 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.
- .7 Provide digital photos, if requested, for site records.

1.8 FINAL SURVEY

- .1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.9 EQUIPMENT AND SYSTEMS

- .1 For each item of equipment and each system include description of unit or system, and component parts.
 - .1 Give function, normal operation characteristics and limiting conditions.
 - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
 - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
 - .2 Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's as built co-ordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control.
- .15 Additional requirements: as specified in individual specification sections.

1.10 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual specifications sections.

1.11 MAINTENANCE MATERIALS

- .1 Spare Parts:
 - .1 Provide spare parts, in quantities specified in individual specification sections.
 - .2 Provide items of same manufacture and quality as items in Work.
 - .3 Deliver to location as directed; place and store.
 - .4 Receive and catalogue items.
- .1 Submit inventory listing to Departmental Representative or Designate.
- .2 Include approved listings in Maintenance Manual.
 - .5 Obtain receipt for delivered products and submit prior to final payment.
- .2 Extra Stock Materials:
 - .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to location as directed; place and store.
- .4 Receive and catalogue items.
- .1 Submit inventory listing to Departmental Representative or Designate.
- .2 Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

1.12 DELIVERY, STORAGE AND HANDLING

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and for review by Departmental Representative or Designate.

1.13 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative or Designate approval.
- .3 Warranty management plan to include required actions and documents to assure that Departmental Representative or Designate receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Departmental Representative or Designate for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within [ten] days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.

- .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with PCA's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Include information contained in warranty management plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
 - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include commissioned systems.
 - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location where installed.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to continue warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
 - .11 Organization, names and phone numbers of persons to call for warranty service.
 - .12 Typical response time and repair time expected for various warranted equipment.
 - .4 Procedure and status of tagging of equipment covered by extended warranties.
 - .5 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .9 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .10 Written verification to follow oral instructions.

- .1 Failure to respond will be cause for the Departmental Representative or Designate to proceed with action against Contractor.

1.14 WARRANTY TAGS

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Departmental Representative or Designate.
- .2 Attach tags with copper wire and spray with waterproof silicone coating.
- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
 - .1 Type of product/material.
 - .2 Model number.
 - .3 Serial number.
 - .4 Contract number.
 - .5 Warranty period.
 - .6 Inspector's signature.
 - .7 Construction Contractor.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Take over structures to be removed based on their condition on the date that tender is accepted.

1.2 REFERNECES

- .1 CEAA, CEPA Standards and guidelines for conservation historic places in Canada.

1.3 RELATED SECTIONS

- .1 Section 31 22 13 – Rough Grading
- .2 32 91 19 – Topsoil Placement and Grading

1.4 EXISTING CONDITIONS

- .1 Take over structures to be demolished, based on their condition on the date that the tender is accepted.

1.5 DEMOLITION DRAWINGS

- .1 Submit for approval drawings, diagrams or details showing sequence of disassembly work or supporting and underpinning, as required by authorities having jurisdiction.

1.6 PROTECTION

- .1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, and adjacent grades. Provide bracing, and shoring if required. Make good damage and be liable for injury caused by demolition.
- .2 Prevent debris from blocking drainage system, mechanical and electrical systems which must remain in operation.
- .3 Existing Buried Artifacts and Structures:
 - .1 Size, depth and location of existing structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .2 Prior to commencing work confirm locations of all structures by careful test excavations.
 - .3 Maintain and protect from damage, artifacts and structures encountered.
- .4 Notify immediately appropriate authority in case of damage to any structure or artifact during excavation

1.7 PERMITS

- .1 Obtain and pay for permits necessary to carry-out work.

Part 2 Products - Not Applicable

2.1 WORK

- .1 Dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.

2.2 PREPARATION

- .1 Inspect site with Engineer and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage, and items to remain.
- .2 Locate and protect existing structures. Hand excavate down to and the like, where identified on drawings and/or where conflicts with services are anticipated. Open trenches to be photographed and inspected by engineer prior to proceeding. Await instruction from engineer on how to protect utility before commencing to next stage of work.

2.3 DEMOLITION

- .1 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
- .2 At the end of each day's work, leave work in safe condition so that no part is a danger to public safety.
- .3 Demolish to minimize dusting. Keep dusty materials wetted.
- .4 Do not sell or burn materials on the site.
- .5 Remove contaminated or dangerous materials from the site, and dispose of in a manner that minimizes any danger during disposal.
- .6 Remove any designated trees during demolition. Obtain written approval of Consultant prior to removal of trees.
- .7 Stockpile topsoil for final grading and landscaping.

2.4 STOCKPILING

- .1 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.
- .2 Stockpile materials designated for alternative disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or handling procedures.

2.5 REMOVAL FROM SITE

- .1 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

2.6 CLEANING

- .1 Remove debris, trim surfaces and leave work site clean, upon completion of work.
- .2 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

END OF SECTION

Part 1 General

- .1 The General Conditions and all Sections of Division 1 and relevant sections of Division 2 apply equally to this Section of the Specifications.

1.2 RELATED REQUIREMENTS

- .1 Section 03 20 00 - Concrete Reinforcing.
- .2 Section 03 30 00 - Cast-in-Place Concrete.

1.3 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 No measurement will be made under this Section.
 - .1 Include reinforcement costs in items of concrete work in Section 03 30 00 - Cast-In-Place Concrete.

1.4 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-O86S1-06, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
 - .3 CSA O121-M1978(R2008), Douglas Fir Plywood.
 - .4 CSA O151-04, Canadian Softwood Plywood.
 - .5 CSA O153-M1980(R2008), Poplar Plywood.
 - .6 CAN/CSA-O325.0-92(R2003), Construction Sheathing.
 - .7 CSA O437 Series-93(R2006), Standards for OSB and Waferboard.
 - .8 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
 - .9 CAN/CSA-S269.3-M92(R2008), Concrete Formwork, National Standard of Canada
- .2 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber.
- .3 Ontario Provincial Standard Specifications
 - .1 OPSS 904 Construction Specification for Concrete Structures April 2010.
 - .2 OPSS 919 Construction Specification for Formwork and Falsework November 2009
- .4 Canada's Historic Places
 - .1 Standards and Guidelines for the Conservation of Historic Places in Canada, 2nd Edition

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

- .1 Submit shop drawings for formwork and falsework.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Place materials defined as hazardous or toxic in designated containers.
 - .2 Divert wood materials from landfill to a recycling facility as approved by Departmental Representative or Designate.
 - .3 Divert plastic materials from landfill to a recycling facility as approved by Departmental Representative or Designate.

Part 2 Products

2.1 MATERIALS

- .1 Formwork materials:
 - .1 Lumber for formwork and falsework: Grade-marked sawn lumber graded in accordance with NLGA and related CSA standards.
 - .2 Plywood for Formwork: CSA A23.1, high density overlay (plastic overlay) grade plywood. Plywood may be of lower finish grade when use in conjunction with a form liner.
- .2 Tubular column forms: round, spirally wound laminated fibre forms.
- .3 Form ties:
 - .1 Material: Steel.
 - .2 Spreader Inserts:
 - .3 Conical or spherical type.
 - .4 Design to maintain positive contact with forming material.
 - .5 Furnish units that will leave no metal closer than 25 mm to concrete surface when forms, inserts, and tie ends are removed.
 - .6 Wire ties not permitted.
 - .7 Flat bar ties for panel forms; furnish plastic or rubber inserts with minimum 25 mm depth and sufficient dimensions to permit patching of tie hole.
- .4 Form release agent: non-toxic.
- .5 Form stripping agent: colourless mineral oil, non-toxic free of kerosene, with viscosity between 70 and 110s Saybolt Universal at 40 degrees C, flashpoint minimum 150 degrees C, open cup.
- .6 Falsework materials: to CSA-S269.1.

Part 3 Execution

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Obtain Departmental Representative's or Designate's approval for use of earth forms framing openings not indicated on drawings.
- .3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .4 Fabricate and erect falsework in accordance with CSA S269.1.
- .5 Refer to architectural drawings for concrete members requiring architectural exposed finishes.
- .6 Do not place shores and mud sills on frozen ground.
- .7 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .8 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .9 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
- .10 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
- .11 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .12 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .13 Line forms for following surfaces:
 - .1 Exposed faces of abutments, wingwalls, piers and pylons: do not stagger joints of form lining material and align joints to obtain uniform pattern.
 - .2 Secure lining taut to formwork to prevent folds.
 - .3 Pull down lining over edges of formwork panels.
 - .4 Ensure lining is new and not reused material.
 - .5 Ensure lining is dry and free of oil when concrete is poured.
 - .6 Application of form release agents on formwork surface is prohibited where drainage lining is used.
- .14 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

3.2 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete.

- .1 4 days for walls and sides of beams.
- .2 4 days for columns.
- .3 2 days for footings and abutments.
- .2 Remove formwork when concrete has reached 70 % of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.
- .3 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
- .4 Space reshoring in each principal direction at not more than 3000 mm apart.
- .5 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 00 - Cast-In-Place Concrete.
- .2 Section 03 10 00 - Concrete Forming and Accessories.

1.2 PRICE AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 No measurement will be made under this Section.
 - .1 Include reinforcement costs in items of concrete work in Section 03 30 00 - Cast-In-Place Concrete.

1.3 REFERENCES

- .1 American Concrete Institute (ACI)
 - .1 SP-66-04, ACI Detailing Manual 2004.
- .2 ASTM International
 - .1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - .2 ASTM A143/A143M-07, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .3 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- .3 CSA International
 - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.
 - .3 CSA-G30.18-[09], Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .6 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC-[2004], Reinforcing Steel Manual of Standard Practice.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

- .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in [Province] [Territory] of Canada.
 - .1 Indicate placing of reinforcement and:
 - .1 Bar bending details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative or Designate, with identifying code marks to permit correct placement without reference to structural drawings.
 - .2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated].
 - .1 Provide type B unless otherwise indicated.
 - .4 When Chromate solution is used as replacement for galvanizing non-prestressed reinforcement, provide product description for review by [Departmental Representative] [DCC Representative] [Consultant] prior to its use.

1.5 QUALITY ASSURANCE

- .1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.
 - .1 Mill Test Report: provide Departmental Representative of Designate with certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work].
 - .2 Submit in writing to Departmental Representative or Designate proposed source of reinforcement material to be supplied.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in a manner, which will prevent deterioration or contamination. Deteriorated or contaminated materials will be rejected and must be removed from site.
 - .2 Replace defective or damaged materials with new.
- .4 Reinforcing steel: billet steel, grade 400 and 400W, deformed bars to CSA-G30.18 M, and CSA G30.5-M unless indicated otherwise.
- .5 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.
- .6 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.

- .7 Welded steel wire fabric: to ASTM A185/A185M.
- .8 Galvanizing of non-prestressed reinforcement: to CAN/CSA-G164, minimum zinc coating [610] g/m².
 - .1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.
 - .2 If chromate treatment is carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.
 - .1 Temperature of solution equal to or greater than 32 degrees and galvanized steels immersed for minimum 20 seconds.
 - .3 If galvanized steels are at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.
 - .1 In this case, no restriction applies to temperature of solution.

1.7 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Departmental Representative or Designates' written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 .Reinforcing Splices:
 - .1 Lap Splices:
 - .1 Splice by lapping reinforcing bars, unless specified otherwise.
 - .2 Welded Splices:
 - .1 Full penetration direct butt splice welds in accordance with CSA W186 M and as specified.
 - .3 Splices in Wire Fabric:
 - .1 Comply with CSA A23.3.
- .4 Upon approval of Departmental Representative or Designate, weld reinforcement in accordance with CSA W186.
- .5 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

1.8 SOURCE QUALITY CONTROL

- .1 Upon request, provide Departmental Representative or Designate with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
- .2 Upon request inform Departmental Representative or Designate of proposed source of material to be supplied.

Part 2 Execution

2.1 PREPARATION

- .1 Notify Departmental Representative or Designate when reinforcing is ready for inspection and allow sufficient time for inspection prior to placing concrete.
- .2 Clean reinforcing bars of loose rust, mill scale, dried cement paste, mud, oil, or other coatings that will affect adhesion in accordance with CSA A23.1, Clause 6.1.5 - Surface Conditions of Reinforcement, prior to placing concrete.

2.2 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative or Designate.
- .2 When field bending is authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars, which develop cracks or splits.

2.3 PLACING REINFORCEMENT

- .1 Place reinforcing steel [as indicated on placing drawings] in accordance with CSA-A23.1/A23.2.
- .2 Use plain round bars as slip dowels in concrete.
 - .1 Paint portion of dowel intended to move within hardened concrete with [one coat of asphalt paint].
 - .2 When paint is dry, apply thick even film of mineral lubricating grease.
- .3 Prior to placing concrete, obtain Departmental Representative or Designates' approval of reinforcing material and placement.
- .4 Ensure cover to reinforcement is maintained during concrete pour.
- .5 Tying Reinforcing Bars:
 - .1 Bend tie wire away from concrete surface. Ensure a cover for tie wires, form tie bolts etc are same as the reinforcing bars. Do not let reinforcing tie wire touch formwork or be exposed in the finished concrete structure.
- .6 Splicing:
 - .1 Use lap splices, unless otherwise shown or permitted in writing by Departmental Representative or Designate.
 - .2 Welded Splices: Accomplish by full penetration groove welds and develop a minimum of 125 percent of yield strength of bar in tension and compression.
 - .3 Stagger splices in adjacent bars.

2.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 This Section covers all cast-in-place concrete related to foundations, retaining walls and, including formwork, finishing, expansion and construction joints, anchor bolts and other concrete accessories
- .2 Section 03 10 00, Concrete Forming and Accessories.
- .2 Section 03 20 00, Concrete Reinforcing.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Cast-in-place concrete will not be measured but will be paid for as fixed price item.
 - .2 Supply and installation of anchor bolts, nuts and washers and bolt grouting will not be measured but considered incidental to work.

1.3 REFERENCES

- .1 Reference Standards:
 - .1 ASTM International
 - .1 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C494/C494M-10a, Standard Specification for Chemical Admixtures for Concrete.
 - .3 ASTM C1017/C1017M-07, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - .4 C1059/C1059M, Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
 - .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .3 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum [2007]).
 - .4 CSA International
 - .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA A283-06, Qualification Code for Concrete Testing Laboratories.
 - .3 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

- .5 Canada's Historic Places
 - .1 Standards and Guidelines for the Conservation of Historic Places in Canada, 2nd Edition

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: convene pre-installation meeting one week prior to beginning concrete works.
 - .1 Ensure key personnel, and Departmental Representative or Designate attend.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 At least 4 weeks prior to beginning Work, provide Departmental Representative or Designate with samples of materials proposed for use as follows:
 - .1 5 L of curing compound.
- .3 Certificates:
 - .1 A minimum of 8 weeks prior to placement of concrete, submit to the Departmental Representative manufacturer's test data and certification by the concrete producer with material samples verified by a qualified independent inspection and testing laboratory that the following materials will meet the specified requirements of this Contract.
 - .1 Portland cement.
 - .2 Blended hydraulic cement.
 - .3 Supplementary cementing materials.
 - .4 Admixtures.
 - .5 Aggregates.
 - .2 Submit certification that plant, equipment, and materials to be used in concrete Work comply with requirements of CAN/CSA A23.1/A23.2, most recent edition.
 - .3 Submit certification that Ready Mix concrete producer has current qualification of Ready Mix Concrete Association of Ontario (RMCAO) Special Seal of Quality.
 - .4 Submit test results and certification demonstrating that aggregates will not, nor have the potential to, react with cement to result in deleterious expansion in the concrete. Ensure these tests are current and represent the aggregates being supplied.
 - .5 Submit test results and certification that deleterious substances in aggregate are within limits specified in CSA A23.1, Table 12 Limits for Deleterious Substances and Physical Properties of Aggregates. Ensure these tests are current and represent the aggregates being supplied.
- .4 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.
- .5 Reports:

- .1 Submit for the Departmental Representative or Designate review the quality control plans which describe the material, equipment and procedures to be used for the following activities.
 - .1 Uniform and consistent concrete finishing.
 - .2 Cold weather protection.
 - .3 Hot weather protection.
 - .4 Concrete curing.
 - .5 Concrete placing.
- .2 Mix design:
 - .1 Submit performance based mix design 8 weeks prior to placement of concrete using RMCAO Mix Design Submission Form or equivalent acceptable to the Departmental Representative or Designate.
 - .2 Alkali aggregate reactivity problems may occur under certain circumstances. Ensure mix design is adjusted suitably to prevent such problems.
 - .3 Do not place concrete before performance based mix designs have been reviewed by the Departmental Representative or Designate.
 - .6 Submit mix design for patching material to the Departmental Representative or Designate for acceptance.

1.6 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Provide Departmental Representative or Designate, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
 - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.
- .3 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative or Designate on following items:
 - .1 Falsework erection.
 - .2 Hot weather concrete.
 - .3 Cold weather concrete.
 - .4 Curing.
 - .5 Finishes.
 - .6 Formwork removal.
- .4 Quality Control Plan: provide written report to Departmental Representative or Designate verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:

- .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 Do not modify maximum time limit without receipt of prior written agreement from laboratory representative and concrete producer as described in CSA A23.1/A23.2.

Part 2 Products

2.1 MATERIALS

- .1 Portland cement: to standards of CSA A5/A8/A362 normal Type 10.
- .2 Slag Cement: to standards of CSA A3000.
- .3 Water, fine aggregates, and normal density coarse aggregates: to standards of CSA A23.1/A23.
- .4 Air Entraining Admixture: to standards of ASTM C260.
- .5 Chemical Admixtures: to standards of ASTM C494/ C494M.
- .6 Pozzolanic Mineral Admixtures: to standards of ASTM C1017/C1017M.
- .7 Superplasticizing Admixtures: to standards of ASTM C494/C494M.
- .8 Concrete Mixes and Materials: to Section 03 30 00.
- .9 Caulking: Polysulphide two component, CAN/CSA-19.24M, Plykol by Thornhill Sales Ltd.

2.2 MIXES

- .1 Proportion normal density concrete to CSA-A23.1/A23.2, Clause 14, to give the following properties:

Location	Strength	Max W/C Ratio	Air content (%)	Max Aggregate	Exposure
Foundations	35 at 28d	0.48	5-8	20	C-1
Other Concrete	35 at 28d	0.48	5-8	20	C-1

- .2 Provide certification that plant, equipment, and all materials to be used in concrete comply with requirements of CSA-A23.1/A23.2.
- .3 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA-A23.1/A23.2.
- .4 Slag cement in combination with normal Portland cement to a maximum of 25% may be used.
- .5 Obtain Departmental Representative's or Designate's consent before using chemical admixtures.

- .6 Use of calcium chloride not permitted.

Part 3 Execution

3.1 PREPARATION

- .1 Obtain Departmental Representative's or Designate's written approval before placing concrete.
 - .1 Provide 24 hours minimum notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .5 Prior to placing of concrete obtain Departmental Representative's or Designate's approval of proposed method for protection of concrete during placing and curing [in adverse weather].
- .6 Protect previous Work from staining.
- .7 Clean and remove stains prior to application for concrete finishes.
- .8 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .9 In locations where new concrete is dowelled to existing work, drill holes in existing concrete or masonry work.
 - .1 Place steel dowels of deformed steel reinforcing bars and pack solidly with shrinkage compensating grout or epoxy grout to anchor and hold dowels in positions as indicated.
- .10 Do not place load upon new concrete until authorized by Departmental Representative or Designate.

3.2 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .2 Sleeves and inserts:
 - .1 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Departmental Representative or Designate before placing of concrete.
 - .2 Confirm locations and sizes of sleeves and openings shown on drawings.
 - .3 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts:

- .1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.
 - .2 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from Departmental Representative or Designate.
 - .1 Drilled holes: to manufacturers' recommendations.
 - .3 Set bolts and fill holes with shrinkage compensating grout or epoxy grout.
 - .4 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .4 Drainage holes and weep holes:
- .1 Form weep holes and drainage holes in accordance with Section 03 10 00 - Concrete Forming and Accessories. If wood forms are used, remove them after concrete has set.
 - .2 Install weep hole tubes and drains as indicated.
- .5 Dovetail anchor slots: in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .1 Install continuous vertical anchor slot to forms where masonry abuts concrete wall or columns.
 - .2 Install continuous vertical anchor slots at 800 mm on centre where concrete walls are masonry faced.
- .6 Finishing and curing:
- .1 Finish concrete to CSA A23.1/A23.2.
 - .2 Use procedures noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.
 - .3 Use curing compounds compatible with applied finish on concrete surfaces.
- .7 Toppings:
- .1 Topping mixture to meet minimum requirements as follows: Monolithic.
 - .2 Make allowance for monolithic topping thickness when pouring base course.
 - .3 Apply cement/sand grout to base course to CSA A23.1/A23.2.
 - .4 Place monolithic topping to CSA A23.1/A23.2 and topping manufacturer's recommendations.
 - .5 Ensure that joints in topping are of same material as those in base course. Also ensure that their locations precisely match those in base course. Provide reinforcing mesh as indicated.
- .8 Joint fillers:
- .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative or Designate.
 - .2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
 - .3 Install joint filler.

3.3 FIELD QUALITY CONTROL

- .1 Site tests: conduct tests as follows in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .1 Concrete pours.
 - .2 Slump.
 - .3 Air content.
 - .4 Compressive strength at 28 days.
 - .5 Air and concrete temperature.
- .2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Departmental Representative or Designate for review to CSA A23.1/A23.2.
 - .1 Ensure testing laboratory is certified to CSA A283.
- .3 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.
- .4 Inspection or testing by Departmental Representative or Designate will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.

3.4 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Waste Management: separate waste materials for recycling]in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Using appropriate safety precautions, collect liquid or solidify liquid with inert, non-combustible material and remove for disposal.
 - .2 Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

END OF SECTION

PRECAST STRUCTURAL CONCRETE
RETAINED SOIL SYSTEM WITH FINISHING CAP, WALL/SLOPE, HIGH PERFORMANCE
PRECAST CONCRETE FACING ELEMENTS INCLUDING PANELS

1.0 SCOPE

- .1 This Special provision covers the requirements for materials, quality control and quality assurance testing and acceptance criteria for precast concrete facing elements including panels.

2.0 REFERENCES

This special provision refers to the following standards, specifications or publications:

.1 Ontario Provincial Standard Specifications, Material:

- .1 OPSS 1002, Material Specification for Aggregates - Concrete
- .2 OPSS 1350, Material Specification for Concrete - Materials and Production

.2 Ministry of Transportation Publications

- .1 MTO Laboratory Testing Manual: Tests

.3 Canadian Standards Association

- .1 CSA A 23.1- Concrete Materials and Methods of Concrete Construction
- .2 CSA A23.2-3C, Making and Curing Concrete Compression and Flexure Test Specimens
- .3 CSA A23.2-4C, Air Content of Plastic Concrete by the Pressure Method
- .4 CSA A23.2-5C, Slump of Concrete
- .5 CSA A23.2-9C, Compressive Strength of Cylindrical Concrete Specimens
- .6 CSA A23.2-14C Obtaining and Testing Drilled Cores for Compressive Strength Testing

.4 American Society of Testing Materials

- .1 ASTM C457, Microscopical Determination of Parameters of the Air Void System in Hardened Concrete

3.0 DEFINITIONS

Submission Requirements

- .1 For precast concrete facing elements, the following information shall be submitted to the Departmental Representative or Designate at least four weeks prior to the use of the precast concrete facing elements:
 - .1 concrete mix design,
 - .2 test data on aggregates documenting conformance with OPSS 1002.
 - .3 Manufacturer's production quality control data on compressive strength and air void system parameters, less than 6 months old

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- .4 production quality control data on salt scaling resistance less than 12 months old.
- .5 Testing shall be carried out in conformance with test methods specified in this Special Provision.
- .6 If, due to the product's physical characteristics, the product cannot be tested for scaling resistance in conformance with MTO Laboratory Testing Manual, LS- 412, Method of Test for Scaling Resistance of Concrete Surfaces Exposed to De-icing Chemicals, the Parks Canada Agency will request alternative testing.

5.0 MATERIALS

Concrete shall conform to OPSS 1350 except for the following:

- .1 Air void system parameters shall be a minimum of 3 % air content and the average spacing factor obtained on a minimum of two cores per structure shall be no more than 200 :m maximum with no individual test result greater than 230 :m.
- .2 Concrete shall conform to requirements for scaling resistance. The average maximum scaling mass loss shall be 0.8 kg/m^2 .

6.0 QUALITY CONTROL AND QUALITY ASSURANCE

The quality control and quality assurance results will be used for determining acceptance of the product supplied to this contract.

.1 Quality Control of Precast Concrete Facing Units

Copies of all quality control tests required shall be provided to the Departmental Representative or Designate as soon as they are available unless otherwise specified in this Special Provision.

The Contractor shall submit quality control test data on concrete air content, slump, temperature, compressive strength, air void system parameters analysis and cover over reinforcing steel.

Testing for air content, slump, temperature and compressive strength shall be carried out per each 30 m^3 of concrete produced or per each day of production whichever is more frequent. For acceptance purposes, the Contractor shall test a minimum of three sets of 150 x300 mm compressive strength cylinders each representing different batches of concrete, at a laboratory acceptable to the Parks Canada Agency. Each set shall consist of two cylinders. The cylinders made for acceptance purposes shall be made and cured in conformance with CSA A23.2-3C under standard moisture and temperature conditions and tested in conformance with CSA A23.2-9C. The cylinders shall be made by a concrete field testing technician certified by the Canadian Standard Association or by the American Concrete Institute. This person shall have successfully completed, as part of the certification requirement, written and practical examinations within the last five years verifying his/her competence to carry out field testing of concrete, and have in his/her possession, at all times testing is to be

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performed, a card issued by the certifying agency verifying the currency of the individual's certification.

Air void system parameters analysis shall be carried out by the Contractor on a minimum of two 100 mm diameter cores per structure removed from precast concrete facing elements at locations determined by the Departmental Representative or Designate. Individual cores shall be taken from different panels. Cores shall not contain embedded steel. For air void system parameters testing, the Contractor shall use a approved laboratories and operators for this testing. The cores shall be cut lengthwise into two halves with one half to be tested by the Contractor Air void analysis results shall be submitted to the Contract Administrator within 35 days of delivery of the precast elements to the job site.

Concrete cover measurements shall be carried out by the Contractor on reinforced concrete facing elements supplied to the contract, before they are installed. A minimum of 30 measurements per structure shall be carried out. Measurements shall be carried out at locations and on precast elements randomly selected by the Departmental Representative or Designate. Cover measurement shall be carried out with a covermeter or a method acceptable to the Departmental Representative or Designate. The depth of cover, to the nearest millimetre, shall be determined to the outermost reinforcing steel. Concrete cover measurement results shall be submitted to the Departmental Representative or Designate at least 2 days prior to the installation of the reinforced concrete facing elements represented by the test results.

Testing shall be carried out in conformance with the following:

- .1 Slump: CSA A23.2-5C, Slump of Concrete
 - .2 Air Content: CSA A23.2-4C, Air Content of Plastic Concrete by the Pressure Method
 - .3 Compressive Strength: CSA A23.2-9C, Compressive Strength of Cylindrical Concrete Specimens and CSA A23.2-3C, Making and Curing Concrete Compression and Flexure Test Specimens
 - .4 Obtaining Cores: CSA A23.2-14C Obtaining and Testing Drilled Cores for Compressive Strength Testing
 - .5 Air Void System Parameters: ASTM C457, Microscopical Determination of Parameters of the Air Void System in Hardened Concrete
- .2 Quality Assurance
The Contractor shall submit to the Departmental Representative or Designate two 300 mm x 300 mm specimens per structure for testing of scaling resistance by the Ministry of Transportation. The specimens shall be obtained from finished precast concrete facing elements randomly selected by the Departmental Representative or Designate. Testing for scaling resistance will be carried out in conformance with MTO Laboratory Testing Manual, LS- 412, Method of Test for Scaling Resistance of Concrete Surfaces Exposed to De-icing Chemicals.
- .3 Acceptance of Precast Concrete Facing Elements

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The acceptance of precast concrete facing elements will be based on quality control test results obtained by the Contractor and on salt scaling results obtained by the Owner.

Acceptability of air void system parameters will be based on individual core results for air content, and on the average result from two cores per structure for spacing factor. Precast concrete facing elements on a structure represented by a pair of cores which fails to meet the requirements for air void system parameters will be considered unacceptable. Acceptability of concrete compressive strength will be based on the following:

- .1 the average of all sets of compressive strength tests shall be equal to or greater than the specified strength
- .2 no individual strength test shall be more than 15% below the specified strength.

When the compressive strength specimens fail to meet these requirements, the precast concrete facing panels supplied to the contract will be considered unacceptable.

Acceptability of concrete cover over reinforcing steel will be based on the percentage of satisfactory measurements. The concrete cover over reinforcing steel shall be within ± 10 mm of the design concrete cover. When 10 % or more of the total number of measurements per structure is outside the specified limits, the panels in a structure represented by these measurements will be considered unacceptable.

Acceptability of salt scaling resistance will be based on average of results obtained on two 300 mm x 300 mm specimens representing a structure. When the specimens fail to meet the requirements for salt scaling resistance the precast concrete facing units represented by the specimens will be considered unacceptable.

Unacceptable concrete facing elements shall be removed and replaced at the Contractor's expense. The Contractor may elect to submit a proposal for remedial action to the Departmental Representative or Designate.

END OF SECTION

1.0 SCOPE

- .1 This Special Provision covers the requirements for the design, supply and construction of retained soil systems (RSS) walls and steep slopes.
- .2 Additional requirements for RSS precast concrete facing elements shall be as specified in the Contract Documents.

2.0 REFERENCES

This special provision refers to the following standards, specifications or publications:

- .1 **Ontario Provincial Standard Specifications, Construction.**
 - .1 OPSS 501 Compacting
- .2 **Ontario Ministry of Transportation Publications**
 - .1 MTO Designated Sources of Materials (DSM)
 - .2 Qualification Criteria for RSS
- .3 **CSA Standards**
 - .1 S6-06 Canadian Highway Bridge Design Code (CHBDC)

3.0 DEFINITIONS

For the purposes of this Special Provision the following definitions apply:

Alignment Elements means components specified by the manufacturer that are constructed on the foundation for RSS to facilitate placing of the facing elements to the correct lines and grades, such as concrete levelling pads and soldier piles.

Approved Product Drawings means the documentation for an RSS that has been submitted by the manufacturer and accepted by the Ministry for listing in the DSM, according to the Qualification Criteria for RSS.

Backfill for RSS means the material specified by the manufacturer as part of the engineered materials comprising the backfill for the RSS.

Constructed Height means the vertical distance between the foundation for RSS and the top of the currently placed and compacted backfill for RSS, measured at the point of the design height.

Corrective Work means work carried out by the Contractor to repair deficiencies identified by the Parks Canada Agency during the RSS warranty period.

Design Checking Engineer means the Engineer retained by the Contractor who checks the original design and working drawings.

Design Engineer means the Engineer retained by the Contractor who produces the original design and working drawings.

Design Height means the maximum difference in elevation between the foundation for RSS and the corresponding top of backfill for RSS, over the full length or perimeter of the RSS.

External Stability means stability against deep-seated failure of the foundation for RSS, including adequate bearing capacity at specified settlements of the foundation.

Facing Elements means components specified by the manufacturer that delineate the front face of the RSS and to which reinforcing elements may be attached, such as precast concrete panels, split-face concrete blocks, and geo-synthetic panels.

Foundation for RSS means the base on which the RSS is constructed, such as excavation to a specified elevation and construction of a granular pad.

Internal Stability means stability against failure of the engineered materials comprising the RSS, including adequate resistance against excessive elongation, breakage and pullout of the reinforcing elements.

Manufacturer means the firm who supplies the design and proprietary components, and who specifies the backfill and other materials, for the RSS.

Manufacturer's Representative means an individual with continuous full-time employment with the manufacturer for a period of at least three (3) years, and who is knowledgeable in the design and construction of the RSS.

Obstruction means any part of the work and any existing condition within the Working Area that affects the design, construction and performance of the RSS, such as structures, catch basins and manholes, drainage pipes and sewers, and utilities

Performance Tolerance – Local means the joint gap between any two constructed facing elements, measured at any point along the joint between the facing elements and perpendicular to the line of the joint.

Performance Tolerance – Global means the vector distance between any point on the constructed RSS and the corresponding point on the theoretical RSS surface as defined in the Contract Documents.

Placing Tolerances means tolerances specified by the manufacturer on the placing of the RSS components and backfill for RSS to ensure compliance of the constructed RSS with the performance tolerances.

Quality Verification Engineer: means an Engineer recognized by the Manufacturer as having demonstrated experience and expertise to provide quality verification services for the Manufacturer's RSS. The Quality Verification Engineer shall be retained by the Contractor to certify that the work is in general conformance with the Contract Documents and to issue Certificates of Conformance.

Reinforcing Elements means components specified by the manufacturer that are placed within the backfill for RSS and connected to the facing elements to mechanically stabilize the backfill for RSS, such as metal tie strips, metal grids and geo-synthetic grids,

Retained Soil System (RSS) means a proprietary system listed in the DSM used to retain horizontal loads for applications such as true and false abutment structures, retaining walls and steep slopes; or, to retain vertical loads for applications such as embankments over soft ground.

RSS Superintendent means the Contractor's authorized representative in responsible charge of the construction of the RSS.

Structure means any bridge, culvert, tunnel, retaining wall, overhead sign, high mast light pole, wharf, dock, or any part thereof.

4.0 DESIGN AND SUBMISSION REQUIREMENTS

.1 Design

.1 General

The Contractor shall be responsible for the design of the RSS and for ensuring the RSS as designed is compatible with the Work.

The geometric requirements of the RSS, such as lines and grades of the facing elements and typical cross-sections, shall be as specified in the Contract Drawings.

The foundation for RSS shall be as specified in the Contract Documents.

.2 RSS Selection

An RSS shall be selected from the DSM that meets the application, performance and appearance requirements for that RSS, as specified in the Contract Drawings.

An RSS shall be selected from the DSM designated as either 'A' (Accepted) or 'DE' (Demonstration). RSS designated as 'DE' status requires inspection, instrumentation and monitoring of the constructed RSS, and the reporting of the findings to the Ministry by the manufacturer as specified in the Qualification Criteria for RSS.

When there is more than one RSS included in the same tender item number for payment, all RSS for the tender item shall be selected from the same DSM listing, including type and colour of facing elements

All RSS that abut an existing structure, or a structure to be constructed as part of the Work, and that have the same performance and appearance requirements, shall be selected from the same DSM listing, including type and colour of facing elements.

.3 Performance Tolerances

Performance tolerances for the RSS shall be according to Table 1.

.4 Obstructions

Design details of the RSS shall be included on the Working Drawings for all obstructions shown in the Contract Drawings.

Where an obstruction is shown in the Contract Drawings but not located to sufficient accuracy for the design of the RSS, the obstruction shall be located in the field to sufficient accuracy as required to design the RSS.

.5 Foundation Report

A Foundation Investigation Report that describes the subsurface conditions at the RSS is available, as specified in the Contract Documents.

The Parks Canada Agency warrants the data in the Foundation Investigation Report, except that interpretations of the data and opinions expressed in the Foundation Investigation Report are not warranted.

.2 Submissions

.1 Working Drawings

At least two weeks prior to commencement of construction of the RSS, three (3) sets of Working Drawings shall be submitted to the Departmental Representative or Designate for information purposes. A separate submission of Working Drawings shall be made for each RSS in the Contract. All submissions shall bear the seal and signature of the design Engineer and the design checking Engineer.

The RSS Superintendent shall have a copy of the Working Drawings on site at all times during the construction of the RSS.

.2 Working Drawing Requirements

Working Drawings shall include at least the following:

- .1 Statement from the manufacturer confirming the experience and expertise of the design Engineer and design checking Engineer to provide design services for the manufacturer's RSS;
- .2 All design, fabrication and construction drawings and specifications for the RSS;
- .3 Location and value of the design height of the RSS;
- .4 Defined lines and grades, type, and quantity in cubic metres of the backfill for RSS;
- .5 Details at obstructions, and connections to other structures, where shown in the Contract Drawings;
- .6 Statement of bearing resistance required by the RSS foundation according to CAN/CSA-S6-06;
- .7 Statement of satisfactory internal and external stability; and
- .8 Placing tolerances for the RSS.

.3 RSS Superintendent

At least two weeks prior to commencement of construction of the RSS, the name(s) of the RSS Superintendent responsible for each RSS in the Contract shall be submitted in writing to the Departmental Representative or Designate.

During construction of an RSS, the RSS Superintendent shall not change without written permission from the Departmental Representative or Designate. A proposal for a change in the RSS Superintendent shall be submitted at least one week prior to the actual change in RSS Superintendent.

.4 Manufacturer's Representative

At least two weeks prior to commencement of construction of the RSS, the name(s) of the manufacturer's representative for each RSS shall be submitted in writing to the Departmental Representative or Designate.

At least 48 hours written advance notice shall be provided to the Departmental Representative or Designate prior to each visit to the site by the manufacturer's representative. The advance notice shall include the dates and locations the manufacturer's representative will be on site.

.5 Certificates of Conformance

Upon completion of each RSS, a certificate of conformance sealed and signed by the QVE shall be submitted to the Departmental Representative or Designate.

.6 Milestone Inspection

For each RSS, a milestone inspection report shall be submitted to the Departmental Representative or Designate following an interim inspection by the QVE at each of the following milestones, and prior to commencement of subsequent operations on that RSS:

- a) Layout and marking of all lines and grades needed to construct the RSS; and construction of the alignment elements, where applicable;
- b) Delivery and storage on site of facing elements and reinforcing elements, where applicable; and
- c) Installation of the facing elements; placement and compaction of the backfill for RSS; and installation of the reinforcing elements, where applicable.

.7 RSS Warranty

A warranty shall be submitted to the Parks Canada Agency to address all deficiencies identified by the Parks Canada Agency related to the performance of the RSS for a period of 36 months from the date of the Contract Completion Certificate.

.8 Repair Procedures for Corrective Work

Three copies of repair procedures for corrective work shall be submitted to the Departmental Representative or Designate for information purposes only at least two weeks prior to commencement of any corrective work at an RSS required during the warranty period.

The repair procedures shall include a description of the cause and fully detail the corrective work required to correct the deficiencies identified by the Parks Canada Agency.

The repair procedures shall bear the seal and signature of an Engineer, and be signed by the manufacturer's representative.

5.0 MATERIALS

.1 General

All materials for the selected RSS shall be according to the approved product drawings for that RSS.

6.0 EQUIPMENT

.1 Restriction on Skid-Steer Vehicles

Skid-steer vehicles shall not be permitted on any area where the depth of backfill for RSS over installed reinforcing elements is less than 0.5 m.

7.0 CONSTRUCTION

.1 General

The RSS shall be constructed according to the Working Drawings and this specification.

Construction of the RSS shall not begin until all applicable certificates of conformance for the foundation of the RSS have been submitted to the Departmental Representative or Designate.

.2 RSS Superintendent

The construction of an RSS shall be scheduled such that it is at all times under the responsible charge of an RSS Superintendent who has been advised on site by the manufacturer's representative as to the required procedures for the construction of that RSS, for the specified operations and time periods.

.3 Manufacturer's Representative

The manufacturer's representative shall be on site to advise the RSS Superintendent as to the procedures and placing tolerances required for the construction of the RSS.

For each RSS, the manufacturer's representative shall be on site at commencement of each of the following operations, for a time period of three (3) Working Days per operation or until the operation is complete, whichever is less:

- a) Layout of the RSS; and construction of the alignment elements, where applicable;
- b) Installation of the facing elements; and
- c) Placement and compaction of the backfill for RSS; and installation of the reinforcing elements, where applicable.

Whenever there is a change in the RSS Superintendent during construction of an RSS, the manufacturer's representative shall return to the site for the same operations and time periods as at commencement.

.4 Backfill for RSS

Backfill for RSS shall be placed within the lines and grades shown on the Working Drawings. All backfill for RSS shall be compacted according to OPSS 501.

Unless otherwise shown in the Contract Drawings, backfill for RSS shall not be placed against an adjacent concrete structure that is part of the work until the concrete in that structure has obtained at least 70% of the compressive strength specified in the Contract Documents.

.5 Management of Excess Materials

Management of excess materials shall be according to the Contract Documents.

.6 Corrective Work

All deficiencies shall be repaired according to the repair procedures for corrective work. All corrective work shall be done within the RSS warranty period, unless prevented by seasonal shutdown, in which case the corrective work shall be done prior to June 30 of the following year.

At least one week prior to commencement of any corrective work, written notice of commencement of work shall be submitted to the Departmental Representative or Designate or the Parks Canada Agency.

Access to the corrective work shall be provided for inspection by the Parks Canada Agency when requested.

8.0 QUALITY ASSURANCE

.1 Acceptance Criteria at End of the RSS Warranty Period

The Parks Canada Agency will accept the RSS at the end of the RSS warranty period if none of the deficiencies listed in Table 2 are found during the warranty inspections. The RSS shall not be accepted until all deficiencies have been repaired by corrective work.

.2 Warranty Inspections

Throughout the warranty period the Parks Canada Agency will carry out warranty inspections of the RSS for deficiencies according to Table 2. The Parks Canada Agency will notify the Contractor as to the date and time of the inspection(s) and the Contractor may, at his discretion, be present during the inspection(s).

Within two weeks following a warranty inspection the Parks Canada Agency will notify the Contractor in writing of all deficiencies that require corrective work.

9.0 MEASUREMENT FOR PAYMENT

.1 Actual Measurement

.1 Backfill for Retained Soil System, High Performance

Measurement shall be of the mass in tonnes of the material placed within the theoretical lines and grades shown in the stamped Working Drawings. The method of determining the mass shall be as specified in the Contract Documents.

10.0 BASIS OF PAYMENT

.1 Retained Soil System, Wall/Slope, High Performance, Retained Soil System with Finishing Cap, Wall/Slope, High Performance

**RETAINED SOIL SYSTEM
 WITH FINISHING CAP, WALL/SLOPE, HIGH PERFORMANCE**

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment and Material to do the work, including all costs associated with having the manufacturer's representative on site.

Payment for construction of the foundation for RSS shall be made under the appropriate tender items in the Contract.

No payment shall be made for corrective work, including investigation of deficiencies, design of repairs, site access, traffic staging and removal of existing work, except where the corrective work is required as a result other than an act or fault of the Contractor.

.2 Backfill for Retained Soil System, High Performance - Item

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment and Material to do the work.

When the Contract does not contain a separate tender item for backfill for RSS, the contract price for the RSS contract items in which the backfill for RSS is incorporated shall include full compensation for all labour, Equipment and Material required to place and compact the backfill for RSS.

TABLE 1 : Performance Tolerances for RSS

Performance Requirement	Performance Tolerance (mm)	
	Local	Global
Abutments	Joint Gap \pm 5 (Note 1)	\leq 20
High	Joint Gap \pm 10 (Note 1)	\leq 30
Medium	N/A	\leq 50
Low	N/A	\leq 100
Notes: 1. Joint Gap shall be as specified on the working drawings.		

TABLE 2 : RSS Deficiencies

No.	Description of Deficiency
1	Performance tolerance exceeds tolerances given in Table 1.
2	Damaged facing elements and damaged alignment elements, where applicable.
3	Dead and dying vegetative elements that are an integral part of the RSS.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 03 08 Historic - Mortaring
- .2 Section 04 03 31 Historic - Repairing Brickwork
- .3 Section 04 03 41 Historic - Repairing Stone
- .4 Section 04 03 42 Historic - Reconstructing Stone and Brick Masonry
- .5 Section 04 05 00 Common Work Results for Masonry
- .6 Section 04 21 13 Brick Masonry
- .7 Section 04 43 23 Stone Masonry

1.2 SUMMARY OF WORK

- .1 Summary of work in this Section includes but is not limited to repointing at the following locations:
 - .1 Reconstructing stone and brick masonry: Main Entrance Gate, end portion of North Interior Wing Wall.
 - .2 Masonry Repairs: Sally Port Alcove brick walls and roof structure
 - .3 Localized Masonry Repairs: Powder Magazine outer brick vaults
 - .4 General Masonry Repairs: Main Entrance Gate, Powder magazines and Sally Port brick surfaces and copings
 - .5 General Masonry Repairs: Main Entrance Gate stone walls and copings

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 No measurement will be made under this Section.
 - .1 Include costs as part of masonry work in related Sections.

1.4 REFERENCES

- .1 Definitions:
 - .1 Raking: removal of loose/deteriorated mortar to a depth suitable for repointing until sound mortar, and/or 4x joint thickness and/or a specified mm depth is reached.
 - .2 Repointing: filling and finishing of masonry joints from which mortar is missing, has been raked out or has been omitted.
 - .3 Back Pointing: repointing to depths greater than minimum raked depths specified, to bring mortar face to specified depth for raked joints.
 - .4 Finish Pointing: repointing face of joint, to depth specified for raked joints.
 - .5 Tooling: finishing of masonry joints using tool to provide final contour.

- .6 Low-pressure water cleaning: water soaking of masonry using less than 350 kPa (50 psi) water pressure, measured at nozzle tip of hose.
- .2 Reference Standards:
 - .1 CSA Group
 - .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A179-04(R2014), Mortar and Grout for Unit Masonry.
 - .2 Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets, including product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Provide labelled samples of materials to be used on project for approval before work commences.
- .4 Test and Evaluation Reports:
 - .1 Provide certified test reports showing compliance with specified performance characteristics and physical properties.
 - .2 Provide laboratory test reports certifying compliance of mortar ingredients with specifications requirements.

1.6 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Operation and Maintenance Data: submit operation and maintenance data for masonry work for incorporation into manual.

1.7 QUALITY ASSURANCE

- .1 Qualifications for Masonry Contractor, Project Supervisor, Masons: Refer to Section 04 05 00 - Common Work Results for Masonry.
- .2 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 04 05 00 - Common Work Results for Masonry.
 - .2 Construct mock-up, 600mm x 600mm, to demonstrate raking and repointing procedures at selected areas of exterior masonry repairs, for each type of masonry material specified, in locations designated by Departmental Representative or designate.
- .3 Laboratory tests for mortar: Refer to Section 04 03 08 Historic - Mortaring.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 04 03 08 Historic - Mortaring and manufacturer's written instructions.

1.9 SITE CONDITIONS

- .1 Ambient conditions: in accordance with Section 04 05 00 - Common Work Results for Masonry

Part 2 Products

2.1 MORTAR

- .1 Mortar: in accordance with Section 04 03 08 - Historic - Mortaring.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify masonry, staging and storage areas and notify Departmental Representative or designate in writing of conditions detrimental to acceptable and timely completion of Work.
 - .1 Visually inspect substrate in presence of Departmental Representative or designate.
 - .2 Inform Departmental Representative or designate in writing of areas of deteriorated masonry not previously identified.
- .2 If evidence of hazardous materials is discovered, stop work in that area and report to Departmental Representative or designate immediately.

3.2 PROTECTION OF IN-PLACE CONDITIONS

- .1 Protection requirements are specified in Section 04 05 00 - Common Work Results for Masonry.

3.3 SPECIAL TECHNIQUES

- .1 Examine mortar joints.
 - .1 Examine horizontal and vertical joints to determine which were struck first and whether they are the same style, as well as aspects of quality of work which establish authenticity of original work.
 - .2 Replicate the style selected by Departmental Representative or designate.
- .2 Test mortar joints.
 - .1 Procedure of testing: examine joints visually for signs of deteriorated masonry such as voids, spalled surfaces, loose or missing mortar, cracking or micro-cracking at edges of joints or across joints, dense cement-rich mortar.
 - .2 Test joints not visually deteriorated as follows:
 - .1 Test for voids and weakness by using hammers or other approved means.

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

3.4 RAKING JOINTS

- .1 Use manual raking tool to obtain clean masonry surfaces.
 - .1 Remove deteriorated and adhered mortar from masonry surfaces to full depth of deteriorated mortar but in no case less than 20 mm leaving square corners and flat surface at back of cut.
 - .2 Clean out voids and cavities encountered.
- .2 Remove mortar without chipping, altering or damaging masonry units.
- .3 Where use of power tools to remove mortar is deemed appropriate by Departmental Representative or designate:
 - .1 Rake out using maximum 86 mm diameter blades to centre of joint only, to a maximum depth that is equal to half of joint width. Mortar must remain on each side of saw cut. Raking must not touch masonry units.
 - .2 Stop saw cut 50 to 75 mm from end of vertical and discontinuous horizontal joints. Do not cut into masonry units.
 - .3 Notify Departmental Representative or designate to inspect raking, prior to removing remaining mortar with hand tools.
 - .4 Remove remaining mortar with hand tools.
- .4 Clean surfaces of joints by compressed air or with non-ferrous brush without damaging texture of exposed joints or masonry units.
- .5 Replace stone and brick damaged as a result of careless raking of saw cutting, at no cost to Owner.
- .6 Remove mortar from top, bottom and side joints, with back surface of joint square and of an even depth.

3.5 REPOINTING

- .1 When required repair and replacement work is complete, carry out repointing.
- .2 Before repointing, wash down wall to be repointed and allow to dry to damp, but not wet. Ensure that dust and debris are removed from joints and wall surfaces prior to repointing.
- .3 Keep masonry damp while pointing is being performed.
- .4 Completely fill joint with mortar.
 - .1 If surface of masonry units has worn rounded edges keep pointing back 1 mm from surface to maintain same width of joint
 - .2 Avoid feathered edges.
 - .3 Pack mortar firmly into voids and joints, ensuring full contact with back and sides of joint and leaving no voids.
- .5 Build-up pointing in layers not exceeding 25 mm in depth.
 - .1 Allow each layer to set before applying subsequent layers.

- .2 Maintain joint width.
- .6 Tool joints to match profile shown on drawings and to match approved mock-ups.
- .7 Remove excess mortar from adjacent masonry surfaces before it sets.

3.6 PROTECTION DURING CURING PROCESS

- .1 Provide protection during the curing process in accordance with Section 04 03 08 Historic - Mortaring and manufacturer's written instructions.

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 04 05 00 - Common Work Results for Masonry.
 - .1 Leave Work area clean at end of each day.
 - .2 Clean surfaces thoroughly of sealant and mortar droppings, stains and other blemishes resulting from work of this contract on a daily basis, as work progresses.
 - .3 Remove droppings and splashings using clean water and thick cotton rags.
 - .4 Clean masonry with stiff natural bristle brushes and plain water only if sealant or mortar has fully cured.
 - .5 Obtain approval of Departmental Representative or designate prior to using other cleaning methods for persistent stains.

3.8 PROTECTION OF COMPLETED WORK

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 03 07 Historic - Masonry Repointing
- .2 Section 04 03 31 Historic - Repairing Brickwork
- .3 Section 04 03 41 Historic - Repairing Stone
- .4 Section 04 03 42 Historic - Reconstructing Stone and Brick Masonry
- .5 Section 04 05 00 Common Work Results for Masonry
- .6 Section 04 21 13 Brick Masonry
- .7 Section 04 43 23 Stone Masonry

1.2 SUMMARY OF WORK

- .1 Summary of work in this Section includes but is not limited to mortar for the following:
 - .1 Reconstructing stone and brick masonry: Main Entrance Gate, end portion of North Interior Wing Wall.
 - .2 Masonry Repairs: Sally Port Alcove brick walls and roof structure
 - .3 Localized Masonry Repairs: Powder Magazine outer brick vaults
 - .4 General Masonry Repairs: Main Entrance Gate, Powder magazines and Sally Port brick surfaces and copings
 - .5 General Masonry Repairs: Main Entrance Gate stone walls and copings

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 No measurement will be made under this Section.
 - .1 Include costs as part of masonry work in related Sections.

1.4 REFERENCES

- .1 ASTM International
 - .1 ASTM C207-06(2011), Standard Specification for Hydrated Lime for Masonry Purposes.
 - .2 ASTM C270-12a, Standard Specification for Mortar for Unit Masonry.
 - .3 ASTM C1713, Standard Specification for mortar for the Repair of Historic Masonry
- .2 CSA International
 - .1 CAN/CSA-A179-04(R2009), Mortar and Grout for Unit Masonry.
 - .2 CSA A-371 Masonry for buildings.
- .3 Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Refer to Section 04 05 00 - Common Work Results for Masonry.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for premixed mortar and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Provide samples in quantity and size in accordance with CAN/CSA-A179.
- .4 Test reports:
 - .1 Submit test results during site work as directed by Departmental Representative or Designate as follows:
 - .1 Mortar compressive strength: at 7 and 28 days or otherwise required.

1.6 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Operation and Maintenance Data: submit operation and maintenance data for masonry work for incorporation into manual.

1.7 QUALITY ASSURANCE

- .1 Qualifications for Masonry Contractor, Project Supervisor, Masons: Refer to Section 04 05 00 - Common Work Results for Masonry.
- .2 Mock-ups:
 - .1 Construct mock-up in accordance with Section 04 05 00 - Common Work Results for Masonry.
 - .2 Submit methods of reproducing existing mortar colour, texture and pointing types, and samples.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 04 05 00 - Common Work Results for Masonry and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

1.9 SITE CONDITIONS

- .1 Ambient Conditions: in accordance with Section 04 05 00 - Common Work Results for Masonry, and manufacturers written instructions.
 - .1 Provide weather-tight enclosure to store materials and mix mortars, maintain air temperature above 10 degrees C at all times.
 - .2 Maintain maximum/minimum thermometers and relative humidity gauges on site and in enclosures.

- .1 Maintain a daily record of temperature and humidity.
- .2 Install relative humidity and temperature equipment, record temperature and relative humidity and submit report to Departmental Representative or Designate.

Part 2 Products

2.1 MATERIALS

- .1 Water: potable, clean and free from contaminants.
- .2 Bedding and Repointing Mortar: KING HLM-500 premixed hydraulic-lime-based mortar, as manufactured by King Masonry Products, or approved alternate. Colour as selected from manufacturers standard range.
- .3 Repointing Mortar: KING HLM-350 premixed hydraulic-lime-based mortar, as manufactured by King Masonry Products, or approved alternate. Colour as selected from manufacturers standard range.

2.2 MORTAR MIXES

- .1 Mix in accordance with manufacturer's instructions.

2.3 ALLOWABLE TOLERANCES

- .1 As per manufacturers technical data.

Part 3 Execution

3.1 PREPARATION

- .1 Premixed Mortar:
 - .1 Follow manufacturer's written instructions.

3.2 CONSTRUCTION

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

3.3 PREPARATION AND MIXING OF MORTAR

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Contractor to appoint 1 individual to mix mortar for duration of project. If this individual must be changed, mortar mixing must cease until new individual is trained, and mortar mix is tested.

3.4 MORTAR PLACEMENT

- .1 Install premix mortar in accordance with CAN/CSA-A179 and manufacturers instructions.

- .2 Refer to related masonry specification sections.

3.5 FIELD QUALITY CONTROL

- .1 Site Tests, Inspection: in accordance with Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
 - .1 Test and evaluate mortar during construction in accordance with CAN/CSA-A179.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 04 05 00 - Common Work Results for Masonry.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .3 Remove droppings and splashings using clean sponge and water.
- .4 Clean masonry with low pressure clean water and soft natural bristle brush.
- .5 Obtain approval of Departmental Representative or Designate prior to using other cleaning methods for persistent stains.

3.7 PROTECTION OF COMPLETED WORK

- .1 Cover completed and partially completed work not enclosed or sheltered at end of each work day.
- .2 Enclose and protect work using wetted burlap, to provide moist cure as per manufacturers written instructions.
- .3 Cover with waterproof tarps to prevent weather from eroding recently laid material.
 - .1 Maintain tarps in place for minimum of 1 week after laying.
 - .2 Ensure that bottoms of tarps permit airflow to reach mortar in joints.
- .4 Anchor coverings securely in position.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 03 07 Historic - Masonry Repointing
- .2 Section 04 03 08 Historic - Mortaring
- .3 Section 04 03 41 Historic - Repairing Stone
- .4 Section 04 03 42 Historic - Reconstructing Stone and Brick Masonry
- .5 Section 04 03 43 Historic - Dismantling Stone and Brick Masonry
- .6 Section 04 05 00 Common Work Results for Masonry
- .7 Section 04 21 13 Brick Masonry
- .8 Section 04 43 23 Stone Masonry
- .9 Section 05 50 00 Structural Steel Fabrications
- .10 Section 07 92 10 Joint Sealing
- .11 Section 08 11 02 Metal Gates/Grilles

1.2 SUMMARY OF WORK

- .1 Summary of work in this Section includes but is not limited to repairing brickwork at the following locations:
 - .1 Structural Crack Repairs (sealants): Main Entrance Gate brick copings, Powder Magazines brick surfaces and copings, Sally Port brick surfaces and copings
 - .2 Structural Crack Repairs (grout): Sally Port Tunnel brick ceiling
 - .3 Masonry Repairs: Sally Port Alcove brick walls and roof structure
 - .4 Localized Masonry Repairs: Powder Magazine outer brick vaults
 - .5 General Masonry Repairs: Main Entrance Gate, Powder magazines and Sally Port brick surfaces and copings

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Structural crack repairs (sealant) will be paid on a unit price basis. Measurement will be based on the length of the structural crack in lin. m.
- .2 Structural crack repairs (grout) will be paid on a unit price basis. Measurement will be based on the length of the structural crack in lin. m.
- .3 Masonry repairs to the Sally Port Alcove brick walls and roof structure will be paid from the masonry repair cash allowance in the amount of \$40,000.00
- .4 Localized masonry repairs to the Powder Magazine outer brick vaults, including the structural steel formwork, will be paid as a fixed price item.
- .5 General masonry repairs at the Main Entrance Gate, Powder Magazines and Sally Port brick surfaces and copings will be paid from the masonry repair cash allowance in the amount of \$50,000.00.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Refer to Section 04 05 00 Common Work Results for Masonry.

1.5 REFERENCES

- .1 Reference Standards:
 - .1 ASTM International
 - .1 ASTM C216-13, Standard Specification for Facing Brick (Solid Masonry Units Made of Clay or Shale).
 - .2 CSA Group
 - .1 CSA A82-14, Fired Masonry Brick Made From Clay or Shale.
 - .2 CSA A370-14, Connectors for Masonry.
 - .3 CAN/CSA-A371-04(R2014), Masonry Construction for Buildings.
 - .4 CSA S304.1-04(R2010), Design for Masonry Structures.
 - .3 Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 04 05 00 Common Work Results for Masonry.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets, including product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer with experience in rehabilitating historic structures registered or licensed in Province of Ontario, Canada.
- .4 Samples:
 - .1 Submit samples of materials, anchors, etc. as required to complete the work.
- .5 Certificates:
 - .1 Provide certificates signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements.
- .6 Test Reports:
 - .1 Provide certified test reports showing compliance with specified performance characteristics and physical properties.

1.7 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 04 05 00 Common Work Results for Masonry.
- .2 Operation and Maintenance Data: submit operation and maintenance data for masonry work for incorporation into manual.
- .3 Project Record Documents: Refer to Item 3.1 Documentation of Brick Repair Work.

1.8 QUALITY ASSURANCE

- .1 Qualifications of Masonry Contractor, Project Supervisor, Masons: Refer to Section 04 05 00 - Common Work Results for Masonry.
- .2 Mock-ups:
 - .1 Prepare mock-ups in accordance with Section 04 05 00 Common Work Results for Masonry.
 - .2 Prepare mock-ups to demonstrate brickwork repair procedures as required.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 04 05 00 Common Work Results for Masonry and as per approved methods and procedures.

1.10 SITE CONDITIONS

- .1 Ambient conditions:
 - .1 Maintain temperature of mortar materials in accordance with manufacturers recommendations.
 - .2 Maintain masonry temperature between 10 and 27 degrees C in accordance with Section 04 05 00 - Common Work Results for Masonry.
 - .3 Cold weather requirements: meet recommended practices for cold weather masonry construction.

Part 2 Products

2.1 MATERIALS:

- .1 Existing Brick:
 - .1 Existing brick stockpiled in the North Powder Magazine.
- .2 Additional Brick:
 - .1 Additional brick to be supplied by Departmental Representative or Designate, if required.
- .3 Mortar: in accordance with Section 04 03 08 - Historic - Mortaring.
- .4 Sealants and Backer Rod: in accordance with Section 07 92 10 Joint Sealing.
- .5 Grout: Daubois Grout F-20 hydraulic lime based injection grout, or approved alternate.
- .6 Structural Steel Formwork: as per structural drawings/specifications and approved shop drawings
- .7 Accessories/Anchors: as required

2.2 EXISTING BRICK

- .1 Use hard, sound, and clean existing bricks from stockpile in the North Powder Magazine, only with Departmental Representative or Designate's approval. Use only bricks without evidence of soluble salts, compatible in appearance and performance with existing.

- .2 Additional brick, if required for masonry repairs, will be supplied by Departmental Representative or Designate.

Part 3 Execution

3.1 DOCUMENTATION OF BRICK REPAIR WORK

- .1 Prepare a detailed report, as outlined in Section 04 05 00 Item 1.7, documenting the brick repair work.
- .2 Include in report the approved scope of repair work and associated repair methods/procedures. Advise the Departmental Representative or Designate of any proposed changes to specified procedures for approval before commencement of work.

3.2 EXAMINATION

- .1 Verification of Conditions: verify masonry, staging and storage areas and notify Departmental Representative or Designate in writing of conditions detrimental to acceptable and timely completion of Work.
 - .1 Visually inspect substrate in presence of Departmental Representative or Designate.
 - .2 Inform Departmental Representative or Designate in writing of areas of deteriorated masonry not previously identified.
- .2 Check for evidence of repairs, cracks, moisture, soluble salt contamination and other defects not noted on Contract Drawings, and report to Departmental Representative or Designate before starting Work.
- .3 If evidence of hazardous materials is discovered, stop work in that area and report to Departmental Representative or Designate immediately.

3.3 STRUCTURAL CRACK REPAIRS WITH SEALANT

- .1 Inspect existing brickwork with Departmental Representative or Designate to determine locations and extent of existing structural cracks to be repaired with sealant.
- .2 Rake out existing structural crack to required depth as detailed.
- .3 Remove excess mortar adhered on surface of adjacent bricks, and clean crack of loose debris and dust. Refer to Section 07 92 10 Joint Sealing for surface preparation procedures.
- .4 Install backer rod and sealant in accordance with Section 07 92 10 Joint Sealing, and as per manufacturers recommendations. Face of sealant to be set back from face the brickwork as detailed. Mask adjacent brick surfaces to prevent excess sealant adhering to these surfaces.
- .5 Once sealant has set, remove masking material and any excess caulking on adjacent brick surfaces.

3.4 STRUCTURAL CRACK REPAIRS WITH GROUT

- .1 Inspect existing brickwork with Departmental Representative or Designate to determine locations and extent of the existing structural crack in the Sally Port Tunnel arched ceiling to be repaired with grout.
- .2 Rake out existing structural crack as required, and prepare existing masonry surfaces as per manufacturers recommendations.
- .3 Mix and install grout as per manufacturers recommendations.
- .4 Clean any excess or leaking grout immediately as per manufacturers recommendations.

3.5 MASONRY REPAIRS: SALLY PORT ALCOVE BRICK WALLS AND ROOF STRUCTURE

- .1 Inspect existing brickwork with Departmental Representative or Designate to determine the extent of required masonry repairs to the Sally Port Alcove brick walls, ceiling and exposed brick roof structure.
- .2 Extent of existing masonry deterioration and deficiencies to be reviewed by all parties and associated masonry repair scope of work to be defined and costed as a cash allowance item.
- .3 Extent of masonry repair work is anticipated to include brick repairs/replacement, installation of "Cintec" anchors or approved alternate, backpointing and repointing of exposed masonry joints.

3.6 LOCALIZED MASONRY REPAIRS: POWDER MAGAZINE OUTER BRICK VAULTS

- .1 Inspect existing brickwork with Departmental Representative or Designate to determine the extent of required masonry repairs to the exposed Powder Magazine outer brick vaults.
- .2 Extent of existing masonry deterioration and deficiencies to be reviewed by all parties and required masonry repair scope of work confirmed.
- .3 Extent of masonry repair work includes supply and installation of structural steel support frames and dowels as detailed, brick removals, brick installation, brick repairs and replacement, backpointing and repointing of exposed masonry joints.

3.7 GENERAL MASONRY REPAIRS: MAIN ENTRANCE GATE BRICK COPINGS, POWDER MAGAZINE BRICK SURFACES/COPINGS, SALLY PORT BRICK SURFACES/COPINGS

- .1 Inspect existing brickwork with Departmental Representative or Designate to determine the extent of required masonry repairs at each structure.
- .2 Extent of existing masonry deterioration and deficiencies to be reviewed by all parties and required masonry repair scope of work to be defined and costed as a cash allowance item.
- .3 Extent of masonry repair work is anticipated to include brick removals, brick repairs and replacement, backpointing and repointing of exposed masonry joints.

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 04 05 00 Common Work Results for Masonry
- .2 Clean brick surfaces after repairs have been completed and mortar has set.
- .3 Clean brick surfaces of mortar residue resulting from work performed without damaging bricks or joints.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 04 05 00 Common Work Results for Masonry.

3.9 PROTECTION OF WORK

- .1 Provide protection as required in accordance with Section 04 05 00 Common Work Results for Masonry and manufacturers recommendations.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 03 07 Historic - Masonry Repointing
- .2 Section 04 03 08 Historic - Mortaring
- .3 Section 04 03 31 Historic - Repairing Brickwork
- .4 Section 04 03 42 Historic - Reconstruction Stone and Brick Masonry
- .5 Section 04 03 43 Historic - Dismantling Stone and Brick Masonry
- .6 Section 04 05 00 Common Work Results for Masonry
- .7 Section 07 92 10 Joint Sealing
- .8 Section 08 03 12 Wood and Metal Gates/Posts

1.2 SUMMARY OF WORK

- .1 Summary of work in this Section includes but is not limited to repairing stone at the following locations:
 - .1 Structural Crack Repairs (sealants): Main Entrance Gate stone walls and copings.
 - .2 General Masonry Repairs: Main Entrance Gate stone walls and copings.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Structural crack repairs (sealant) will be paid on a unit price basis. Measurement will be based on the length of the structural crack in lin. m.
- .2 General masonry repairs at the Main Entrance Gate stone walls and copings will be paid from the masonry repair cash allowance in the amount of \$50,000.00.

1.4 REFERENCES

- .1 Reference Standards:
 - .1 ASTM International
 - .1 ASTM C144-11, Standard Specification for Aggregate for Masonry Mortar.
 - .2 ASTM A276-13a, Standard Specification for Stainless Steel Bars and Shapes.
 - .2 CSA Group
 - .1 CAN/CSA-A179-04(R2014), Mortar and Grout for Unit Masonry.
 - .2 CSA-A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .3 Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with 04 05 00 Common Work Results for Masonry.
- .2 Product Data:
- .3 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets, including product characteristics, performance criteria, physical size, finish and limitations.
- .4 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer with experience in rehabilitating historic structures registered or licensed in Province of Ontario, Canada.
- .5 Samples:
 - .1 Submit samples of materials, anchors, etc. as required to complete the work.
- .6 Certificates:
 - .1 Provide certificates signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements.
- .7 Test Reports:
 - .1 Provide certified test reports showing compliance with specified performance characteristics and physical properties.

1.6 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 04 05 00 Common Work Results for Masonry.
- .2 Operation and Maintenance Data: submit operation and maintenance data for masonry work for incorporation into manual.
- .3 Project Record Documents: Refer to Item 3.1 Documentation of Stone Repair Work.

1.7 QUALITY ASSURANCE

- .1 Masonry Contractor, Project Supervisor, Masons: Refer to Section 04 05 00 - Common Work Results for Masonry.
- .2 Mock-ups:
 - .1 Prepare mock-ups in accordance with Section 04 05 00 Common Work Results for Masonry.
 - .2 Prepare mock-ups to demonstrate stone repair procedures as required.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 04 05 00 Common Work Results for Masonry and as per approved methods and procedures.

1.9 SITE CONDITIONS

- .1 Ambient conditions:

- .1 Maintain temperature of mortar materials and masonry in accordance with Section 04 03 07 - Historic - Masonry Repointing.
- .2 Cold weather requirements: meet recommended practices for cold weather masonry construction.
- .3 Hot weather requirement:
 - .1 Shade stones from direct sunlight with temporary cover.

Part 2 Products

2.1 MATERIALS

- .1 Additional Stone: to be supplied by Departmental Representative or Designate, if required.
- .2 Mortar: in accordance with Section 04 03 08 - Historic - Mortaring.
- .3 Sealants and Backer Rod: in accordance with Section 07 92 10 Joint Sealing.
- .4 Accessories/Anchors: as required

2.2 MORTAR MIXES

- .1 Mortar: in accordance with CAN/CSA-A179 and Section 04 03 08 - Historic - Mortaring.

2.3 FILLING MIXES

- .1 Proprietary premixed stone patching material - Jahn Restoration Mortar or approved alternate, formulated to closely match colour, texture, physical properties of stone to be patched.

2.4 ADHESIVE MIXES

- .1 Proprietary stone adhesive formulated for repair of broken stone units. Mix proportions as recommended by manufacturer to obtain specified results.

Part 3 Execution

3.1 DOCUMENTATION OF STONE REPAIR WORK

- .1 Prepare a detailed report, as outlined in Section 040500 Item 1.7, documenting the repairing of the historic stone elements.
- .2 Include in report the approved scope of repair work and associated repair methods/procedures. Advise the Departmental Representative or Designate of any proposed changes to specified procedures for approval before commencement of work.

3.2 EXAMINATION

- .1 Verification of Conditions: verify masonry, staging and storage areas and notify Departmental Representative or Designate in writing of conditions detrimental to acceptable and timely completion of Work.

- .1 Visually inspect substrate in presence of Departmental Representative or Designate.
- .2 Inform in writing Departmental Representative or Designate areas of deteriorated masonry not previously identified.
- .2 Obtain Departmental Representative or Designate's approval and instructions for repair and replacement of masonry units before proceeding with repair work.
- .3 If evidence of hazardous materials is discovered, stop work in that area and report to Departmental Representative or Designate immediately.

3.3 STRUCTURAL CRACK REPAIRS WITH SEALANT

- .1 Inspect existing stonework with Departmental Representative or Designate to determine locations and extent of existing structural cracks to be repaired with sealant.
- .2 Rake out existing structural crack to required depth as detailed.
- .3 Remove excess mortar adhered on surface of adjacent stones, and clean crack of loose debris and dust. Refer to Section 07 92 10 Joint Sealing for surface preparation procedures.
- .4 Install backer rod and sealant in accordance with Section 07 92 10 Joint Sealing, and as per manufacturers recommendations. Face of sealant to be set back from face the stonework as detailed. Mask adjacent stone surfaces to prevent excess sealant adhering to these surfaces.
- .5 Once sealant has set, remove masking material and any excess caulking on adjacent brick surfaces.

3.4 GENERAL MASONRY REPAIRS: MAIN ENTRANCE GATE STONE WALLS/COPINGS

- .1 Inspect existing stonework with Departmental Representative or Designate to determine the extent of required masonry repair work.
- .2 Extent of existing masonry deterioration and deficiencies to be reviewed by all parties and required masonry repair scope of work to be defined and costed as a cash allowance item.
- .3 Extent of masonry repair work is anticipated to include stone removals, repairs and replacement, backpointing and repointing of exposed masonry joints.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 04 05 00 Common Work Results for Masonry
- .2 Clean stonework surfaces after repairs have been completed and mortar has set.
- .3 Clean stone surfaces of mortar residue resulting from work performed without damaging bricks or joints.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 04 05 00 Common Work Results for Masonry.

3.6 PROTECTION OF WORK

- .1 Provide protection as required in accordance with Section 04 05 00 Common Work Results for Masonry and manufacturers recommendations.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 00 Cast in Place Concrete
- .2 Section 04 03 07 Historic - Masonry Repointing
- .3 Section 04 03 08 Historic - Mortaring
- .4 Section 04 03 31 Historic - Repairing Brickwork
- .5 Section 04 03 41 Historic - Repairing Stone
- .6 Section 04 03 43 Historic - Dismantling Stone and Brick Masonry
- .7 Section 04 05 00 Common Work Results for Masonry

1.2 SUMMARY OF WORK

- .1 Summary of work in this Section includes but is not limited to reconstructing stone and brick at the following locations:
 - .1 Stonework: Main Entrance Gate end portion of north interior wing wall.
 - .2 Brick coping: Main Entrance Gate end portion of north interior wing wall.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Reconstructing of the stone masonry wall will be paid for on a unit price basis. Measurement will be based on the volume of stone following reconstruction in m³.
- .2 Reconstructing of the brick coping will be paid for on a unit price basis. Measurement will be based on the surface area of brick coping following reconstruction in m².

1.4 REFERENCES

- .1 Reference Standards:
 - .1 ASTM International
 - .1 ASTM C97/C97M-09, Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.
 - .2 ASTM C170/C170M-09, Standard Test Method for Compressive Strength of Dimension Stone.
 - .3 ASTM C568/C568M-10, Standard Specification for Limestone Dimension Stone.
 - .2 CSA Group
 - .1 CAN/CSA-A179-04(R2014), Mortar and Grout for Unit Masonry.
 - .2 CSA A370-14, Connectors for Masonry.
 - .3 CAN/CSA-A371-04(R2014), Masonry Construction for Buildings.
 - .3 "Code of Practice for Stone Masonry" published by the British Standards Institute, London, BS 5390, 1976

- .4 Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Refer to Section 04 05 00 Common Work Results for Masonry.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 04 05 00 Common Work Results for Masonry.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for masonry materials and reinforcing and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer with experience in rehabilitating historic structures registered or licensed in Province of Ontario, Canada.

1.7 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with 04 05 00 Common Work Results for Masonry.
- .2 Operation and Maintenance Data: submit operation and maintenance data for masonry work for incorporation into manual.
- .3 Project Record Documents: Refer to Item 3.1 Documentation of Stone and Brick Reconstruction Work.

1.8 QUALITY ASSURANCE

- .1 Qualifications of Masonry Contractor, Project Supervisor, Masons: Refer to Section 04 05 00 - Common Work Results for Masonry.
- .2 Mock-ups: Construct mock-up in accordance with Section 04 05 00 - Common Work Results for Masonry
 - .1 Construct mock-up 1 m² minimum of stonework and brick coping to be reconstructed using specified materials and methods.
 - .2 Use existing stonework and bricks when constructing job mock-up.
 - .3 Retain approved mock-up as part of finished work.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 04 05 00 - Common Work Results for Masonry and approved methods and procedures.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Prevent damage and soiling of finishes when transporting, storing and handling.
- .4 Keep materials dry. Protect against weather, freezing and any source of contamination.

- .5 Do not place stones and bricks directly on the ground.

1.10 SITE CONDITIONS

- .1 Ambient conditions: in accordance with Section 04 05 00 - Common Work Results for Masonry
 - .1 Maintain ambient temperature of minimum 10 degrees C after repointing masonry for:
 - .1 Minimum 7 days in summer.
 - .2 Minimum 28 days in cold weather conditions using dry heated enclosures.

Part 2 Products

2.1 MATERIALS

- .1 Existing stone:
 - .1 Existing stone dismantled, cleaned and stored. Refer to Section 04 03 43 - Historic - Dismantling Stone & Brick Masonry. Additional stone to be supplied by Departmental Representative or Designate, if required.
- .2 Existing brick:
 - .1 Existing brick dismantled, cleaned and stored. Refer to Section 04 03 43 - Historic - Dismantling Stone & Brick Masonry. Additional brick to be supplied by Departmental Representative or Designate, if required.
- .3 Reinforcement:
 - .1 Reinforcement in accordance with Structural Drawings and approved shop drawings.
- .4 Connectors:
 - .1 Connectors in accordance with Structural Drawings and approved shop drawings.
- .5 Mortar Mixes:
 - .1 Mortar and mortar mixes in accordance with Section 04 03 08 - Historic - Mortaring.
- .6 Cleaning Compounds:
 - .1 Cleaning compounds compatible with stone masonry and in accordance with approved methods and procedures.

2.2 EXISTING STONE & BRICK

- .1 Use hard, sound, and clean existing stone and brick salvaged on site, as approved by Departmental Representative or Designate.
- .2 If there are insufficient quantities of dismantled stone and brick, use additional stone and brick supplied by Departmental Representative or Designate.

2.3 MORTAR

- .1 Mortar: in accordance with Section 04 03 08 - Historic - Mortaring.
- .2 Obtain mortar ingredients of uniform quality and from a single manufacturer, source or producer.

2.4 ACCESSORIES

- .1 Obtain each type of stone necessary, sealant and other materials from a single manufacturer.
- .2 Anchors, cramps, dowels: as indicated on Structural drawings and approved shop drawings.

Part 3 Execution

3.1 DOCUMENTATION OF STONE AND BRICK RECONSTRUCTION WORK

- .1 Prepare a detailed report, as outlined in Section 04 05 00 Item 1.7, documenting the stone and brick reconstruction work.
- .2 Include in report the approved scope of stone and brick reconstruction work and associated methods/ procedures. Advise the Departmental Representative or Designate of any proposed changes to specified procedures for approval before commencement of work.

3.2 EXAMINATION

- .1 Verification of Conditions: verify masonry, staging and storage areas and notify Departmental Representative or Designate in writing of conditions detrimental to acceptable and timely completion of Work.
 - .1 Visually inspect substrate in presence of Departmental Representative or Designate.
 - .2 Inform Departmental Representative or Designate in writing of areas of deteriorated masonry not previously identified.
 - .3 Obtain Departmental Representative or Designate's approval and instructions for repair and replacement of masonry units before proceeding with repair work.
 - .4 If evidence of hazardous materials is discovered, stop work immediately and report to Departmental Representative or Designate.

3.3 PREPARATION

- .1 Move and lift stone units using means to prevent damage as per approved moving methods and procedures. Submit stone units dropped or impacted to Departmental Representative or Designate for inspection and approval. Do not make holes or indentations on face or top side of stone.

3.4 STONEMASONRY RECONSTRUCTION

- .1 Co-ordinate stone layout, bond pattern, coursing height and joint width to match existing stonework prior to dismantling, and as per approved layout drawings.

- .2 Install anchors, dowels and cramps as per approved shop drawings.
- .3 Apply bedding mortar.
 - .1 Lay stones on full beds of mortar.
 - .2 Lay heavy stones and projecting stones after mortar in courses below has hardened sufficiently to support weight.
 - .3 Prop and anchor projecting stones until wall above is set.
 - .4 Set large stones on water soaked softwood wedges to support stone in proper alignment until mortar has set. Remove wedges when dry, do not break off.
 - .5 Set stones to match alignment of adjacent stones, plumb, true, level, as shown on drawings in full bed of mortar with vertical joints buttered and placed full except where otherwise specified.
 - .6 Fill anchor, dowel and lifting holes and voids left by removed edges.
- .4 Rake bedding mortar back to a minimum depth of 25 mm and make ready for pointing with pointing mortar in separate operation.
 - .1 Provide minimum 3-day damp cure to bedding mortar prior to pointing.
 - .2 Remove mortar dropping from face of stone before mortar is set. Sponge stone free of mortar along joints as work progresses.

3.5 BRICK COPING RECONSTRUCTION

- .1 Co-ordinate brick layout, bond pattern, coursing height and joint width to match existing brickwork prior to dismantling, and as per approved layout drawings.
- .2 Apply bedding mortar.
 - .1 Lay bricks on full beds of mortar.
 - .2 Set bricks to match alignment of adjacent bricks, plumb, true, level, as shown on drawings in full bed of mortar with vertical joints buttered and placed full except where otherwise specified.
- .3 Rake bedding mortar back to a minimum depth of 25 mm and make ready for pointing with pointing mortar in separate operation.
 - .1 Provide minimum 3-day damp cure to bedding mortar prior to pointing.
 - .2 Remove mortar dropping from face of brick before mortar is set. Sponge brick free of mortar along joints as work progresses.

3.6 FILLING JOINTS/POINTING

- .1 Fill joints and point: in accordance with Section 04 03 07 - Historic - Masonry Repointing.
- .2 Joint preparation:
 - .1 Rake out joints to 25 mm depth before bedding mortar sets.
 - .2 Leave stone surfaces clean.
 - .3 Ensure back of joint is vertical, sound, uniform and ready for pointing.

3.7 REPOINTING

- .1 Do pointing work in accordance with Section 04 03 07 - Historic - Masonry Repointing.

3.8 PROTECTION OF WORK

- .1 Cover completed and partially completed work not enclosed or sheltered at end of each work day.
 - .1 Extend membranes 0.5 m beyond surface area of work.
 - .1 Prevent finished work from drying out too rapidly.
 - .2 Cover with waterproof tarps to prevent weather from eroding recently repointed material.
 - .1 Maintain tarps in place for minimum of 4 weeks after repointing.
 - .2 Ensure that bottoms of tarps permit airflow to reach mortar in joints.
 - .3 Anchor coverings securely in position.
 - .4 Damp cure:
 - .1 Provide damp cure for pointing mortars.
 - .1 Install and maintain wetted burlap protection during the curing process:
 - .1 Minimum 3 days.
 - .2 Wet mist burlap only - ensure no direct spray reaches surface of curing mortar.
 - .3 Shade areas of work from direct sunlight and maintain constant dampness of burlap.
 - .2
 - .3
 - .5 Protect from drying winds. Pay particular attention at corners.
 - .6 Inspect tarps daily for duration of curing.

3.9 CLEANING

- .1 Confirm acceptance of mock-up cleaning operations with Departmental Representative or Designate before starting cleaning work.
- .2 Clean stone work surfaces after repairs have been completed and mortar has set.
- .3 Clean stone surfaces of adhesive or mortar residue resulting from work performed without damaging stone or joints.
- .4 Progress Cleaning: clean in accordance with Section 04 05 00 - Common Work Results for Masonry and approved methods and procedures.
- .5 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .6 Protect plants, grass, vegetation and soil from accumulation of water used for cleaning.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 03 07 Historic - Masonry Repointing
- .2 Section 04 03 08 Historic - Mortaring
- .3 Section 04 03 31 Historic - Repairing Brickwork
- .4 Section 04 03 41 Historic - Repairing Stone
- .5 Section 04 03 42 Historic - Reconstructing Stone & Brick Masonry
- .6 Section 04 05 00 Common Work Results for Masonry

1.2 SUMMARY OF WORK

- .1 Summary of work in this Section includes but is not limited to dismantling existing masonry at the following locations:
 - .1 Stonework: Main Entrance Gate end portion of north interior wing wall.
 - .2 Brick coping: Main Entrance Gate end portion of north interior wing wall.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Dismantling of the existing stone masonry wall will be paid for on a unit price basis. Measurement will be based on the volume of stone prior to dismantling in m³.
- .2 Dismantling of the existing brick coping will be paid for on a unit price basis. Measurement will be based on the surface area of brick coping prior to dismantling in m².

1.4 REFERENCES

- .1 Reference Standards:
 - .1 "Code of Practice for Stone Masonry" published by the British Standards Institute, London, BS 5390, 1976
 - .2 Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Refer to Section 04 05 00 Common Work Results for Masonry.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 04 05 00 Common Work Results for Masonry.
- .2 Submit method of reference numbering for dismantling masonry prior to start of masonry removal to Departmental Representative or Designate for approval.
- .3 Shop Drawings:

- .1 Submit drawings stamped and signed by professional engineer with experience in rehabilitating historic structures registered or licensed in Province of Ontario, Canada.
- .2 Submit drawings for shoring, bracing, temporary framing work.
- .4 Site Quality Control Submittals:
 - .1 Provide up-to-date copies of masonry location recording system chart or card index, as well as chronological information concerning each numbered unit (individual cards of units), when requested.

1.7 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 04 05 00 Common Work Results for Masonry.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.
- .3 Project Record Documents: Refer to Item 3.1 Documentation of Stone and Brick Dismantling Work.

1.8 QUALITY ASSURANCE

- .1 Masonry Contractor, Project Supervisor, Masons: Refer to Section 04 05 00 - Common Work Results for Masonry.
- .2 Mock-ups:
 - .1 Construct mock-up in accordance with Section 04 05 00 Common Work Results for Masonry.
 - .2 Perform mock-up 1 m x 1 m to demonstrate dismantling procedures.
 - .3 Notify Departmental Representative or Designate minimum of 48 hours prior to construction of mock-up.
 - .4 Perform mock-up under supervision of Departmental Representative or Designate to demonstrate a full understanding of specified procedures and techniques is achieved before work commences.
 - .5 Perform mock-up where directed by Departmental Representative or Designate.
 - .6 Work not to proceed prior to approval of mock-up. Allow 48 hours for inspection of mock-up by Departmental Representative or Designate before proceeding with masonry dismantling work.
 - .7 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 04 05 00 Common Work Results for Masonry and with manufacturer's written instructions.
- .2 Protect and store stones and bricks to facilitate their resetting.
 - .1 Store dismantled masonry units on wood platforms or pallets, protected from exposure to water, elements, and potential mechanical damage.

- .2 Submit storage and identification system to Departmental Representative or Designate for review and approval.

1.10 AMBIENT CONDITIONS

- .1 Loosen wet masonry only when temperature is above 5 degrees C.
- .2 In temperature 5 degrees C and below:
 - .1 Keep stones dry.
 - .2 Protect wet stones from freezing.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 DOCUMENTATION OF STONE AND BRICK DISMANTLING WORK

- .1 Prepare a detailed report, as outlined in Section 04 05 00 Item 1.8, documenting the dismantling of the stone and brick elements.
- .2 Include in report the approved scope of dismantling work and associated methods/procedures. Advise the Departmental Representative or Designate of any proposed changes to specified procedures for approval before commencement of work.

3.2 EXAMINATION

- .1 Examine masonry, staging and storage areas and notify Departmental Representative or Designate in writing of conditions detrimental to acceptable and timely completion of Work.
 - .1 Visually inspect substrate in presence of Departmental Representative or Designate.
 - .2 Inform Departmental Representative or Designate of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed Departmental Representative or Designate.
 - .4 Report in writing, to Departmental Representative or Designate areas of deteriorated stone or brick not identified in the documents. Obtain Departmental Representative or Designate approval and instructions before proceeding.
 - .5 Stop work in that area and report to Departmental Representative or Designate immediately evidence of hazardous materials.

3.3 REMOVAL

- .1 Remove stones and bricks identified for removal on the drawings using low impact removal methods, as per approved dismantling methods and procedures.
- .2 Obtain Departmental Representative or Designate's approval for alternative methodology and tools to be employed before commencing the work.
- .3 Clean stone and brick surfaces of mortar, dust and debris.

3.4 PROTECTION

- .1 Prevent damage to landscaping, natural features, bench marks and other elements which are to remain.
- .2 Make good damage incurred.
- .3 Protect surrounding components from damage during work.
- .4 Make good damage to historic fabric.
- .5 Obtain Departmental Representative or Designate's approval for repair methodology.

3.5 SPECIAL TECHNIQUES

- .1 Number and identify stones, bricks and other elements on a photographic record.
- .2 Before dismantling stones and bricks, indicate dimensions of each numbered stone and brick in removal area on drawings and charts.
- .3 Temporary Marking and Recording:
 - .1 Mark stone and brick elements, on face, before removal using marking product which can be completely erased when required without damaging masonry unit:
 - .2 Tracking relocated stones and other masonry units:
 - .1 Use numbering, marking, and positioning system as per approved procedures.
 - .3 Mark/Identify:
 - .1 Stones and brick elements or components to show identity and position.
 - .2 Wood platforms or other equipment used to transport and store stones and bricks.
 - .3 Work and storage areas.
 - .4 Location from which stones and bricks are removed on drawings and charts.
 - .4 Ensure that temporary marking will remain in use resistant to weather, handling and cleaning.
 - .5 Remove markings and adhesive without damaging units

3.6 TEMPORARY SHORING

- .1 Construct shoring and bracing in accordance with Structural drawings and approved shop drawings.
- .2 Construct shoring and cradling, and other temporary framing work needed to support structure, or parts of it, during removal operations and in anticipation of resetting.

3.7 METHOD FOR LOOSENING STONES AND BRICKS

- .1 Use approved methods to loosen stones and bricks which will cause no damage either to stones, bricks or other architectural elements.
- .2 Prior to removing a stone or brick, rout out existing mortar joints around the stone or brick.
- .3 Remove mortar from top, bottom and side joints, with the back surface of the joint square and of an even depth.
- .4 Use only hand held tools with mallet or pneumatic driven percussion at low stroke speed.
- .5 Obtain Departmental Representative or Designate's approval for use of power tools before commencing work.
- .6 Ensure that adjacent stones are not used as lever points in removal of stone.
- .7 Loosen wet masonry when temperature is above freezing.

3.8 DISMANTLING AND MOVING STONES AND BRICKS

- .1 Avoid damaging stones and bricks when removing mortar and freeing up.
- .2 Remove excess mortar using hand tools.
- .3 Use wood wedges where required to remove or dislocate stones and bricks.
- .4 Protect stone from damage when hoisting and lifting from position.
 - .1 Use separators or wood shims to isolate units from hoisting belts.
- .5 Take all precautions to ensure existing stones and bricks are not damaged during dismantling. If damage occurs, report to Departmental Representative or Designate and update recording drawings to reflect this information.

3.9 HANDLING

- .1 Place detached stones and bricks on wood surfaces during handling. Prevent contact with metal.
- .2 When stones and bricks are removed, place directly on wooden platform used for transport or storage.
- .3 Transport and keep stones and bricks on wooden platforms.
- .4 Ensure that edges of stones and bricks do not come into contact with hard objects.

3.10 TEMPORARY STORAGE STAGING AREA

- .1 Place stones and bricks in designated area of site for cleaning, detailed inspection and for final marking, before storage.
- .2 Make stones accessible and retrievable when required.

3.11 CLEANING

- .1 Clean stones in accordance with Section 04 05 00 Common Work Results for Masonry and approved cleaning procedures.
- .2 Do cleaning operations at above freezing temperature.

- .1 After cleaning, protect wet stones against freezing until dry.
- .3 Use chemical cleaning methods only with prior written approval of Departmental Representative or Designate.
- .4 Progress Cleaning: clean in accordance with Section 04 05 00 Common Work Results for Masonry.
- .5 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 04 05 00 Common Work Results for Masonry.

3.12 FINAL MARKING

- .1 Do final marking after cleaning, on surface that supports good adhesion and legibility and will not be visible after resetting.
- .2 Do marking in colour. Dimensions: legible from distance of [2] m.
- .3 Ensure that marking product used will not affect mortar to stone or brick adhesion when resetting.
- .4 Ensure marking product used will survive storage until resetting of stone or brick.

3.13 FINAL STORAGE

- .1 Store stones and bricks as per approved storage methods and procedures.
- .2 Lay out storage so that each stone and brick will have its numbered face visible, and be accessible or removable without having to move adjacent stones.
- .3 Show layout of stones and bricks to be stored on record drawing.
- .4 Store rubble stone in a wood box.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 00 Cast in Place Concrete.
- .2 Section 04 03 07 Historic - Masonry Repointing
- .3 Section 04 03 08 Historic - Mortaring
- .4 Section 04 03 31 Historic - Repairing Brickwork
- .5 Section 04 03 41 Historic - Repairing Stone
- .6 Section 04 03 42 Historic - Reconstructing Stone and Brick Masonry
- .7 Section 04 03 43 Historic - Dismantling Stone and Brick Masonry
- .8 Section 04 21 13 Brick Masonry
- .9 Section 04 43 23 Stone Masonry
- .10 Section 05 50 00 Structural Steel Fabrications
- .11 Section 08 03 12 Wood Gates/Posts
- .12 Section 08 11 02 Metal Gates/Grilles

1.2 REFERENCES

- .1 CSA Group
 - .1 CAN/CSA-A179-04(R2009), Mortar and Grout for Unit Masonry.
 - .2 CAN/CSA-A371-04(R2009), Masonry Construction for Buildings.
- .2 International Masonry Industry All-Weather Council (IMIAC)
 - .1 Recommended Practices and Guide Specification for Cold Weather Masonry Construction.
- .3 Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation meetings: comply with Section 01 31 19 - Project Meetings. Conduct pre-installation meeting one week prior to commencing work of this Section and on-site installations to:
 - .1 Verify project requirements, including mock-up requirements.
 - .2 Verify substrate conditions.
 - .3 Co-ordinate products, installation methods and techniques.
 - .4 Sequence work of related sections.
 - .5 Co-ordinate with other building subtrades.
 - .6 Review manufacturer's installation instructions.

- .7 Review masonry cutting operations, methods and tools and determine worker safety and protection from dust during cutting operations.
- .8 Review warranty requirements.
- .2 Sequencing: sequence with other work in accordance with Section 01 32 00 - Construction Progress Documentation.
- .3 Scheduling: schedule with other work in accordance with Section 01 32 00 - Construction Progress Documentation.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets as identified in related masonry specification sections, including product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Submit shop drawings as identified in related masonry specification sections.
- .4 Samples:
 - .1 Provide samples as identified in related masonry specification sections.
- .5 Certificates: submit manufacturer's product certificates certifying materials comply with specified requirements.
- .6 Test and Evaluation Reports:
 - .1 Submit certified test reports as identified in related masonry specification sections.
 - .2 Test reports to certify compliance of masonry units and mortar ingredients with specified performance characteristics and physical properties.
 - .3 Submit data for masonry units, in addition to requirements set out in referenced CSA and ASTM Standards, indicating initial rates of absorption.
- .7 Installer Instructions: provide manufacturer's installation instructions, including storage, handling, safety and cleaning.
- .8 Manufacturer's Reports: provide written reports prepared by manufacturer's on-site personnel to include:
 - .1 Verification of compliance of work with Contract.
 - .2 Site visit reports providing detailed review of installation of work, and installed work.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit manufacturer's instructions for care, cleaning and maintenance of masonry materials for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Project Record Documents. Refer to Item 1.7 Project Record Documents and related masonry sections.

1.6 QUALITY ASSURANCE

- .1 Masonry Contractor:
 - .1 Use single Masonry Contractor for masonry work.
 - .2 Provide documentation stating that the Masonry Contractor is of recognized standing in the industry, with a proven record of satisfactory experience over five years. Obtain Departmental Representative or Designate's approval of this standing.
 - .3 Masonry Contractor to have experience in historic stone and brick masonry repair and conservation work on projects of similar size and complexity to Work of this Contract.
 - .4 Masonry Contractor to have good level of understanding of structural behaviour of masonry walls when masonry work involves replacing or repairing stones and brick which are part of structural masonry work.
 - .5 Masonry Contractor will be responsible for all aspects of masonry work for duration of project.
- .2 Project Supervisor:
 - .1 Masonry Contractor to employ a Project Supervisor with documented successful experience of historic masonry repair and conservation work of required for this Contract. Project Supervisor to be present on site full-time for duration of Work.
 - .2 Provide documentation stating Project Supervisor is of recognized standing in the industry, with a proven record of satisfactory experience over five years. Obtain Departmental Representative or Designate's approval of this standing.
 - .3 Demonstrate competence levels to satisfaction of Departmental Representative or Designate before undertaking Work.
- .3 Masons:
 - .1 Masons to have certificate of qualification with experience in historic stone and brick masonry repair and conservation work required for this Contract.
 - .2 Masons to have proof of license certification for proprietary restoration mortars.
- .4 Grouting: grouting activities should be undertaken by workers experienced in manipulation and grouting methods.
- .5 Departmental Representative or designate reserves the right to reject Masonry Contractor or proposed Project Supervisor, mason or apprentice if, documentation provided does not demonstrate level of experience or skill required for successful completion of Work of this Contract.

- .6 Obtain written approval from Departmental Representative or Designate for changes to qualified personnel.
- .7 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct mock-up as identified in related masonry specification sections.
 - .3 Mock-up used:
 - .1 To judge quality of work, substrate preparation, operation of equipment and material application.
 - .2 For testing to determine compliance with performance requirements. Perform following tests.
 - .1 For clay units, in addition to requirements set out in referenced CSA and ASTM Standards include data indicating initial rate of absorption.
 - .4 Construct mock-up where directed by Departmental Representative or Designate.
 - .5 Allow 48 hours for inspection of mock-up by Departmental Representative or Designate before proceeding with work.
 - .6 When accepted by Departmental Representative or Designate, mock-up will demonstrate minimum standard for this work. Mock-ups may remain as part of finished work.
 - .7 Start work only upon receipt of written approval of mock-up by Departmental Representative or Designate.

1.7 PROJECT RECORD DOCUMENTS

- .1 Provide written documentation of all masonry repair, fabrication and installation work, including all procedures and materials used during the work.
- .2 Prior to the commencement of the masonry work, take a reasonable number of digital photographs of the following:
 - .1 Overall condition of the existing brick and stone masonry.
 - .2 Specific issues of concern and/or anything exceptional which should be recorded.
- .3 During the stone fabrication work, take digital photographs which illustrate the fabrication process.
- .4 During the brick and stone repair, installation and cleaning work, take digital photographs which illustrate each type of repair/installation procedure and result.
- .5 Submit a final report containing the information specified herein:
 - .1 A record of all as found conditions, approved scope of fabrication, repair, installation and cleaning work, and a record of work undertaken and treatments used.
 - .2 Submit 1 electronic copy (CD) of the report c/w colour images.
 - .3 Submit 1 electronic copy (CD) of all digital photographic images c/w titles and date taken.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect material from nicks, scratches, and blemishes.
 - .3 Keep materials dry until use except where wetting of bricks is specified.
 - .4 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.
 - .5 Replace defective or damaged materials with new.

1.9 SITE CONDITIONS

- .1 Ambient Conditions: assemble and erect components when temperatures are above [4] degrees C.
- .2 Weather Requirements: to CAN/CSA-A371 and to IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
- .3 Cold weather requirements:
 - .1 To CAN/CSA-A371 with following requirements.
 - .1 Maintain temperature of mortar between 5 degrees C and 50 degrees C until batch is used or becomes stable.
 - .2 Maintain ambient temperature of masonry work and it's constituent materials between 5 degrees C and 50 degrees C and protect site from windchill.
 - .3 Maintain temperature of masonry above 0 degrees C for minimum of 28 days, after mortar is installed.
 - .4 Preheat unheated wall sections in enclosure for minimum 72 hours above 10 degrees C, before applying mortar.
 - .2 Hot weather requirements:
 - .1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.
 - .2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.
 - .3 Spray mortar surface at intervals and keep moist for maximum of 3 days after installation.

Part 2 Products

2.1 MATERIALS

- .1 Masonry materials are specified elsewhere in related Sections.

2.2 DOCUMENTATION OF FABRICATION WORK

- .1 Prepare a detailed report, as outlined in Item 1.7, documenting the stone fabrication work.
- .2 Include in report the approved scope of fabrication work and associated methodologies/procedures. Advise the Departmental Representative or Designate of any proposed changes to specified procedures for approval before commencement of work.

Part 3 Execution

3.1 INSTALLERS

- .1 Experienced and qualified masons to carry out erection, assembly and installation of masonry work, as specified in Item 1.6 Quality Assurance.

3.2 DOCUMENTATION OF REPAIR/INSTALLATION WORK

- .1 Prepare a detailed report, as outlined in Item 1.7, documenting the masonry repair, installation and cleaning work.
- .2 Include in report the approved scope of repair/installation work and associated methodologies/procedures. Advise the Departmental Representative or Designate of any proposed changes to specified procedures for approval before commencement of work.

3.3 EXAMINATION

- .1 Examine conditions, substrates and work to receive work of this Section.
 - .1 Inform Departmental Representative or Designate of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation after unacceptable conditions have been remedied and after receipt of written approval from Departmental Representative or Designate.
- .2 Verification of Conditions:
 - .1 Verify that:
 - .1 Substrate conditions which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of brick and stone.
 - .2 Field conditions are acceptable and are ready to receive work.
 - .3 Built-in items are in proper location, and ready for roughing into masonry work.
 - .2 Commencing installation means acceptance of existing substrates.

3.4 PREPARATION

- .1 Surface Preparation: prepare surface in accordance with manufacturer's written recommendations and co-ordinate with work in related Masonry spec sections.
- .2 Establish and protect lines, levels, and coursing.
- .3 Protect adjacent materials from damage and disfiguration.

3.5 INSTALLATION

- .1 Do masonry work in accordance with CAN/CSA-A371 except where specified otherwise.
- .2 Build masonry plumb, level, and true to line, with vertical joints in alignment, respecting construction tolerances permitted by CAN/CSA-A371.
- .3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.6 SITE TOLERANCES

- .1 Tolerances in notes to CAN/CSA-A371 apply.

3.7 FIELD QUALITY CONTROL

- .1 Site Tests, Inspection:
 - .1 Perform field inspection and testing in accordance with Section 01 45 00 - Quality Control.
 - .2 Notify inspection agency minimum of 48 hours in advance of requirement for tests.

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.

3.9 PROTECTION

- .1 Temporary Bracing:
 - .1 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place, as per approved shop drawings.
 - .2 Brace masonry walls as necessary to resist wind pressure and lateral forces during construction.
- .2 Moisture Protection:
 - .1 Keep masonry dry using waterproof, non staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until completed and protected by flashing or other permanent construction.
 - .2 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.
 - .3 Air Temperature Protection: protect completed masonry as required.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 03 07 Historic - Masonry Repointing
- .2 Section 04 03 08 Historic - Mortaring
- .3 Section 04 03 31 Historic - Repairing Brickwork
- .4 Section 04 05 00 Common Work Results for Masonry
- .5 Section 04 43 23 Stone Masonry
- .6 Section 08 11 02 Metal Gates/Grilles

1.2 SUMMARY OF WORK

- .1 Summary of work in this Section includes but is not limited to the following new brick masonry elements:
 - .1 Powder Magazines brick parapet wall extensions and associated vent shafts, using the existing brick stockpiled in the North Powder Magazine. Additional brick, if required, to be supplied by Departmental Representative or Designate.
- .2 Summary of work in this Section also includes but is not limited to the following:
 - .1 Powder Magazines vent opening modifications (4 in total) using the existing brick stockpiled in the North Powder Magazine. Additional brick, if required, to be supplied by Departmental Representative or Designate.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Powder Magazines brick parapet wall extensions and associated vent shaft extensions, and vent opening modifications will not be measured but will be paid for as fixed price item.
 - .2 Supply and installation of anchor bolts, nuts and washers and bolt grouting will not be measured but considered incidental to work.

1.4 REFERENCES

- .1 ASTM International
 - .1 ASTM C216-13, Standard Specification for Facing Brick (Solid Masonry Units Made of Clay or Shale).
- .2 Brick Industry Association (BIA)
 - .1 Technical Note No. 20-2006, Cleaning Brick Work.
- .3 CSA Group
 - .1 CAN/CSA-A82-06(R2011), Fired Masonry Brick Made From Clay or Shale.
 - .2 CAN/CSA-A371-04(R2009), Masonry Construction for Buildings.

- .4 Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for brick masonry and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Indicate dimensions, construction and detailing of brick elements, and arrangements of anchoring and dowelling.
- .4 Samples:
 - .1 Submit 2 samples of brick anchors and dowels.

1.6 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 04 05 00 Common Work Results for Masonry.
- .2 Operation and Maintenance Data: submit operation and maintenance data for masonry work for incorporation into manual.
- .3 Project Record Documents: Refer to Item 3.1 Documentation of Installation Work.

1.7 QUALITY ASSURANCE

- .1 Masonry Contractor, Project Supervisor, Masons: Refer to Section 04 05 00 - Common Work Results for Masonry.
- .2 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .3 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Mock-ups: Construct mock-ups in accordance with requirements of Section 04 05 00 - Common Work Results for Masonry
 - .1 Construct mock-up of brick construction, including use of reinforcement, anchors, jointing, coursing, mortar and quality of work.
 - .2 Demonstrate final cleaning methods and procedures.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 04 05 00 - Common Work Results for Masonry and with manufacturer's written instructions.

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

1.9 SITE CONDITIONS

- .1 Ambient Conditions: in accordance with Section 04 05 00 - Common Work Results for Masonry and with manufacturer's written instructions.
- .2 Field Measurements:
 - .1 Make site measurements as necessary to verify existing dimensions.

Part 2 Products

2.1 MATERIALS

- .1 Existing brick:
 - .1 Existing clay brick stockpiled in the North Powder Magazine
- .2 Additional brick:
 - .1 To be supplied by Departmental Representative or Designate, if required.
- .3 Reinforcement:
 - .1 Reinforcement in accordance with Structural Drawings and approved shop drawings.
- .4 Connectors:
 - .1 Connectors in accordance with Structural Drawings and approved shop drawings.
- .5 Mortar Mixes:
 - .1 Mortar and mortar mixes in accordance with Section 04 03 08 - Historic - Mortaring.
- .6 Cleaning Compounds:
 - .1 Cleaning compounds compatible with brick masonry units and in accordance with manufacturer's written recommendations and instructions.

2.2 EXISTING BRICK

- .1 Use hard, sound, and clean existing bricks from stockpile in the North Powder Magazine, only with Departmental Representative or Designate's approval. Use only bricks without evidence of soluble salts, compatible in appearance and performance with existing.
- .2 Additional brick, if required for masonry repairs, will be supplied by Departmental Representative or Designate.

Part 3 Execution

3.1 DOCUMENTATION OF INSTALLATION WORK

- .1 Prepare a detailed report, as outlined in Section 04 05 00 Item 1.7, documenting the preparation and installation of the brick elements.
- .2 Include in report the approved scope of preparation, installation and cleaning work and associated methods/ procedures. Advise the Departmental Representative or Designate of any proposed changes to specified procedures for approval before commencement of work.

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously repaired/installed under other Sections or Contracts are acceptable for brick masonry installation.
 - .1 Visually inspect substrate in presence of Departmental Representative or Designate.
 - .2 Inform Departmental Representative or Designate of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative or Designate.

3.3 PREPARATION

- .1 Remove existing brick masonry stockpiled in North Powder Magazine, sort and store on pallets in designated storage area.
- .2 Verify quantities of existing brick, to ensure there are sufficient quantities to complete the work. Advise Departmental Representative or Designate in writing if additional brick is required.
- .3 Inspect and select the highest quality brick. Discard any existing brick that is damaged or not suitable for installation.
- .4 Remove any existing mortar or contaminants from existing brick to be installed and clean as required.

3.4 INSTALLATION

- .1 Construction to conform to CAN/CSA-A371.
- .2 Bond: as indicated.
- .3 Coursing height: as indicated.
- .4 Jointing: as indicated.
- .5 Mixing and blending: mix units within each pallet and with other pallets to ensure uniform blend of colour and texture.
- .6 Clean masonry as work progresses.
- .7 Reinforcement:

- .1 Install reinforcing in accordance with Structural Drawings and approved shop drawings.
- .8 Connectors:
 - .1 Install connectors in accordance with Structural Drawings and approved shop drawings.
- .9 Mortar Placement:
 - .1 Place mortar in accordance with Section 04 03 08 - Historic - Mortaring.
- .10 Field Quality Control:
 - .1 Site Tests, Inspection: in accordance with Section 04 05 00 - Common Work Results for Masonry
 - .2 Manufacturer's Field Services: in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .11 Tolerances:
 - .1 To CAN/CSA-A371.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 04 05 00 - Common Work Results for Masonry
- .2 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .3 Clean brick masonry as follows.
 - .1 Remove large particles with wood paddles without damaging surface. Saturate masonry with clean water and flush off loose mortar and dirt.
 - .2 Clean masonry as per approved cleaning methods and procedures.
 - .3 Repeat cleaning process as often as necessary to remove mortar and other stains.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 04 05 00 - Common Work Results for Masonry.

3.6 PROTECTION

- .1 Brace and protect brick masonry in accordance with Section 04 05 00 - Common Work Results for Masonry.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 03 07 Historic - Masonry Repointing
- .2 Section 04 03 08 Historic - Mortaring
- .3 Section 04 03 31 Historic - Repairing Brickwork
- .4 Section 04 05 00 Common Work Results for Masonry
- .5 Section 04 43 13 Brick Masonry
- .6 Section 08 11 02 Metal Gates /Grilles

1.2 SUMMARY OF WORK

- .1 Summary of work in this Section includes but is not limited to the following new stone masonry elements:
 - .1 Powder Magazines vent shaft and parapet wall extension stone caps
 - .2 Powder Magazines vent shaft opening stone lintels and sills

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Powder Magazines vent shaft and parapet wall stone elements will not be measured but will be paid for as fixed price items.
- .2 Supply and installation of anchor bolts, nuts and washers and bolt grouting will not be measured but considered incidental to work.

1.4 REFERENCES

- .1 ASTM International
 - .1 ASTM C568/C568M-10, Standard Specification for Limestone Dimension Stone.
- .2 CSA Group
 - .1 CAN/CSA-A370-04(R2009), Connectors for Masonry.
 - .2 CAN/CSA-A371-04(R2009), Masonry Construction for Buildings.
- .3 Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature and data sheets including stone characteristics, performance criteria, physical size, finish and limitations.

- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Indicate sizes and sections of stone elements, and arrangements of anchoring and dowelling.
- .4 Samples:
 - .1 Submit 2 samples of stone representing the final colour, finishes and texture of stone elements.

1.6 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 04 05 00 Common Work Results for Masonry.
- .2 Operation and Maintenance Data: submit operation and maintenance data for masonry work for incorporation into manual.
- .3 Project Record Documents: Refer to Item 2.1 Documentation of Fabrication Work and Item 3.1 Documentation of Installation Work.

1.7 QUALITY ASSURANCE

- .1 Qualifications of Masonry Contractor, Project Supervisor, Masons: Refer to Section 04 05 00 - Common Work Results for Masonry.
- .2 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .3 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Mock-ups: Construct mock-ups in accordance with Section 04 05 00 - Common Work Results for Masonry
 - .1 Construct mock-ups of stone cap installations and stone lintel/sill installations, including use of reinforcement, anchors, jointing, coursing, mortar and quality of work

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 04 05 00 - Common Work Results for Masonry and with manufacturer's written instructions.

1.9 SITE CONDITIONS

- .1 Ambient Conditions:
 - .1 Refer to Section 04 05 00 - Common Work Results for Masonry.
- .2 Field Measurements:
 - .1 Make site measurements as necessary to ensure proper fit of elements.

Part 2 Products

2.1 DOCUMENTATION OF FABRICATION WORK

- .1 Prepare a detailed report, as outlined in Section 04 05 00 Item 1.7, documenting the fabrication of the new stone elements.
- .2 Include in report the approved scope of fabrication work and associated methods/ procedures. Advise the Departmental Representative or Designate of any proposed changes to specified procedures for approval before commencement of work.

2.2 MATERIALS

- .1 Limestone: to ASTM C568/C568M, material, colour and texture to match approved sample.
- .2 Anchors, cramps, dowels: as per structural drawings and approved shop drawings.

2.3 MORTAR

- .1 Mortar and mortar mixes in accordance with Section 04 03 08 - Historic - Mortaring.

2.4 FABRICATION

- .1 Fabricate stone elements, to shape and dimensions on approved shop drawings. Dress exposed faces true. Cut stone to lay on its natural quarry bed.
- .2 Prepare stones for anchors, clamps, dowels and support systems, as per approved shop drawings.

2.5 FINISHES

- .1 Bush-hammer exposed stone surfaces to match approved sample.

Part 3 Execution

3.1 DOCUMENTATION OF INSTALLATION WORK

- .1 Prepare a detailed report, as outlined in Section 04 05 00 Item 1.7, documenting the installation of the new stone elements.
- .2 Include in report the approved scope of installation work and associated methods/ procedures. Advise the Departmental Representative or Designate of any proposed changes to specified procedures for approval before commencement of work.

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for stone installation.
 - .1 Visually inspect substrate in presence of Departmental Representative or Designate.
 - .2 Inform Departmental Representative or Designate of unacceptable conditions immediately upon discovery.

- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative or Designate.

3.3 PREPARATION

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

3.4 INSTALLATION

- .1 Install in accordance with CAN/CSA-A371, and approved scope of installation work and associated methods/ procedures.
- .2 Clean stone exposed surfaces by washing with stiff fibre brush and water.
- .3 Install anchors, dowels and cramps.
- .4 Set stones plumb, true, level in full bed of mortar with vertical joints slushed full except where otherwise specified. Completely fill anchor, dowel and lifting holes. Keep edges and faces aligned to respect indicated tolerances.
- .5 Place soft-wood wedges under stones to maintain joint thickness. Set heavy stones and projecting courses after mortar in courses below has hardened sufficiently to support weight.
- .6 Tool joints after initial set has occurred.
- .7 Rake out joints to 25 mm depth and make ready for pointing with pointing mortar. Sponge stone face along joints and remove droppings and splashed mortar immediately.
- .8 Pointing: in accordance with Section 04 03 07 - Historic -Masonry Repointing.

3.5 TOLERANCES

- .1 To CAN/CSA-A371.

3.6 FIELD QUALITY CONTROL

- .1 Site Tests Inspection: in accordance with Section 04 05 00 - Common Work Results for Masonry

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 04 05 00 - Common Work Results for Masonry
- .2 At end of each working day, brush off loose mortar from stone face.
- .3 At completion, wash stonework with stiff-fibre brushes and clean water.

3.8 PROTECTION

- .1 Brace and protect stone elements in accordance with Section 04 05 00 - Common Work Results for Masonry.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Structural steel frames in Powder Magazines with all connections will be paid at unit price and will include all material, labour and equipment required to complete the work.
 - .2 Galvanized steel plates in vent space with toggle bolts required for reconstruction of exterior arches of Powder Magazines will be paid under Masonry Repairs.
 - .3 Structural steel required for construction of Observation Deck will be paid under the Observation Deck Lump Sum item.
 - .4 Supply and installation of anchor bolts, welds, nuts, washers and bolt grouting will not be measured but considered incidental to work.

1.3 REFERENCES

- .1 ASTM International Inc.
 - .1 ASTM A36/A36M-08, Standard Specification for Carbon Structural Steel.
 - .2 ASTM A325M-08, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength Metric.
 - .3 ASTM A500/A500M-07, Standard Specification for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA G40.20/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA-S16-01(R2007), Limit States Design of Steel Structures.
 - .3 CAN/CSA-S136-07, North American Specifications for the Design of Cold Formed Steel Structural Members.
 - .4 CSA W59-03, Welded Steel Construction (Metal Arc Welding).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

- .2 Deliver materials in manufacturer's original, undamaged containers with identification labels intact.

Part 2 Products

2.1 MATERIALS

- .1 Structural steel: to CSA-G40.20/G40.21 Grade as indicated and/or CAN/CSA-S136.
- .2 Structural; Steel HSS shapes: to ASTM A500, grade 350W.
- .3 Structural Steel Plates: to CSA G40.20/G40/21, grade 300W.
- .4 Anchor bolts: to CSA-G40.20/G40.21, Grade 300W.
- .5 Bolts, nuts and washers: to ASTM A325M.
- .6 Welding materials: to CSA W59 and certified by Canadian Welding Bureau.
- .7 Shop paint primer: to CISC/CPMA2-75 solvent reducible alkyd, grey.
- .8 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m².

Part 3 Execution

3.1 ERECTION

- .1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16.
- .2 Field cutting or altering structural members: to approval of Consultant.
- .3 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
- .4 Continuously seal members by continuous welds where indicated. Grind smooth.

3.2 FIELD QUALITY CONTROL

- .1 Test bolts in accordance with ASTM, minimum 3 bolts of each diameter and length of bolt.
- .2 Test welds in accordance with CSA W59, fillet weld -10% tested by magnetic particle inspection.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 .Section 03 30 00 - Cast-in-Place Concrete.
- .1 .Section 05 12 23 - Structural Steel.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A53/A53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A269-08, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .3 ASTM A500 / A500M - 07 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
 - .4 ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
 - .2 CAN/CGSB-1.181-92, Ready-Mixed, Organic Zinc-Rich Coating.
- .3 CSA International
 - .1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA S16-09, Design of Steel Structures.
 - .4 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .5 CSA W59-M03(R2008), Welded Steel Construction (Metal Arc Welding) [Metric].

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for sections, plates, pipe, tubing, bolts and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

- .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations. .
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Steel sections and plates: to CSA G40.20/G40.21, Grade 350W.
- .2 Steel pipe: to ASTM A53/A53M standard weight galvanized finish.
- .3 Welding materials: to CSA W59.
- .4 Welding electrodes: to CSA W48 Series.
- .5 Bolts and anchor bolts: to ASTM A307.
- .6 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Where possible, fit and shop assemble work, ready for erection.
- .3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164.
- .2 Shop coat primer: MPI- INT 5.1A in accordance with chemical component limits and restrictions requirements and VOC limits of GS-11.
- .3 Zinc primer: zinc rich, ready mix to MPI-INT5.2C in accordance with chemical component limits and restrictions requirements and VOC limits of GS-11.

2.4 SHOP PAINTING

- .1 Primer: VOC limit 250 g/L maximum to GS-11.
- .2 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .3 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
- .4 Clean surfaces to be field welded; do not paint.

Part 3 Execution

3.1 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Departmental Representative or Designate such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Supply components for work by other trades in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CSA S16 or Weld field connection.
- .7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion of:
 - .1 Primer: maximum VOC limit 250 g/L to GS-11.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
 - .1 Primer: maximum VOC limit 250 g/L to GS-11.

3.2 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A53/A53M-12 'Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless'.
 - .2 ASTM A307-14 'Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength'.
 - .3 ASTM A366/A366M-97e1 'Standard Specification for Commercial Steel (CS) Sheet, Carbon (0.15 Maximum Percent) Cold Rolled'.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1-183-99 'Zinc-Rich Epoxy Coating'.
- .3 CSA Group
 - .1 CSA G40.20-13/G40.21-13 'General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels, Includes Update No. 1(2014)'.
 - .2 CAN/CSA S16.1-06 'Commentary on CSA Standard CAN/CSA-S6-06 Canadian Highway Bridge Design Code'.
 - .3 CSA W47.1-09(2014) 'Certification of Companies for Fusin Welding of Steel Structures'.
 - .4 CSA W55.3-08(R2013) 'Resistance Welding Qualification Code for Fabrication of Structural Members used in Buildings'.
 - .5 CSA W59-13 'Welded Steel Construction (Metal Arc Welding)'.
 - .6 CSA W186-M90(R2012)'Welding of Reinforcing Bars in Reinforced Concrete Construction'.
- .4 Canadian Welding Bureau (CWB)
- .5 Ontario Building Code (latest edition) (OBC)
- .6 Ontario Occupational Health and Safety Acts (OOHSA) (latest edition)

1.2 SHOP DRAWINGS

- .1 Submit Engineer stamped shop drawings indicating materials, fittings, finishes, connections, and joints, weld method of anchorage, fasteners, support structures, reinforcement details and accessories as applicable.

1.3 DESIGN STANDARDS

- .1 Ontario Building Codes (latest edition).
- .2 Occupational Health and Safety Acts (latest edition).
- .3 All welding under this section will be executed by Welders approved by Canadian Welding Bureau to requirements of CSA W 47.1, W47.2, and W55.3.
- .4 Steel Sections and Plates: to CSA G40.20/G40.21 Amendment 2, 300W.

- .5 Steel Tubing: to ASTM A53/A53M standard weight.
- .6 Welding Materials: to CSA W59.
- .7 Bolts and Anchor Bolts: to ASTM A307.
- .8 Galvanizing: hot dipped galvanizing with zinc coating 600g/m² to CSA G164.
- .9 Zinc Primer: zinc rich, ready mix to CAN/CGSB 1-GP-183.

Part 2 Products

2.1 MATERIALS

- .1 Fabricate metal fence and railings of steel to sizes and dimensions as indicated on reviewed shop drawings.
 - .1 Prefabricated Metal Fence:
 - .1 Height: 1070 mm
 - .2 Post Size: 50 x 50 mm steel square support post
 - .3 Post Centre: 1200 mm on centre
 - .4 Top Rail: 50 x 50 mm steel square tube top rail
 - .5 Pickets: 25 x 25 mm steel square tube picket
 - .6 Material: Galvanized Steel
 - .7 Brackets: as per manufacturer instruction
 - .8 Fasteners: all nuts and bolts are to be galvanized.
 - .2 Cap all exposed ends.

Part 3 Execution

3.1 ERECTION

- .1 Erect fabricated fence and railing plumb, straight, and true accurately fitted, with tight joints and intersections, as per approved shop drawings.
- .2 Make field connection with bolts to CSA S16.1.
- .3 Touch up field welds, burnt or scratched surfaces after completion of erection with zinc primer.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 32 11 23 – Aggregate Base Courses
- .2 32 91 19 – Topsoil Placement and Grading

1.2 PROTECTION

- .1 Protect the existing slope, vegetation, fort structures and adjacent landscaping throughout the construction of this section. The Contractor will be responsible for repairs to all damages.

Part 2 Products

2.1 Timber:

- .1 Timber: 50 mm x 150 mm nominal eastern white cedar wood timbers as delineated on the contract drawings for the cribbing.
- .2 200 mm x 200 mm nominal eastern white cedar wood or pressure treated timbers as delineated on the contract drawings for the sleepers.

2.2 Stonedust:

- .1 Hard, durable, crushed stone particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.

2.3 Earth Anchors:

- .1 As per drawings.

Part 3 Execution

3.1 WORKMANSHIP

- .1 Do not perform work under adverse field conditions such as frozen ground, ground covered with snow, ice or standing water.
- .2 Review exact limits of work with the Contract Administrator prior to commencement of work.
- .3 Excavate as required for the construction of the wood retaining wall. Remove all excavated material off the site as directed by Contract Administrator.
- .4 Install wood retaining wall as per the drawings and details.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 04 03 31 Historic - Repairing Brickwork
- .2 Section 04 03 41 Historic - Repairing Stone.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- .2 Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition.

1.3 SUMMARY OF WORK

- .1 The work in this Section includes but is not limited to the supply and installation of sealants as follows:
 - .1 Caulking of structural cracks in brick.
 - .2 Caulking of structural cracks in stone.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 No measurement will be made under this Section.
 - .1 Include costs as part of structural crack repair work in related Sections.

1.5 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's product to describe.
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Submit duplicate samples of each type of material and colour.
- .5 Cured samples of exposed sealants for each color where required to match adjacent material.
- .6 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Instructions to include installation instructions for each product used.

1.6 QUALITY ASSURANCE/MOCK-UPS

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-ups to show location, size, shape and depth of joints complete with back-up material, primer, caulking and sealant.
- .3 Mock-ups will be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
- .4 Locate where directed by Departmental Representative or Designate.
- .5 Allow 24 hours for inspection of mock-ups by Departmental Representative or Designate before proceeding with sealant work.
- .6 When accepted, mock-ups will demonstrate minimum standard of quality required for this Work. Approved mock-ups may remain as part of finished Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 010001 – General Requirements.
- .2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.8 PROJECT CONDITIONS

- .1 Environmental Limitations:
 - .1 Do not proceed with installation of joint sealants under following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.
 - .2 When joint substrates are wet.
- .2 Joint-Width Conditions:
 - .1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:
 - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.9 ENVIRONMENTAL REQUIREMENTS

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

Part 2 Products

2.1 SEALANT MATERIALS

- .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
- .2 When low toxicity caulks are not possible, confine usage to areas which offgas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize offgas time.
- .3 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

- .1 Multi-component chemical curing.
 - .1 To CAN/CGSB-19.24-M90, colour as selected by Departmental Representative or Designate from manufacturer's standard range.
 - .2 Acceptable material: "Dymeric:" manufactured by Tremco, or approved equivalent in accordance with Section 010001 – General Requirements.
- .2 Preformed Compressible and Non-Compressible back-up materials.
 - .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
 - .1 Extruded closed cell foam backer rod.
 - .2 Size: oversize 30 to 50 %.
 - .2 Neoprene or Butyl Rubber.
 - .1 Round solid rod, Shore A hardness 70.
 - .3 High Density Foam.
 - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m³ density, or neoprene foam backer, size as recommended by manufacturer.
 - .4 Bond Breaker Tape.
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

- .1 Multi-component chemical curing sealant for:
 - .1 Caulking of structural cracks, and miscellaneous exterior work.

2.4 JOINT CLEANER

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

Part 3 Execution

3.1 PROTECTION

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

3.2 SURFACE PREPARATION

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

- .1 Sealant.
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.

- .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing.
- .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.
- .3 Cleanup.
- .1 Clean adjacent surfaces immediately and leave Work neat and clean.
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
 - .3 Remove masking tape after initial set of sealant.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 03 08 Historic - Mortaring
- .2 Section 04 03 07 Historic - Masonry Repointing
- .3 Section 04 03 41 Historic - Repairing Stone
- .4 Section 04 05 00 Common Work Results for Masonry

1.2 SUMMARY OF WORK

- .1 Summary of work in this Section includes but is not limited to the removal of the following elements:
 - .1 Main Entrance Gate wood gates and posts.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Removal of the wood gates and posts will not be measured but will be paid for as fixed price items.

1.4 REFERENCES

- .1 Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate wood gate and post dimensions, detailing, materials, arrangement of hardware, and finishes.
 - .3 Indicate proposed handling methods and procedures.

1.6 QUALITY ASSURANCE/MOCK-UPS

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up to show removal techniques/materials.
- .3 Notify Departmental Representative or Designate 48 hours in advance of required inspection.
- .4 Approved mock-up becomes standard of acceptance for finished Work.

1.7 QUALIFICATIONS

- .1 Provide corporate or individual resumes for proposed contractor and workers.
- .2 Carry out removal work using skilled tradesperson trained and experienced in documenting and removing wood structures of a similar size/scale.
- .3 Provide documentation stating site foreperson and personnel are of recognized standing in the industry, with a proven record of satisfactory experience over five years. Obtain Departmental Representative or Designate's approval of this standing.
- .4 Maintain full-time supervisor/foreperson on job site during times removal work is in progress. Supervisor must have minimum five years experience similar in nature and scope to specified work.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Protect removed wood elements from scratches, handling marks and other damage. Hand over to the Departmental Representative or Designate for delivery to an off site storage facility.

1.9 PROJECT RECORD DOCUMENTS

- .1 Provide written documentation of the existing condition of all wood gate/post elements, and proposed removal work, including all procedures and materials used during the work.
- .2 Prior to the commencement of the work, take a reasonable number of digital photographs of the following:
 - .1 Overall condition of the existing wood gates, posts and hardware.
 - .2 Specific issues of concern and/or anything exceptional which should be recorded.
- .3 During the removal work, take digital photographs which illustrate the removal procedures and result.
- .4 Submit a final report containing the information specified herein:
 - .1 A record of all as found conditions, approved scope of removal work, and a record of work undertaken and treatments used.
 - .2 Submit 1 electronic copy (CD) of the report c/w colour images.
 - .3 Submit 1 electronic copy (CD) of all digital photographic images c/w titles and date taken.

Part 2 Products

2.1 MATERIALS

- .1 Not applicable.

Part 3 Execution

3.1 DOCUMENTATION OF ON SITE REMOVAL WORK

- .1 Prepare a detailed report, as outlined in Item 1.9, documenting the removal of the existing wood gate and post elements
- .2 Include in report the approved scope of removal work and associated methods/procedures. Advise the Departmental Representative or Designate of any proposed changes to specified procedures for approval before commencement of work.

3.2 REMOVALS

- .1 Carefully remove the existing wood gates and posts as per approved removal methodology/procedures.
- .2 Prior to removal, photograph and document the general as-found condition of the existing wood gates and posts in situ, as outlined in Item 1.8.2. Include any specific notes of existing damage or missing elements. Examine to determine the nature and extent of the required removal work. Submit recommended scope of removal work for review/approval by Departmental Representative or Designate prior to commencement of work.
- .3 Photograph and document the removal process as outlined in Item 1.8.3.
- .4 The scope of removal work includes but is not limited to the following:
 - .1 Remove the existing wood gates
 - .2 Remove the existing wood posts and associated steel supports imbedded in the existing stone masonry wall.
- .5 Once the removal work is complete/approved, protect the removed wood gates and posts and hand over to the Departmental Representative or Designate for delivery to an off site storage facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 03 08 Historic - Mortaring
- .2 Section 04 03 31 Historic - Repairing Brickwork
- .3 Section 04 05 00 Common Work Results for Masonry
- .4 Section 04 43 13 Brick Masonry
- .5 Section 04 43 23 Stone Masonry

1.2 SUMMARY OF WORK

- .1 Summary of work in this Section includes, but is not limited to the restoration and installation of the following elements:
 - .1 Powder Magazine existing metal gates (2 in total)
 - .2 Sally Port existing metal gates (2 in total)
- .2 Summary of work in this Section also includes but is not limited to the fabrication and installation of the following elements:
 - .1 Powder Magazine metal grilles, parapet wall vent openings (4 in total).

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Restoration and installation of the existing metal gates will not be measured but will be paid for as fixed price items.
 - .2 Supply and installation of new metal grilles will not be measured but will be paid for as fixed price items.
- .2 Supply and installation of anchor bolts, nuts and washers and bolt grouting will not be measured but considered incidental to work.

1.4 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A653/A653M-06a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA-G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA W59-03, Welded Steel Construction (Metal Arc Welding).

- .4 Standards and Guidelines for the Conservation of Historic Places in Canada, Second Edition.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit printed product literature, specifications and data sheets for all required products and materials in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Provide shop drawings for each existing metal gate including dimensions, detailing, materials, arrangement of hardware, finishes, extent of required modifications and new work, anchorage materials and methods.
 - .3 Provide shop drawings for new metal grilles including dimensions, detailing, materials, arrangement of hardware, finishes, anchorage materials and methods.
- .4 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit one sample of metal grille showing materials, construction techniques, finishes, etc.
 - .3 Submit two samples of each type of hardware

1.6 QUALITY ASSURANCE

- .1 Arrange for Departmental Representative or Designate to inspect metal fabrication shop during the Work.
- .2 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control
 - .2 Prepare mock-ups for inspection by Departmental Representative or Designate before proceeding with further Work.
 - .3 Construct mock-up to show restoration techniques/materials, surfaces/finishes, and hardware installation.
- .3 Notify Departmental Representative or Designate 48 hours in advance of required inspection.
- .4 Approved mock-up becomes standard of acceptance for finished Work.
- .5 Obtain approval of Departmental Representative or Designate before installing approved mock-up.
- .6 Approved mock-up will be incorporated in finished work.

1.7 QUALIFICATIONS

- .1 Provide corporate or individual resumes for proposed contractor and workers.
- .2 Carry out restoration work using skilled tradesperson trained and experienced in the restoration and installation of metal gates and frames.
- .3 Provide documentation stating shop foreperson and personnel are of recognized standing in the industry, with a proven record of satisfactory fabrication and installation work over five years. Obtain Departmental Representative or Designate's approval of this standing.
- .4 Metal fabricators: experienced in use of materials. Supply job references showing fabrication experience of similar size and scope as this project.
- .5 Contractor's Field Supervision and Crew Qualifications: maintain full-time supervisor/foreperson on job site during times work is in progress. Supervisor must have metal fabrication training and have minimum five years experience in metal fabrication similar in nature and scope to specified work.
 - .1 Shop crew makeup: trade qualified journeyman and registered apprentices in the ratio of no more than one to one (at least one journeyman to one apprentice).
- .6 Submit crew qualifications for review by Departmental Representative or Designate prior to start of work.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Arrange for delivery of the existing metal gates to the heritage metal workshop.
- .3 Store existing and new metal elements in enclosed space with controlled ambient temperature and relative humidity.
- .4 Protect finished metal elements from scratches, handling marks and other damage. Wrap or crate for delivery to site.

1.9 SITE CONDITIONS

- .1 Field Measurements:
 - .1 Make site measurements necessary to ensure proper fit of members.

1.10 PROJECT RECORD DOCUMENTS

- .1 Provide written documentation of all restoration, fabrication and installation work, including all procedures and materials used during the work.
- .2 During the fabrication work, take digital photographs which illustrate the restoration and fabrication process.
- .3 During the installation work on site, take digital photographs which illustrate the installation procedures and result.
- .4 Submit a final report containing the information specified herein:

- .5 A record of all as found conditions, approved scope of fabrication, restoration, removal/installation work, and a record of work undertaken and treatments used.
- .6 Submit 1 electronic copy (CD) of the report c/w colour images.
- .7 Submit 1 electronic copy (CD) of all digital photographic images c/w titles and date taken.

Part 2 Products

2.1 DOCUMENTATION OF RESTORATION WORK

- .1 Prepare a detailed report, as outlined in Item 1.10, documenting the restoration of the existing metal elements.
- .2 Include in report the approved scope of restoration work for the existing metal gates and associated methods/ procedures. Also include the approved scope of removal, restoration and reinstallation work for the existing hardware and associated methods/ procedures. Advise the Departmental Representative or Designate of any proposed changes to specified procedures for approval before commencement of work.

2.2 DOCUMENTATION OF FABRICATION WORK

- .1 Prepare a detailed report, as outlined in Item 1.10, documenting the fabrication of the new metal elements.
- .2 Include in report the approved scope of fabrication work for the new metal grilles and associated methods/ procedures. Advise the Departmental Representative or Designate of any proposed changes to specified procedures for approval before commencement of work.

2.3 MATERIALS

- .1 Hot dipped galvanized steel sheet: to ASTM A653M, ZF75, minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.
- .2 Metal: to match existing in material, dimensions and appearance in accordance with approved submittals.
- .3 Primer/Paint: 1 coat 3-component zinc rich primer, 1 coat mastic epoxy (2 component), 2 coats urethane epoxy (2 component).
- .4 Solder: in accordance with approved submittals.
- .5 Fasteners/Anchors: as detailed and in accordance with approved submittals.
- .6 New Hardware: as detailed and in accordance with approved submittals.
 - .1 Hinges
 - .2 Hinge pins
 - .3 Latches
 - .4 Padlocks

2.4 RESTORATION OF EXISTING METAL ELEMENTS

- .1 Submit recommended restoration procedures for the existing metal gates for review/approval prior to commencement of work, and photograph and document the fabrication process, as outlined in Item 1.10.2.
- .2 Restore the existing metal gates as follows, and in accordance with approved restoration methods/procedures.
 - .1 Pick up the existing metal gates to be restored from storage facility and site , deliver to the heritage metal restoration shop, and uncrate.
 - .2 Inspect all existing heritage metal elements to be restored, record existing conditions, and develop a restoration strategy for approval by consultant including scope/type of required metal repairs.
 - .3 Remove bulk of paint coatings with chemical paint stripper. Wood and plastic scrapers are allowed. Any metal scrapers must have rounded corners and edges to prevent scratching or gouging of the sheet metal.
 - .4 Remove iron and zinc corrosion deposits, salts and other surface contaminants not removed by the paint stripper with a micro abrasive in an abrasive blasting system.
 - .5 Make repairs to the existing metal elements. Cut out and repair areas of severe damage. Solder all seams and joints with solder.
 - .6 Modify height of existing metal gates as required to suit new on site conditions.
 - .7 Modify existing gate hardware as required to suit new installation and anchorage methods. Supply and install new hardware as required.
 - .8 Prime/paint restored metal gates as follows: 1 coat 3-component zinc rich primer, 1 coat mastic epoxy (2 component), 2 coats urethane epoxy (2 component).

2.5 FABRICATION OF NEW METAL ELEMENTS

- .1 Submit recommended fabrication procedures for the new metal grilles for review/approval prior to commencement of work, and photograph and document the fabrication process, as outlined in Item 1.10.2.
- .2 Fabricate new metal grilles as detailed, and in accordance with approved fabrication methods/procedures.

Part 3 Execution

3.1 DOCUMENTATION OF INSTALLATION WORK

- .1 Prepare a detailed report, as outlined in Item 1.10, documenting the installation of the restored metal gates, and new metal grilles.
- .2 Include in report the approved scope of installation work and associated methods/procedures. Advise the Departmental Representative or Designate of any proposed changes to specified procedures for approval before commencement of work.

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for quarried stone veneer cladding installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative or Designate.
 - .2 Inform Departmental Representative or Designate of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative or Designate.

3.3 REMOVALS/DELIVERY

- .1 Remove the existing metal gate on site, protect and deliver to the metal workshop.
- .2 Pick up existing metal gates (3 in total) from Parks Canada storage facility, protect and deliver to the metal workshop.

3.4 INSTALLATION (RESTORED METAL GATES)

- .1 Install the restored metal gates as per approved installation methodology/ procedures. Photograph and document the installation process as outlined in Item 1.10.4.
- .2 The scope of installation work includes but is not limited to the following:
 - .1 Inspect the brick wall openings and verify that they are ready to receive the restored metal gates.
 - .2 Deliver the restored metal gates to site and unwrap.
 - .3 Install the restored metal gates.
 - .4 Adjust for correct operation.

3.5 INSTALLATION (NEW METAL GRILLES)

- .1 Install the new metal grilles as per approved installation methodology/ procedures. Photograph and document the installation process as outlined in Item 1.10.4.
- .2 The scope of installation work includes but is not limited to the following:
 - .1 Inspect the brick wall openings and verify that they are ready to receive the new metal grilles.
 - .2 Deliver the new metal grilles to site and unwrap.
 - .3 Install the new metal grilles.

3.6 FINISH REPAIRS

- .1 Touch up with primer finishes damaged during installation.

3.7 ADJUSTING

- .1 Re-adjust restored gates and hardware just prior to completion to function freely and hang properly.

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 Cleaning

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A325M-05, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength Metric.
 - .2 ASTM A490M-04a, Standard Specification for High Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints Metric.
 - .3 Commercial Interiors.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
 - .2 CSA-G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .3 CAN/CSA O86.1-01, Engineering Design in Wood.
 - .4 CSA O121-M1978(R2003), Douglas Fir Plywood.
 - .5 CSA O151-04, Canadian Softwood Plywood.
 - .6 CSA O153-M1980(R2003), Poplar Plywood.
 - .7 CAN/CSA-S16-01, Limit States Design of Steel Structures.
 - .8 CAN/CSA-S136-01, North America Specification for the Design of Cold Formed Steel Structural Members including supplement CSA-S136.1-[01].
 - .9 CSA W59-03, Welded Steel Construction (Metal Arc Welding).
- .3 Canada's Historic Places
 - .1 Standards and Guidelines for the Conservation of Historic Places in Canada, 2nd Edition

1.2 DEFINITIONS

- .1 Bracing: temporary support installed in excavation or structure to stabilize against deformations or failure.
- .2 Shoring: temporary support installed in an excavation or structure to relieve loads.

1.3 PERFORMANCE REQUIREMENTS

- .1 Ensure that materials, equipment and procedures safely supporting existing structure and construction live loads; that allow work to be accomplished and that minimize risk of damage to historic and archaeological elements.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

- .3 Shop drawings to indicate shop and erection details in accordance with performance requirements in 1.4.
- .4 Submit to Departmental Representative or Designate for review of shoring, bracing and temporary framing drawings signed by professional engineer registered or licensed in Province of Ontario, Canada.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Structural wood members: timber grade select structural No. 1.
 - .1 Forest Stewardship Council (FSC) certified.
 - .1 Lumber: FSC certified.
- .2 Structural steel members: to CSA G40.21, grade 300, type W, HSS shall be Grade 350W class H.
- .3 Wood connections: Canadian soft wood plywood to CSA O151, Douglas Fir plywood to CSA O121, Poplar plywood to CSA O153 sheathing grade.
- .4 Steel connections: steel gusset plates, angles to CSA G40.21, grade 300, type W.
- .5 Nails: to CSA B111.
- .6 Bolts: lag screws, nuts and washers to CAN/CSA O86.1.
- .7 High-tensile bolts: to ASTM A325M.
- .8 Welding materials: CSA W59.

2.2 SOURCE QUALITY CONTROL

- .1 Timber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.

Part 3 Execution

3.1 EXAMINATION

- .1 Before starting work verify existing conditions and variations from original contract documents and notify Departmental Representative or Designate.

3.2 PREPARATION

- .1 Remove stored materials from building. Store in area designated by Departmental Representative or Designate.
- .2 Before shoring or bracing is begun, drain excavation and ground to support bracing. Maintain area free of standing water for the duration of the contract.
- .3 All wood shall be pressure preservative treated as per OPSS 1601..

3.3 INSTALLATION

- .1 Commence work as per Departmental Representative or Designate instructions.
- .2 Obtain approval from Departmental Representative or Designate, before execution, if alteration to bracing and shoring system is necessary.
- .3 Support individual elements that become loose during shoring and bracing installation.
- .4 Erect structural timber to CAN/CSA O86.1.
- .5 Erect structural steel work to CAN/CSA-S16 and CAN/CSA-S136.
- .6 Weld to CSA W59.
- .7 Bracing of structures:
 - .1 Install packing after review by Departmental Representative or Designate to compensate for unevenness of wall surfaces.
 - .2 Install and use bracing system to stabilize deformations, as indicated on drawings.
- .8 Bracing of excavations:
 - .1 Conduct work in accordance with the current Ontario legislation.
 - .2 Excavate by increments of two poling boards and insert boards from bottom of excavation.
- .9 Shoring of structures:
 - .1 Install packing after review by Departmental Representative or Designate to compensate for unevenness of wall surface.
 - .2 Before final raking shores are erected, install temporary shores, consisting of an upright against wall and raker notched in, to stabilize wall.
 - .3 Install boards, between needles of dead shores, to prevent core escaping.
- .10 Shoring of masonry arches:
 - .1 Install dead shoring before erecting centering.
 - .2 Realign centering before cosmetic repairs as detailed on drawings.
 - .3 Remove dead shoring when masonry arches are stabilized.
 - .4 Remove centering, progressively, by loosening wedges until downward movement of arch stops.

3.4 ADJUSTMENT

- .1 Monitor bracing and shoring system performance and maintain its effectiveness by making adjustments, replacing or repairing damaged and weakened elements of system until final completion of project for period of 12 months after installation of system.
- .2 If adjustments are major, notify Departmental Representative or designate.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 74 21 – Construction Demolition/Waste Management and Disposal
- .2 Section 32 11 23 – Aggregate Base Courses

1.2 MEASUREMENT AND PAYMENT PROCEDURES

- .1 Measurement and Payment:
 - .1 Excavation shall be paid in lump sum for each area, as delineated on the site plan.
 - .2 No additional payment shall be made to remove excess material off-site.

1.3 DEFINITIONS

- .1 Hand excavation: removal of turf, topsoil and earth overburden by hand, with no mechanical equipment.
- .2 Waste Material: excavated material unsuitable for use in work or surplus to requirements.
- .3 Borrow Material: material obtained from excavation and locations outside area to be graded, and required for construction of fill areas or for other portions of work.

1.4 PROTECTION OF EXISTING FEATURES

- .1 Existing Buried Artifacts and Structures:
 - .1 Size, depth and location of existing structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .2 Prior to commencing work confirm locations of all structures by careful test excavations.
 - .3 Maintain and protect from damage, artifacts and structures encountered.
 - .4 Notify immediately appropriate authority in case of damage to any structure or artifact during excavation.
- .2 Existing Buildings and Surface Features:
 - .1 Conduct, with Contract Administrator, condition survey of existing structures, trees, lawns, survey bench marks and monuments which may be affected by work.
 - .2 Protect existing surface features from damage while work is in progress. In event of damage, immediately make repair to approval of Contract Administrator.
 - .3 Where required for excavation, cut roots or branches as approved by Contract Administrator in accordance with Section 32 01 90.1 - Tree and Shrub Preservation.
 - .4 Trees and shrubs identified to be protected in the plans are not to be damaged during construction.

Part 2 Products

N/A

Part 3 Execution

3.1 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

3.2 STOCKPILING

- .1 Stockpile fill materials in areas designated by Contract Administrator.
- .2 Protect fill materials from contamination.

3.3 EXCAVATION

- .1 Excavate to lines, grades, elevations, and dimensions as indicated on Contract Drawings.
- .2 Should any artifacts be uncovered, the Contractor shall immediately stop work and notify the Contract Administrator. No additional work shall proceed without written approval of the Contract Administrator.
- .3 Dispose of surplus and unsuitable excavated material off site, following approved procedures for hauling and disposal.
- .4 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft, or organic matter.
- .5 Notify Contract Administrator when bottom of excavation is reached.
- .6 Obtain Contract Administrator approval of completed excavation.
- .7 Remove unsuitable material from trench bottom to extent and depth as directed by Contract Administrator.
- .8 Correct unauthorized over-excavation with excavated earth material compacted to not less than 95% of corrected maximum dry density.
- .9 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of Contract Administrator.
- .10 Install geotextiles as per the contract drawings.

3.4 TOPSOIL

- .1 Do not proceed with topsoil operations until Contract Administrator has inspected and approved installations.

- .2 Areas to be backfilled to be free from debris, snow, ice, water, and frozen ground.
- .3 Do not use topsoil material, which is frozen, contains ice, snow or debris.
- .4 Place topsoil material in uniform layers not exceeding 150mm compacted thickness.
Compact each layer before placing succeeding layer.

3.5 RESTORATION

- .1 Upon completion of work, remove waste materials and debris; trim slopes, and correct defects as directed by Contract Administrator.
- .2 Remove all extraneous excavated material not required for use on this contract, off-site.
- .3 Clean and reinstate areas affected by work as directed by Contract Administrator.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 This work item includes the installation of snow fences to protect existing trees from damage during construction and methods to be used for compensation due to damage.

1.2 RELATED SECTIONS

- .1 Section 32 91 19 – Topsoil Placement and Grading

Part 2 Products

2.1 SOURCE QUALITY CONTROL

- .1 Obtain approval from Contract Administrator of new plant material at source prior to planting.
- .2 Imported plant material must be accompanied with necessary permits and import licenses. Conform to federal and provincial regulations.
- .3 **Emerald Ash Borer:** (*Agrilus planipennis* Fairmaire)
 - .1 NO Ash trees or products, including mulch will be allowed on site.
- .4 Any fertilizing of plant material applied on site, cannot contain more than 1% of phosphates (P205) by weight, unless it is during the first year, in which turf or managed grasses have been established (either by seed or sod).

2.2 MATERIALS

- .1 Any fertilizing of plant material applied on site, cannot contain more than 1% of phosphates (P205) by weight, unless it is during the first year, in which turf or managed grasses have been established (either by seed or sod).
- .2 Tree Protection Fence: Tenax, Economy Snow Fence, orange (or approved equal).
- .3 Modular Construction Barrier: Modu-loc, 1800mm height, metal fence panels (or approved equal). Posts shall be securely anchored to the ground.

Part 3 Execution

3.1 IDENTIFICATION AND PROTECTION

- .1 Identify plants and limits of root systems to be preserved to the satisfaction of the Contract Administrator.
- .2 Protect plant and root systems from damage, compaction, and contamination resulting from construction to the satisfaction of the Contract Administrator.

3.2 ROOT PRUNING

- .1 In locations where the grade will be lower than the adjacent existing trees, the Contractor will expedite the work of this section to reduce the exposure of the root system.
- .2 Cut roots over 12 mm in diameter with a clean pruning instrument. Do not paint.
- .3 Any exposed roots more than 12 mm that will be exposed longer than 48 hours, before backfilling will be covered with a landscape fabric and watered daily.

- .4 Selectively remove tree branches to reduce transpiration and compensate for damage to root system. Receive approval of branches to be removed by Contract Administrator before commencement of work.
- .5 Do not remove more than one-third of the total branching at a single operation.
- .6 Prune all branches with a diameter more than 75 mm, but only at the direction of the Contract Administrator.

3.3 MAINTENANCE DURING WARRANTY PERIOD

- .1 From time of acceptance by the Contract Administrator to end of warranty period, do the following maintenance operations.
 - .1 Water plants to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion to the soil.
 - .2 Apply pesticides according to national Standard for Pesticide Education, Training, and Certification in Canada, Federal, Provincial and Municipal regulations as and when required to control insects, fungus, and disease. Obtain product approval from Contract Administrator before application.
 - .3 Apply fertilizer in early spring at the rate of 0.025 kg of nitrogen/m² or manufacturer's suggested rate.
 - .4 Remove dead, broken, or hazardous branches from plant material. Dispose of debris.

3.4 DAMAGES

- .1 The Contractor will compensate the client for any trees damaged by the Contractor during construction.
- .2 Damages will include:
 - .1 Any physical damage on tree bark;
 - .2 Any broken branches;
 - .3 Equipment and materials stored within the protected areas and beyond the limits of the contract.
 - .4 Refuelling of equipment within the protected areas.
- .3 The Contractor will supply, install, maintain, and warranty trees of the same species to every one tree damaged, as indicated by the Contract Administrator:
 - .1 Coniferous Trees: 2.1 metre height
 - .2 Deciduous Trees: 70 mm cal.
- .4 In addition the Owner reserves the right to charge the Contractor a maximum of \$1,000 (one thousand dollars) per damaged tree should the Contractor not comply with directions from the Contract Administrator to protect existing trees.
- .5 The exact location of the replacement trees will be staked out to the approval of the Contract Administrator before commencement of work.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 00 – Cast-in-Place Concrete

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C117-13 ‘Standard Test Method for Materials Finer than 75-microm (No. 200) Sieve in Mineral Aggregates by Washing’.
 - .2 ASTM C131-06 ‘Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine’.
 - .3 ASTM D698-12e1, ‘Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³)’.
- .2 Ontario Provincial Standards Specifications
 - .1 OPSS 1010 Form, ‘Material Specification for Aggregates – Granular A,B,M and select Subgrade Material’.

Part 2 Products

2.1 MATERIALS

- .1 Granular base: Granular ‘A’ to meet requirements of OPSS 1010 Form.

Part 3 Execution

3.1 INSPECTION OF EXISTING FINISHED SUBGRADE SURFACE

- .1 Do not place granular base until subbase or rigid insulation is inspected and approved by Consultant.

3.2 SEQUENCE OF OPERATION

- .1 Begin spreading base material on a crown line or high side of a one-way slope.
- .2 Place granular base materials using methods, which do not lead to segregation or degradation.
- .3 Place material in uniform layers not exceeding 150 mm when compacted or to such other depth as approved.
- .4 Shape each layer to a smooth contour and compact to specified density before the succeeding layer is placed.
- .5 Remove and replace portion of a layer in which material has become segregated during spreading.

3.3 COMPACTION EQUIPMENT

- .1 Compaction equipment to be capable of obtaining required material densities.

3.4 COMPACTING

- .1 Shape and roll alternately to obtain a smooth, even and uniformly compacted base.
- .2 Apply water as necessary during compaction to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.
- .3 In areas not accessible to rolling equipment, compact to 98% S.P.D. with approved mechanical tampers.

3.5 SITE TOLERANCES

- .1 Finish compacted surface to within ± 10 mm of established grade but not uniformly high or low.
- .2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerances.

3.6 PROTECTION

- .1 Maintain finish base in a condition conforming to this section until succeeding material is applied or until acceptance.

END OF SECTION

Part 1 General

1.1 SCOPE OF WORK

- .1 This section includes but is not necessarily limited to the supply and installation of pedestrian pathways as indicated on the drawings and details.

1.2 RELATED SECTIONS

- .1 Section 32 11 23 – Aggregate Base Courses

1.3 REFERENCES

- .1 Ministry of Transportation
 - .1 OPSS 314 ‘Construction Specification for Untreated Granular, Subbase, Base, Surface shoulder, and Stockpiling’.

Part 2 Products

2.1 MATERIALS

- .1 Granular Base material as per Section 32 11 23
- .2 Limestone fines to OPSS 314.
- .3 Hardwood chips, submit samples to Contract Administrator for approval prior to construction.

Part 3 Execution

3.1 SCOPE OF WORK

- .1 Place a granular base course to depths and profiles as shown on drawings and details.
- .2 Layouts to be staked out to the approval of the Contract Administrator prior to construction.
- .3 Granular base to be compacted as per soils report.
- .4 Place stonedust course to depth as shown on details. Stonedust course to meet and match surrounding finish grade after compaction.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 31 11 00 – Clearing and Grubbing
- .3 Section 32 01 90 – Tree and Shrub Preservation

1.2 REFERENCES

- .1 Canadian Council of Ministers of the Environment (CCME).
CCME PN 1340 ‘Guidelines for Compost Quality’ issued January 1996 (Revision 2005),
Category (A) unrestricted, Category (B) restricted.’

1.3 SOURCE QUALITY CONTROL

- .1 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions, and warranty requirements.
- .2 An independent testing laboratory will carry out inspection and testing of topsoil. Landscape Contractor to pay for costs of tests.
- .3 Test topsoil from source for clay, sand, and silt, Nitrogen (N), phosphorous (P), potassium (K) and magnesium (Mg), (N, P, K, Mg,) soluble salt content, pH value, growth inhibitors, soil sterilants organic matter, and conductivity. Submit 0.5 kg a sample of topsoil to a testing laboratory and indicate present use, intended use, type of subsoil and quality of drainage. Prepare and ship the sample in accordance with provincial regulations and testing laboratory requirements.
- .4 Determine required limestone treatment to bring pH value of soil ranges between 5.5 to 7.5 levels.
- .5 Submit two copies of soil analysis and recommendations for corrections to Consultant.

1.4 SCHEDULING OF FINISH WORK

- .1 Schedule the placing of the topsoil and grading to permit sodding and seeding within seven days.

1.5 DEFINITIONS

- .1 Compost: should be a mixture of soil and decomposing organic matter, for use as a fertilizer, mulch, or soil conditioner. Compost should be processed organic matter, containing 40% or more organic matter.
- .2 The product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (a carbon and nitrogen (C:N) ratio below 25 or 50) and contain no toxic or growth inhibiting contaminates. Composed bio-solids must meet the requirements of the Waste Management CCME PN 1340.
- .3 Friable: Soil, which is easily crumbled through fingers when held by hand.

Part 2 Products

2.1 TOPSOIL

- .1 All topsoil supplied by the Contractor will be fertile, friable, natural sandy loam containing not less than 4% of organic matter for sandy loams with an acidity value ranging from pH 6.0 to pH 7.0 and capable of sustaining vigorous plant growth. It will be free of stems or roots, stones and or other extraneous matter. Screening of topsoil will be required if designated by the Consultant. Topsoil will not be supplied in a frozen state.
- .2 Horticultural Topsoil: growing medium for plant material, consisting of a variable mixture of sand, silt, clay, organic material, and nutrients meeting the following criteria:
 - .1 45 to 70% sand
 - .2 0 to 35% silt
 - .3 14 to 20% clay
 - .4 4% minimum of organic material
 - .5 5.5 to 7.5 pH value.
- .3 Testing Laboratory: This represents a lab accredited by the Canadian Association for Environmental Analytical Laboratories (CAEAL) and/or Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA).

2.2 SOIL AMENDMENTS

- .1 Fertilizer:
 - .1 Complete commercial synthetic fertilizer with minimum 65% insoluble nitrogen.
 - .2 Formulation ratio - 10-6-4, 10% nitrogen, 6% phosphoric acid, 4% potash.
 - .3 Adjust fertilizer as per soil test recommendations.
- .2 Peatmoss:
 - .1 Derived from partially decomposed fibrous or cellular stems and leaves of species of Sphagnum Mosses.
 - .2 Elastic and homogeneous, brown in colour.
 - .3 Free of wood and deleterious material, which could prohibit growth.
 - .4 Shredded particle minimum size 5 mm.
- .3 Sand: washed coarse silica sand, medium to coarse textured.
- .4 Limestone:
 - .1 Ground agricultural limestone containing minimum calcium carbonate equivalent of 85%.
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
- .5 Bonemeal: finely ground with a minimum analysis of 20% phosphoric acid.

2.3 SOURCE QUALITY CONTROL

- .1 Advise Consultant topsoil sources to be utilized with sufficient lead-time for testing.
- .2 Contractor is responsible for amendments to supply topsoil as specified.
- .3 Soil testing by recognized testing facility for pH, P and K, and organic matter.

- .4 A testing laboratory designated by the Consultant will carry out testing of topsoil. Soil sampling, testing, and analysis are to be in accordance with Provincial standards.

Part 3 Execution

3.1 STRIPPING OF TOPSOIL

- .1 Commence topsoil stripping of areas as directed by Consultant after area has been cleared of brush, weeds, and grasses and removed from site. Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.
- .2 Strip Topsoil to depths as indicated by Consultant. Avoid mixing topsoil with subsoil.
- .3 Stockpile in locations as directed by Consultant. Stockpile height not to exceed 2 metres.
- .4 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill.
- .5 Protect stockpiles from contamination and compaction.

3.2 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct. If discrepancies occur, notify the Consultant and do not commence work until instructions have been received.
- .2 Grade the soil, eliminating uneven areas and low spots, ensuring positive drainage. Remove soil contaminated with toxic materials. Dispose of removed materials as directed by Consultant.
- .3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials. Remove soil contaminated with calcium chloride, toxic materials, and petroleum products. Remove debris, which protrudes more than 75 mm above surface. Dispose of removed material off site.
- .4 Cultivate entire area that is to receive topsoil to depth of minimum 25 mm. Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.
- .5 Planting soil for planting of trees, shrubs, and ground covers: mix 4 parts topsoil with 1 part peatmoss. Incorporate bonemeal into planting soil at rate of 0.5 kg/m³ of soil mixture.

3.3 PLACE AND SPREADING OF TOPSOIL - PLANTING SOIL

- .1 Spread topsoil after subgrade has been approved. Refer to Drawings for direction of surface drainage.
- .2 Spread topsoil with adequate moisture in uniform layers not exceeding 150 mm, over approved, unfrozen subgrade, where sodding, seeding, and planting is indicated.
- .3 For sodded areas keep topsoil 15 mm below finished grade.
- .4 Spread topsoil to following minimum depths after settlement, 80% compaction:
 - .1 150 mm for seeded areas
 - .2 135 mm for sodded areas
 - .3 300 mm for flower beds
 - .4 500 mm for shrub beds
- .5 Apply planting soil as indicated on drawings.

- .6 Manually spread topsoil/planting soil around trees, shrubs, and obstacles.

3.4 SOIL AMENDMENTS

- .1 Apply soil amendments at rate as specified and as determined from soil sample test.
- .2 Mix soil amendments into full depth of topsoil prior to application of fertilizer.
- .3 Place topsoil at depth of 135 mm for sodded areas unless otherwise specified in the drawings.
- .4 Apply planting soil as indicated on drawings and details.

3.5 APPLICATION OF FERTILIZER

- .1 Apply fertilizer at least one week after limestone application.
- .2 Spread fertilizer uniformly over entire area of topsoil at manufacturer's recommended rate of application or rate determined on basis of soil sample test.
- .3 Mix fertilizer thoroughly to the full depth of topsoil.

3.6 FINISH GRADING

- .1 Grade soil to eliminate rough spots and low areas and ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by the Consultant. Leave surfaces smooth, uniform, and firm against deep foot printing.

3.7 ACCEPTANCE

- .1 Consultant will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.8 SURPLUS MATERIAL

- .1 Dispose of materials, except topsoil off site or as directed by the Consultant.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 32 91 19 – Topsoil Placement and Grading

1.2 PRODUCT DATA

- .1 Submit product data for:
 - .1 Seed
 - .2 Fertilizer

1.3 SCHEDULING

- .1 Seed after frost has left ground and before June 1, or between August 25th and September 10th.
- .2 Work must be scheduled so work is completed in one area before proceeding to next area.
- .3 Schedule the completion of work immediately prior to hydraulic mulching.

Part 2 Products

2.1 GRASS SEED

- .1 All seeding to be mechanical unless identified otherwise.
- .2 Mechanical grass seed mixture:
 - 50% Kentucky Blue
 - 40% Creeping Red Fescue
 - 10% Perennial Rye
- .3 Hand seeded shade tolerant grass seed mixture:
 - 50% Creeping Red Fescue
 - 15% Rough Bluegrass
 - 15% Sheep Fescue
 - 20% Rough Fescue
- .4 Seed must be kept in containers with original tags.

2.2 WATER

- .1 Water must be free of impurities that would inhibit germination and growth.

2.3 FERTILIZER

- .1 Complete synthetic, slow release with maximum 35% water soluble nitrogen:
 - 12-6-6 for spring seeding
 - 10-10-10 for fall seeding

Part 3 Execution

3.1 WORKMANSHIP

- .1 Do not perform work under adverse field conditions such as frozen ground, ground covered with snow, ice or standing water.
- .2 Remove and dispose of weeds; debris; stones 50 mm in diameter and large; soil contaminated by oil, gasoline and other deleterious materials; off the site as directed by Contract Administrator.

3.2 SEED BED PREPARATION

- .1 Verify that grades are correct. If discrepancies occur, notify Contract Administrator and do not commence work until further instructed.
- .2 Be a sure fine grade surface is free of humps and hollows and that it is a smooth, even grade, to contours and elevations indicated and to tolerance of plus or minus 15 mm, allowing the surface to drain naturally.
- .3 Cultivate fine grades approved by Contract Administrator to 25 mm depths immediately prior to seeding.

3.3 SEEDING

- .1 Use equipment suitable for area to the approval of the Contract Administrator.
- .2 Sow seed uniformly at the rate of 150 kg/hectare.
- .3 Blend application into adjacent grass areas to form uniform surfaces.
- .4 Sow half of the required amount of seed in one direction and remainder at right angles.
- .5 Embed seed into soil to depth of 5 mm within one hour of sowing.
- .6 Roll area with equipment approved by Contract Administrator.
- .7 Water the seed with fine spray, avoiding washing out of seed. Apply enough water to ensure penetration of minimum 50mm.
- .8 Protect seeded areas against damage. Remove this protection after Contract Administrator has accepted lawn areas.

3.4 FERTILIZING PROGRAM

- .1 Fertilize during establishment and warranty periods to following Program or submit a fertilization program to the Contract Administrator for approval prior to commencement of work on this item.

3.5 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of seed application until final acceptance by the Contract Administrator:

- .1 Water seeded area as required to ensure germination and continued growth of grass. Control watering to prevent washouts.
- .2 Dead or bare patches must be repaired and reseed, to allow establishment of seed prior to acceptance.
- .3 Cut grass to 40 mm whenever it reaches height of 60 mm, remove clippings.
- .4 Fertilize seeded areas after first cutting at the rate determined by the soil test. Spread half the required amount of fertilizer in one direction and remainder at right angles and water in well. Postpone fertilizing until following spring if application falls within four-week periods prior to the expected end of local growing seasons.
- .5 Maintain seeded areas weed free.

3.6 ACCEPTANCE

- .1 Seeded areas will be accepted by Contract Administrator provided that:
 - .1 Areas are uniformly established and turf is free of rutted, eroded, bare or dead spots and free of weeds.
 - .2 Areas have been cut at least twice.
 - .3 Areas have been fertilized.
- .2 Areas seeded in fall will be accepted in following spring, one month after the start of the growing season provided acceptance conditions are fulfilled.

3.7 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations from time of acceptance until the end of the warranty period:
 - .1 Water seeded area to maintain optimum soil moisture level for continued growth of grass. Control watering to prevent washouts.
 - .2 Dead or bare patches must be repaired and reseed to the satisfaction of the Contract Administrator.
 - .3 Cut the grass to 40 mm whenever it reaches the height of 60 mm. Remove clippings, which will smother grass. Fertilize seeded areas in accordance with the fertilizing program. Spread half of the required amount of fertilizer in one direction and remainder at right angles and water in well.

END OF SECTION