

Glengarry Cairn, NHS	Specification	Section 00 00 00
Masonry Repairs	Title Sheet	Page 1
Project No. 784-30023502		September 2016

<u>Project Title</u>	Glengarry Cairn NHS, Masonry Repairs
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<u>Project Date</u>	September 2016
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PART 1 - GENERAL

1.1 Description

.1 General

.1 These detailed Specifications cover the requirements for the furnishing of all labour, materials, tools, equipment, and supervision necessary to completely perform the work, as described by the Drawings and the Specifications for the repairs/restoration of the Glengarry Cairn.

.2 Description of Work

.1 The intent of the project is to complete repairs to the stone masonry on the exterior of the Cairn, to the limits indicated on the drawings and, in conformance with good historic masonry restoration practice. Work includes but is not restricted to the following and, as detailed on the drawings and in these specifications.

.1 All work required for site access including temporary docking measures, ground protection and conveyance systems to and from the island.

.2 Provision of all necessary access to complete the masonry work including supply, maintenance and removal of all scaffolding and/or mobile lifts.

.3 Provision of all protection, barricades and signage to the work site and to prevent public access to the work area.

.4 Provision of protection to all features which may be affected by the work and, to the satisfaction of the Departmental Representative.

.5 Completion of repairs to the masonry including repointing, resetting of stone and supply of new stone to the lines and limits shown on the Contract Drawings and as directed by the Departmental Representative.

.6 Completion of all cementitious patching repairs to the lines and limits shown on the Contract Drawings.

.7 Installation of special masonry joint finish sealant as shown on the drawings.

.8 Installation of masonry vents.

.9 Clean-up site and reinstate all disturbed areas with 100 mm topsoil, seeding and mulch as directed by the Departmental Representative.

1.2 Location of the Work .1 Glengarry Cairn, National Historic site is located on Cairn Island, St. Lawrence River. The island is approximately 0.5 km off shore in the Township of Glengarry, near the Town of South Lancaster.

1.3 Relics and Antiquities .1 Relics and antiquities such as cornerstones and their contents, commemorative plaques, the remains and evidence of ancient persons and peoples, and other objects of historic value and worth will remain the property of the Department. If found, protect such articles and request direction from the Departmental Representative.

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

.3 Note that no excavation is to be carried out as part of this work.

1.4 Standards .1 Reference is made to OPSS, CGSB, ASTM, CSA and other national and international standards. These standards, when quoted, form an integral part of and are to be read in conjunction with the specification as if reproduced herein. The latest edition is applicable, unless a dated edition is specified.

1.5 Abbreviations .1 OPSS - Ontario Provincial Standard Specifications

.2 CGSB - The Canadian General Standards Board.

.3 CSA - Canadian Standards Association.

.4 CWB - Canadian Welding Bureau.

- .5 CAN2 - A National Standard of Canada published by CGSB.
- .6 CAN3 - A National Standard of Canada published by CSA.
- .7 ASTM - American Society for Testing and Materials.
- .8 ACI - American Concrete Institute.
- .9 ANSI - American National Standards Institute.
- .10 NBC - National Building Code of Canada.
- .11 JIC - Joint Industrial Conference, Hydraulic Standards for Industrial Equipment.
- .12 NLGA - National Lumber Grades Authority.
- .13 AWWA - American Water Works Association.

1.6 Definitions

- .1 Unless the context clearly indicates otherwise, the following definitions apply.
 - .1 Plans - the drawings listed in the "List of Drawings".
 - .2 Specification - the subject matter listed in the "Index to Specification", Addenda to the Specification and all relative written communications sent by the Departmental Representative to the Contractor in connection with the work.
 - .3 Department - Parks Canada, Agency, Ontario Waterways Unit.

.4 Departmental Representative - Parks Canada will appoint or designate a Departmental Representative for this Contract. The Contractor will be informed in writing of the designated individual or individuals. Should it be required to change the Departmental Representative, the Contractor will be informed in writing. The Departmental Representative and his designated site inspector will be completing inspections of the work throughout the duration of the Contract. The Contractor shall provide safe boat transporting for these individuals, to and from the site, for the duration of the work the costs of which will be deemed to be included in the tendered site access Contract item(s).

1.7 Pedestrians and the Public

- .1 Install, maintain and remove all necessary barricades and fencing to prevent pedestrian and public access to work areas. All barricades to be in accordance with the Occupational Health and Safety Act.
- .2 Provide all necessary construction signage to work area. Sign posts shall not be anchored, embedded or drilled into existing grounds. All signage to be supported by means of bracing, counter balanced above existing ground level.

1.8 Protection of the Work

- .1 Protect the work from damage by adverse climatic conditions.

1.9 General Environmental Considerations

- .1 The PCA Project Manager must be notified immediately if artifacts or human remains are discovered; the PCA Project Manager is to notify an archaeologist, the coroner's office and the Field Unit Superintendent.
- .2 A designated protected lay-down area will be identified for a re-fueling station;
- .3 Tree trimming required for access to work shall be carried out by a licensed arborist;
- .4 No materials and/or equipment are to be stored or kept within tree drip lines;

- .5 Protection against the spread of dust, debris and water at or beyond the work area by suitable enclosures of sheeting and tarpaulins;
- .6 Contractor shall be responsible for removal of all anchors, concrete pads, or any other items; for the repair and restoration of existing ground surfaces and shoreline at the completion of the job;
- .7 Any fuel, oil, or hazardous material spill must be immediately reported to a Parks Canada official and the Ministry of the Environment - Spills Action Centre - (416-325-3000 or 1-800-268-6060);
- .8 Parks Canada will provide part-time, on-site project supervision. PCA staff will monitor the installation of the access route, working platform, scaffolding and fencing to ensure that mitigation measures are employed.

1.10 Specific Mitigations
Proposed for the Construction of the Temporary, Non-Crib Dock

- .1 Removal of riparian vegetation will be kept to a minimum/ any riparian vegetation to be removed will be demarcated by the PCA project manager or direction will be provided to the Contractor;
- .2 Do not take materials (e.g., rock, logs) to build the dock from the shoreline, from below the waterline or from any water body.
- .3 If rocks, stumps or logs need to be moved on the lake or river bottom or shoreline to build the dock, they should be relocated to an area of similar depth and not removed altogether from the bottom or shoreline;
- .4 Use untreated materials (e.g., cedar, tamarack, hemlock, rocks, plastic, etc.) as supports for dock structures that will be submerged in water;
- .5 Cut, seal and stain all lumber away from the waterway using environmentally-friendly stains. All sealed and stained lumber should be completely dry before being used near water.

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| 1.11 Specific Mitigations Proposed to Avoid Disturbance to Migratory Birds | .1 | Construction activities should avoid, if necessary, the period between March 15 and May 31; |
| | .2 | If there is prior knowledge of an active nest it must be protected with an appropriate buffer until the young have fledged; |
| | .3 | No vegetation may be removed if migratory birds are nesting; vegetation only to be removed after |
| 1.12 Cultural Resource Impacts Analysis (CRIA) REcommendations | .1 | No mechanical compaction of overlying granular "A" is permitted. |
| | .2 | Limit use of machinery on access route and/or working platform to limit residual ground compaction. |
| 1.13 Measurement for Payment | .1 | No measurement for payment will be made for the item "Sitework" (Including Miscellaneous Work). Payment shall be by lump sum and shall include all costs for the following:
.1 Layout of work.
.2 Scheduling.
.3 Permits and taxes.
.4 Provision and maintenance of temporary facilities such as temporary toilet services etc.
.5 Supply, installation and maintenance of all barricades, fencing or signs.
.6 Environmental protection measures.
.7 Site clean-up and restoration. Topsoil, seeding and mulch to restore all disturbed areas of site.
.8 Any other "miscellaneous" items of work called for on the Contract Drawings and Specifications and not specifically covered by other payment items of the Contract. |
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PART 2 - PRODUCTS

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| <u>2.1 Acceptance of Materials</u> | <ul style="list-style-type: none">.1 Where materials and equipment are specified to CSA, CGSB, ASTM or similar standard, submit a written request to the Departmental Representative for approval of the relevant items. Include all relevant items. Do not use until written approval has been received from the Departmental Representative..2 Use new, unused material only, except as noted or approved by the Departmental Representative in writing..3 Materials and equipment specified by a manufacturer's name, catalogue number or trade name are intended to establish a standard of quality. Materials or equipment at least equivalent thereto may be submitted to the Departmental Representative for approval along with proof of equivalence. |
| <u>2.2 Samples</u> | <ul style="list-style-type: none">.1 The Contractor shall be responsible for providing samples and sampling. The Departmental Representative will be responsible for testing. |
| <u>2.3 Rectification of Existing Surfaces and Materials</u> | <ul style="list-style-type: none">.1 Repair, replace and/or refinish, to the Departmental Representative's approval, existing surfaces and items damaged by the work, including the access route(s)..2 The repaired, replaced and/or refinished items to be at least equal to those that existed immediately before damage occurred..3 Restore topsoil and seed and mulch at the Contractor's expense in areas which have been disturbed by the Contractor's operations under this Contract and which are not covered by other items of the Contract..4 Restoration must occur as soon as possible after construction is completed..5 Seeded areas will be accepted when the turf is properly established. |
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PART 3 - EXECUTION

- 3.1 Requirements of Regulatory Agencies
- .1 The Contractor shall be entirely responsible for the design and adequacy of all supports, bracings, blocking, handrails, scaffolding, conveyance systems, etc. used in the construction, and shall comply with all applicable Provincial and Municipal ordinances.
 - .2 Adhere to National, Provincial and Municipal requirements relating to the safety, health and protection of workers and the environment.
- 3.2 Scheduling
- .1 The Contract must be completed on or by the date specified in the instructions to tenderers portion of these documents.
 - .2 Submit the Construction Progress Schedule within five days of award of Contract. No progress payments will be made until the Construction Progress Schedule is approved. Submit a cost breakdown for each lump sum payment item - the breakdown to be in sufficient detail as to permit the calculation of progress payment amounts. Upon receipt of notice from the Departmental Representative, in writing, that the Progress Schedule is not approved or no longer valid, submit a revised Construction Progress Schedule within five days.
 - .3 Take all necessary measures to complete the work within the scheduled times approved by the Departmental Representative.
 - .4 Do not make changes to the approved schedule except with the Departmental Representative's approval.
- 3.3 Layout of the Work
- .1 The Contractor to be responsible for all layout and control of the work.
- 3.4 Temporary Services
- .1 Contractor to make provision for temporary power and water supplies.
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- .2 Contractor to provide and maintain temporary sanitary services for the project duration.
- .3 Provide suitable storage facilities for all equipment and materials/supplies.

3.5 Examination of the Site of the Work

- .1 One site visit has been scheduled during the tender period. This visit is scheduled as indicated in the instructions to tenderer's. Confirmation of attendance is to be made through the Parks Canada Project Manager. No other visits will be scheduled by the Owner.
- .2 Investigate and be fully informed as to the character and extent of the work to be performed and the difficulties involved, the facilities available for delivering, placing and operating the necessary plant and delivering and handling of materials.

3.6 Clean-Up

- .1 Clean and tidy the work area on a daily basis and permit no undue amounts of debris, trash, and/or garbage to accumulate.
- .2 At the completion of the work, remove all surplus materials, tools, plant, rubbish and debris and dispose of them in an approved manner, off the site.

3.7 Taxes

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

3.8 Permits

- .1 Pay all fees and obtain all permits. Provide authorities with plans and information for acceptance certificates. Notify the Ministry of Labour of the work. Provide inspection certificates as evidence that work conforms with requirements of authority having jurisdiction.

3.9 Documents Required

- .1 Maintain at job site, one copy each of following.

- .1 Contract Drawings,
- .2 Specifications,
- .3 Addenda,
- .4 Change Orders,
- .5 Other modifications,
- .6 Field Test Reports,
- .7 Copy of approved work schedule,
- .8 Manufacturers' installation and application instructions,
- .9 Notice of Project issued by Ministry of Labour,
- .10 All items required to be maintained on site as per 01 35 30 - Health and Safety Requirements,
- .11 Waste Management Plan, and
- .12 Site Specific Safety Plan.

<u>3.10 Fires</u>	.1	Fires and burning of rubbish or any material on site is not permitted.
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<u>3.11 Disposal of Waste</u>	.1	Fires and burning of rubbish or any material on site is not permitted.
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<u>3.12 Disposal of Waste</u>	.1	Do not bury rubbish and waste materials on site.
	.2	Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner on site.
	.3	All waste described as subject to Regulation 309, Environmental Act, must be transported with a valid "Certificate of Approval for a Waste Management System" to a site approved to accept the waste.
	.4	Do not dispose of any waste water in storm drains.

<u>3.13 Straw Bales Protection</u>	.1	Straw bales and all other environmental protection measures to be installed and inspected prior to the commencement of work.
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<u>3.14 Disruption of Site</u>	.1	Minimize disruption of site and restore all damaged features to satisfaction of Departmental Representative and at least to the condition before damage occurred.
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<u>3.15 Progress Payments</u>	.1	A number of items in this Contract are paid for on a lump sum basis. Prior to submission of the first progress payment claim, the Contractor shall submit to the Departmental Representative a detailed breakdown of these lump sum items in order to facilitate approval and processing of progress payment claims. The detailed breakdown is subject to review and approval by the Departmental Representative. Failure to provide a breakdown to the approval of the Departmental Representative may constitute grounds for delay of payment without recourse by the Contractor for any costs in delay in payment or for any interest on the monies owing.
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PART 1 - GENERAL

1.1 General

- .1 This section specifies general requirements and procedures for contractors submissions of shop drawings, product data, samples and mock-ups to the Departmental Representative for review. Note that additional specific requirements for submissions are also specified in other individual sections of these specifications.
 - .2 Do not proceed with work until relevant submissions are reviewed by the Departmental Representative.
 - .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
 - .4 Where items or information are not produced in SI Metric units, converted values are acceptable.
 - .5 Contractor's responsibility, for errors and omissions in submission, is not relieved by the Departmental Representative's review of submissions.
 - .6 Notify the Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
 - .7 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by the Departmental Representative's review of submission, unless the Departmental Representative gives written acceptance of specific deviations.
 - .8 Make any changes in submissions which the Departmental Representative may require consistent with Contract Documents and resubmit as directed by the Departmental Representative.
 - .9 Notify the Departmental Representative, in writing, when resubmitting any revisions other than those requested by the Departmental Representative.
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1.2 Submission
Requirements

- .1 Co-ordinate, each submission, with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.
 - .2 Allow 7 days for the Departmental Representative's review of each submission.
 - .3 Accompany submissions with transmittal letter containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
 - .4 Submission shall include:
 - .1 Date and revision dates.
 - .2 Project title and dates.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractors authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents. Note: submissions without a signed Contractor's stamp will not be reviewed and will be returned to the Contractor for resubmission with the required signed stamp.
 - .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.
 - .5 After the Departmental Representative's review, distribute copies.
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- 1.3 Shop Drawings
- .1 Shop drawings: original drawings, or modified standard drawings provided by the Contractor, to illustrate details of portions of the Work, which are specific to the project requirements.
 - .2 Submit shop drawings as follows:
 - .1 Minimum of three (3) copies of prints which will be retained by the Departmental Representative plus a reasonable number of prints the Contractor wants returned for the Contractor's use.
 - .3 Cross-reference shop drawing information to applicable portions of the Contract Documents.

- 1.4 Product Data
- .1 Product data: manufacturers catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products.
 - .2 Submit two (2) copies of product data.
 - .3 Sheet size: 215 x 280 mm, maximum of 3 modules.
 - .4 Delete information not applicable to project.
 - .5 Supplement standard information to provide details applicable to project.
 - .6 Cross-reference product data information to applicable portions of Contract Documents.

- 1.5 Samples
- .1 Samples: examples of materials, equipment, quality, finishes, workmanship.
 - .2 Where colour, pattern or texture is criterion, submit full range of samples.
 - .3 Reviewed and accepted samples will become standard of workmanship and material against which installed work will be verified.
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| <u>1.6 Mock-ups</u> | .1 | Mock-ups: field-erected example of work complete with specified materials and workmanship. |
| | .2 | Erect mock-ups at locations acceptable to the Departmental Representative. |
| | .3 | Reviewed and accepted mock-ups will become standards of workmanship and material against which installed work will be verified. |
| | | |
| <u>1.7 Shop Drawings Review</u> | .1 | The review of shop drawings by the Departmental Representative is for the sole purpose of ascertaining conformance with the general concept. This review shall not mean that the Departmental Representative approves the detailed design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and contract documents. Without restricting the generality of the foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and, for co-ordination of the work of all sub-trades. |

PART 2 - PRODUCTS

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| <u>2.1 Not used</u> | .1 | Not Used. |
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PART 3 - EXECUTION

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| <u>3.1 Not used</u> | .1 | Not used. |
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PART 1 - GENERAL

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| <u>1.1 References</u> | .1 | CSA S269.1-1975 (R1998) Falsework for Construction Purposes. |
| | .2 | CAN/CSA-S269.2-M87 (R1998) (Access Scaffolding for Construction Purposes). |
| | .3 | FCC No. 301-1982 Standard for Construction Operations. |
| <u>1.2 Related Work</u> | .1 | Section 01 54 23 - Access and Protection. |
| <u>1.3 Construction Safety Measures</u> | .1 | Observe construction safety measures of National Building Code, Canadian Labour Code, Provincial Government, Workers'/Workmen's Compensation Board and municipal authority provided that in any case of conflict or discrepancy, the more stringent requirements shall apply. |
| | .2 | Comply with requirements of FCC No. 301. |
| <u>1.4 Overloading</u> | .1 | Ensure no part of Work is subjected to loading that will endanger its safety or will cause permanent deformation. |
| <u>1.5 Falsework</u> | .1 | Design and construct falsework in accordance with CSA S269.1. |
| <u>1.6 Scaffolding</u> | .1 | Design and construct scaffolding in accordance with CSA S269.2 |
| <u>1.7 WHMIS</u> | .1 | Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada and Health and Welfare Canada. |
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- .2 Deliver copies of WHMIS data sheets to Departmental Representative on delivery of materials.

PART 2 - PRODUCTS

<u>2.1 Not used</u>	.1 Not Used.
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PART 3 - EXECUTION

<u>3.1 Not used</u>	.1 Not used.
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PART 1 - GENERAL

- 1.1 References .1 Canadian Standards Association (CSA):
- .1 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures.
 - .2 National Building Code 2005 (NBC):
 - .1 Division B, Part 8 Safety Measures at Construction and Demolition Sites
 - .3 National Fire Code 2005 (NFC):
 - .1 NFC 2005, division B, Part 2 Emergency Planning, subsection 2.8.2 Fire Safety Plan.
 - .4 Province of Ontario:
 - .1 Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, O. Reg. 213/91 as amended, Reg. 834, O. Reg. 278/05 (Asbestos - Construction).
 - .2 Workplace Safety and Insurance Act, 1997
 - .3 Municipal statutes and authorities.
 - .5 Fire Commissioner of Canada (FCC):
 - .1 FC-301 Standard for Construction Operations.
 - .2 FC-302 Standard for Welding and Cutting, June 1982.
 - .6 Canada Labour Code - Part II, Occupational Health and Safety Regulations.

Human Resources Development Canada
Labour Program
Fire Protection Engineering Services
4900 Yonge Street 8th Floor
Willowdale, Ontario M2N 6A6
and copies may be obtained from:
Human Resources Development Canada
Labour Program
Fire Protection Engineering Services
Ottawa, Ontario K1A 0J2

- 1.2 Submittals .1 Make submittals in accordance with Sections 01 01 00 and 01 33 00.
- .2 Submit site-specific Health and Safety Plan: Within 5 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.
 - .3 Measures and controls to be implemented to address identified safety hazards and risks.
 - .4 Contractor's and Sub-contractors' Safety Communication Plan.
 - .5 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations.
 - .3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and may provide comments to Contractor within 5 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 5 days after receipt of comments from Departmental Representative.
 - .4 Departmental Representative's review of Contractor's final Site Specific Health and Safety Plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction site health and safety.
 - .5 Submit records of Contractor's Safety Meetings at site meetings.
 - .6 Submit 1 copy of the Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative when requested.
 - .7 Submit copies of reports or directions issued by safety inspectors of authority having jurisdiction.
 - .8 Submit copies of incident and accident reports.
 - .9 Submit Material Safety Data Sheets for all products and items used on site(MSDS)to Departmental Representative.
 - .10 Submit names of personnel and alternates responsible for site safety and health.
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- .11 Submit WSIB - Workplace Safety and Insurance Board, Experience Rating Report for Province of Ontario.
- .12 Submit signed Attestation and Proof of Compliance with Occupational Health and Safety Parks Canada form prior to start of sitework.

1.3 Filing of Notice

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

1.4 Safety Assessment

- .1 Perform site specific safety hazard assessment related to project. Identifying all potential hazards.

1.5 Meetings

- .1 Pre-construction meeting: schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of work.

1.6 Regulatory Requirements

- .1 Comply with Acts and regulations of the Province of Ontario.
- .2 Comply with specified standards and regulations to ensure safe operations at site.
- .3 In event of conflict between any provisions of specified standards and regulations, the most stringent provision governs.

1.7 Project Site Conditions

- .1 Work at the the site may also involve
 - .1 A Hazard Assessment and listing of designated substances on site.
- .2 Contact with
 - .1 Silica/dust in Concrete and masonry rubble.
- .3 Work at a site open to the Public.
- .4 Work at heights.

- .5 Work in areas with vehicle access.
- .6 Work with lime and water.
- .7 Work with noise.
- .8 Work requiring transport of personnel, materials and equipment, on a water body, to the work site.

1.8 General Requirements

- .1 Develop an independent written site-specific Health and Safety Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until after final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Relief from or substitution for any portion or provision of minimum Health and Safety Guidelines specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing. Departmental Representative will respond in writing, where deficiencies are noted and request resubmission with correction of deficiencies either accepting or requesting improvements.

1.9 Responsibility

- .1 Be responsible for safety of persons and property on site and for protection of environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- .3 Where applicable the Contractor shall be designated "Constructor", as defined by Ontario Act.

1.10 Compliance Requirements

- .1 Comply with Ontario Health and Safety Act, R.S.O.
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- 1.11 Unforeseen Hazards
- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Departmental Representative verbally and in writing.
 - .2 Follow procedures in place for Employees Right to Refuse Work as specified in the Act for the Province of Ontario.

- 1.12 Posting of Documents
- .1 Provide documents as follow and post on site in a conspicuous location:
 - .1 Contractor's Safety Policy.
 - .2 Constructor's Name
 - .3 Health & Safety Representatives Name.
 - .4 Ministry of Labour Orders for Province of Ontario.
 - .5 Occupational Health and Safety Act for Province of Ontario.
 - .6 Material Safety Data Sheets.
 - .7 Safety Plans.
 - .8 Notice of Project.
 - .9 Joint Health and Safety Committee Members(where required).
 - .10 Site specific safety plan.
 - .2 Comply with Provincial general posting requirements.

- 1.13 Correction of Non-Compliance
- .1 Immediately address health and safety non-compliance issues identified by Departmental Representative and regulatory agency having jurisdiction in the Province or any individual who notes a safety related issue.
 - .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
 - .3 Departmental Representative may stop work if a perceived non-compliance of health and safety regulations is perceived to not be immediately corrected.
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- 1.14 Work Stoppage .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
- .2 Assign responsibility and obligation to Competent Supervisor to stop or start Work when, at Competent Supervisor's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop work for health and safety considerations.

PART 2 - PRODUCTS

- 2.1 Not Used .1 Not used.

PART 3 - EXECUTION

- 3.1 Not Used .1 Not used.

PART 1 - GENERAL

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| <u>1.1 Related Requirements Specified Elsewhere</u> | .1 | Particular requirements for inspection and testing to be carried out by testing laboratory designated by Departmental Representative are specified under various sections. |
| <u>1.2 Appointment and Payment</u> | .1 | Departmental Representative will appoint and pay for services of testing laboratory except for the following:
.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
.2 Inspection and testing performed exclusively for Contractor's convenience.
.3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
.4 Mill tests and certificates of compliance.
.5 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.
.6 Additional tests specified in paragraph 1.2.2. |
| | .2 | Where tests or inspections by designated testing laboratory reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests or inspections as Departmental Representative may require to verify acceptability of corrected work. |
| <u>1.3 Contractor's Responsibilities</u> | .1 | Furnish labour and facilities to:
.1 Provide access to work to be inspected and tested, including safe boat transportation of testing personnel to and from the site.
.2 Facilitate inspections and tests.
.3 Make good work disturbed by inspection and test.
.4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples. |
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- .2 Notify Departmental Representative sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.

PART 2 - PRODUCTS

<u>2.1 Not used</u>	.1 Not Used.
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PART 3 - EXECUTION

<u>3.1 Not used</u>	.1 Not used.
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PART 1 - GENERAL

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| <u>1.1 Related Work</u> | .1 | Section 01 01 00 - General Requirements. |
| <u>1.2 Access to the Work</u> | .1 | Access to the work site is complicated by the fact that the Cairn is on an island. The Contractor shall complete access to the island via watercraft and shall construct a temporary dock, at the site of the "access corridor" on the island, to be used for the transfer of all personnel, materials and equipment. The Contractor shall submit details of the docking system and method of anchorage to the Departmental Representative for review and approval. Note that a DFO permit may be required depending on the construction of the dock and it's size. Dock to be constructed and installed in accordance with DFO guidelines, as applicable. Dock will be painted with a yellow border with signs posted "Not for Public Use". A flashing yellow beacon will be fixed on the dock. |
| | .2 | The Contractor shall also arrange for and pay all fees for a mainland staging area as part of this work. Releases from the affected property owners will be required prior to release of any holdback monies on this project. |
| | .3 | The Contractor shall construct an "access corridor" as described on the Contract Drawings. The corridor is to consist of a cellular confinement system with granular overlaying a non-woven geotextile. Corridor is to be constructed to the dimensions and grades detailed on the drawings. |
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<u>1.3 Conveyance System</u>	.1	Conveyance of materials and equipment to the Cairn on the Island shall be via the "access corridor" shown on the drawings. The "corridor" has been selected as the one location which will minimally effect the archaeological resources of the site. The Contractor shall submit details of his conveyance methods to be used in this "corridor" to the Departmental Representative for review and approval.
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<u>1.4 Measurement for Payment</u>	.1	No quantities associated with items of work described in this section will be measured for payment purposes.
	.2	The lump sum price for the item "Site Access" shall include all costs for labour, materials and equipment required for the following: <ul style="list-style-type: none"> .1 The setup, maintenance and restoration of mainland staging area(s). .2 The construction, maintenance and site restoration of docking facilities at the island. .3 The construction, maintenance and site restoration of the work and storage areas, the "access corridor" and ground protection, all as indicated on the drawings. .4 Provision of all watercraft, barges, etc. required to transport materials, equipment and labour to and from the island and including safe boat transportation for Parks Canada personnel, the Departmental Representative and, Site Inspector(s) for the duration of the project and for the purpose of completing inspections of the work (this latter transportation requirements shall be provided within 24 hours notice given to the Contractor).

<u>1.5 Basis of Payment</u>	.1	All other work necessary for completion of the work of this section, will not be measured separately for payment, but will be considered incidental to the work with the cost included in the item "Site Access".
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PART 2 - PRODUCTS

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| <u>2.1 Conveyance
Systems</u> | .1 | Materials shall be new or used, in good condition. |
| <u>2.2 Ground
Protection</u> | .1 | The cellular confinement system shall be a light-weight, flexible, polyethylene confinement system of three-dimensional cells in a honeycomb - like structure. An example of an acceptable product for this application is Terraweb by Terrafix, cell depth 150 mm and seam peel strength of 2130 N. |

PART 3 - EXECUTION

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| <u>3.1 Requirements of
Regulatory Agencies</u> | .1 | Obtain approvals from and pay all fees to Federal or Provincial agencies for temporary docking facilities which require in-water work or possible disruption of fish habitat. |
| <u>3.2 Scheduling</u> | .1 | Within one (1) month of award, submit shop drawings providing details of the docking system and access corridor construction in sufficient detail to allow Parks Canada Agency Archaeologist to determine exact locations of disturbance to existing conditions within the "corridor". |
| <u>3.3 Shop Drawings</u> | .1 | The conceptual and detailed design of all access works shall be the responsibility of the Contractor. |
| | .2 | Submit five sets of shop drawings showing layout and details of dockage and access corridor systems to the Departmental Representative for review and approval. |
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- .3 Shop drawings shall be stamped by a Professional Engineer, registered in the Province of Ontario, who is experienced in this type of work. The same Professional Engineer shall inspect the installed work on site before it is put into use and shall provide the Departmental Representative with a letter indicating that the installation is in conformance with the design and drawings.

3.4 Installation

- .1 Install all access works and protection systems in strict conformance with received shop drawings and manufacturer's recommendations for any products used as part of the work.
- .2 The intent of the confinement and granular system to be used in the access corridor and around the Cairn, is to prevent any rutting of the existing grounds by any aspects of the work of this project. Should rutting occur, cease operations immediately and obtain direction from Departmental Representative before re-commencing work.

3.5 Restoration

- .1 Contractor shall be responsible for removal of all anchors, concrete pads, or any other items, and for the repair and restoration of existing ground surfaces and shoreline at the completion of the job.

PART 1 - GENERAL

- 1.1 Items of Work .1 This section covers the requirements for:
- .1 The provision of access to permit work to be carried out for restoration of the masonry of the Cairn.
 - .2 Any mobile access buckets used shall be of suitable size and capacity to permit access to work without damaging surrounding site or structure features.
 - .3 The supply, maintenance and removal of all plywood covers or, other protective measures deemed necessary by the Departmental Representative, to protect existing features.
 - .4 Provision of shop drawings of all scaffolding methods and locations, if scaffolding is proposed for access to complete the work.
- 1.2 Related Work .1 Section 01 01 00 - General Requirements.
- .2 Section 01 54 22 - Site Access and Conveyance Systems.
 - .3 Section 04 43 03 - Repair of Stone Masonry.
 - .4 Section 04 43 04 - Repointing and Miscellaneous Masonry.
 - .5 Section 04 43 05 - Masonry Removals.
 - .6 Section 04 43 07 - Installation of Masonry.
 - .7 Section 04 43 19 - Cut Stone.
- 1.3 Definition .1 Scaffolding: any method used for access to carry out the work such as rigid framed scaffolding, mobile access buckets, cranes, ladders, etc.
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<u>1.4 Measurement and Payment</u>	.1	No measurement for payment will be made for the item "Access and Protection on Site". Payment shall be by lump sum. All costs for labour, equipment and materials necessary to erect and dismantle scaffolding (if used for access to complete the work), mobile lifts, barriers and measures to protect existing features of the Cairn structure and to maintain them for the duration of the work are to be included in the lump sum bid for this item.
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PART 2 - PRODUCTS

<u>2.1 Scaffolding (If Used) and Mobile Access Lifts</u>	.1	If used for access to complete the work scaffolding materials shall be new, or used materials in good condition. Provide five sets of shop drawings to the Departmental Representative for review and approval. Contractor shall note that the Cairn is a dry laid stone structure with mortar only applied on the exterior joints. The contractor's engineer shall carefully examine the structure and especially points of planned support to ensure that the scaffold arrangement will be adequately supported both with regard to safety of the workers using the scaffolding and also with regard to not damaging the structure.
	.2	Any mobile access buckets used shall be of suitable size and capacity to permit access to work without damaging surrounding site or structure features.

PART 3 - EXECUTION

<u>3.1 Scaffolding, Hoarding and Barriers</u>	.1	Provide all scaffolding, ladders, access, lifting equipment, etc. as necessary to carry out the work of all trades.
	.2	The Departmental Representative will require access to work periodically in order to complete reviews and inspection of work. Upon request, the Contractor shall make provisions for this access.

- .3 Scaffolding shall be erected on wood sills which are placed on tarps to prevent discolouration or contamination of surfaces.
- .4 Provide suitable ladders to scaffolding at each section of scaffold isolated from other sections, for full height of scaffold. Access from the ladder(s) to the scaffolding shall be clear of obstructions and cross bracing so men and materials can easily enter.
- .5 Scaffolding shall be designed, drawn and inspected by a registered Professional Engineer, in the Province of Ontario, experienced in this work, if deemed necessary by the "Ontario Health and Safety Act and Regulations for Construction Projects". Provide shop drawings for review. Make all changes required by Ministry of Labour officials. Prior to using the scaffolding for carrying out the work, the Design Engineer for the scaffolding shall complete an inspection of the installation and shall provide the Departmental Representative with a letter stating that the installation conforms with his/her design and is suitable for the Contractors use. Make all changes required by Ministry of Labour officials. Provide for periodic inspections monthly as scaffolding and work progresses.
- .6 Install, maintain and remove all plywood covers or other measures to protect existing features.
- .7 Contractor shall be responsible for removal of all anchors from the masonry (Note, anchors shall only be installed in masonry joints and not in stone units). Contractor is responsible to ensure all holes are filled to the satisfaction of the Departmental Representative as scaffolding is dismantled.

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- 3.2 Tree Protection .1 The trimming of trees required to permit access to work shall be carried out by a Licensed Arborist only.
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- .2 Trees are not to be damaged and shall be protected from construction operations. No materials and/or equipment are to be stored or kept within the tree drip lines. Install tree protection according to OPSS 801.

PART 1 - GENERAL

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| <u>1.1 Items of Work</u> | .1 | Unless otherwise noted, provide all necessary shoring to support stonework remaining when removals occur and support from below is lost. |
| | .2 | Provide bracing as required to ensure all masonry remains stable at all times. |
| <u>1.2 Related Work</u> | .1 | Section 01 33 00 - Shop Drawings, Product Data, Samples and Mock-ups. |
| | .2 | Section 04 43 05 - Masonry Removals. |
| <u>1.3 Definitions</u> | .1 | Bracing: temporary support installed in structure to increase rigidity in both longitudinal and transversal axes and thus stabilize against deformations. |
| | .2 | Shoring: temporary support installed in an excavation or structure to relieve vertical and/or horizontal loads to permit alterations or repairs to foundation or main supporting elements. |
| <u>1.4 Source Quality</u> | .1 | Structural Steel to conform to CSA G40.21-98, Grade 300W or Grade 350W. |
| | .2 | Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board. |
| | .3 | Plywood identification: by grade mark in accordance with applicable CSA standards. |
| <u>1.5 Measurement and Payment</u> | .1 | No measurement for payment will be made for the work of this section. All costs associated with the work of bracing and shoring shall be deemed to be included in the related masonry items. |
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PART 2 - PRODUCTS

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| <u>2.1 Material</u> | .1 | Structural members: solid timber or built-up timber group A, B, C or D, grade structural No. 1 to CAN/CSA-0141-91. |
| | .2 | Structural steel members: to CSA G40.21-98, Grade 300 or Grade 350, Type W. |
| | .3 | Wood connections: Canadian soft wood plywood to CSA 0151-M1978, Douglas Fir plywood to CSA 0121-M1978, Poplar plywood to CSA 0153-M1980 sheathing grade. |
| | .4 | Steel connections: steel plates and angles to CSA G40.21-98, Grade 300 or 350, Type W. |
| | .5 | Nails: to CSA B111-1974. |
| | .6 | Bolts: lag screws, nuts and washers to CAN3-086-M84. |
| | .7 | High-tensile bolts: to ASTM A325M-86. |
| | .8 | Welding materials: CSA W59-M1984. |
| | .9 | Temporary Jack Posts: Heavy duty and having capacity as required. |

PART 3 - EXECUTION

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| <u>3.1 Inspection</u> | .1 | Before work is begun, inspect conditions upon which this work depends for damage and weakness and inform Departmental Representative in writing of conditions not discussed in Contract. |
| <u>3.2 Installation</u> | .1 | Erect structural timber to CAN3-086-M84. |
| | .2 | Fabricate and erect structural steel work to CAN3-S16.1-M84 and CAN3-S136-M84. |
| | .3 | Weld to CSA W59-M1984. |
| | .4 | Install braces and/or shoring to support masonry to remain. |
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- .5 Install braces as required to maintain stone masonry in a safe and stable condition.
- .6 Install packing behind wall pieces to compensate for unevenness of wall surfaces.

3.3 Maintenance

- .1 Maintain effectiveness of system by making adjustments, replacing or repairing damaged and weakened elements of system until final completion of project.

PART 1 - GENERAL

1.1 Description of Work

.1 Work of this section includes, but is not limited to:

.1 The chipping and repointing of stonework to the lines and depths delineated on the Contract Drawings or as directed by the Departmental Representative.

.2 When necessary, the resetting of dislodged masonry units.

1.3 Installation of mortar fill as directed by the Departmental Representative and the installation of mortar fill as capping on the top of the Cairn, to form the base for the installation of lead flashing, and to form crickets on the treads of the stairway.

.4 Installation of masonry vents.

.5 Installation of special masonry joint finish sealant.

- .2 The existing masonry joints were completed using Grey Portland Cement based mortars. This use has resulted in a joint colour that is a medium to dark grey, after weathering. It has been decided that the maintenance of this colour is a priority and the use of lime based mortars, with white non-staining Portland Cement (the normal practice for today's heritage restoration projects), will not provide this medium to dark grey colouration and will therefore not be used on this project. A grey Portland Cement is to be used in lieu of white non-staining Portland Cement and, recognizing that colour is also very much dependent on the colour of the sand, it will also be important to identify a "darker" sand supply for the completion of this work. The determination of a mortar, having a suitable colouration, will then involve completing trial batches, possibly many, to arrive at a final approved mortar colour. Provided that the other properties of the trial batch mortars are acceptable (ie., strength, air entrainment, etc.), these can be used as back-up mortar (in which case, these can serve as the trial test patch areas) or, mortar fill. No finish pointing is to be completed until an approved mortar mix has been arrived at. Note also that an acceptable mortar colour will only be determined after a trial batch has been placed, the curing period is complete and, a minimum of seven days has elapsed, from the end of the curing period, to allow the joint to dry out.

- 1.2 Related Work
- .1 Section 01 54 23 - Access and Protection.
 - .2 Section 04 43 01 - Bracing and Shoring.
 - .3 Section 04 43 05 - Masonry Removals.
 - .4 Section 04 43 07 - Installation of Masonry.
 - .5 Section 07 62 00 - Flashing and Sheet Metal.

- 1.3 Qualifications
- .1 All work to be completed by skilled tradesmen, experienced in the type of work specified.

- .2 The work of this section shall be executed under the continuous supervision and direction of a competent mason.
- .3 One thoroughly experienced, reliable and competent workman shall be in charge of all mortar mixing for the duration of the job.

1.4 Definitions

- .1 Repointing: filling and finishing of masonry joints from which mortar has been raked out or omitted.
- .2 Tooling: finishing masonry joints to provide final contour.
- .3 Repair: using adhesives to sections of fractured masonry.
- .4 Consolidation: strengthening masonry units to prevent deterioration (spalling).

1.5 Standards

- .1 All masonry restoration to be to CSA A371-94, "Masonry Construction for Buildings" and as augmented by these specifications.
- .2 "Mortar and Grout for Unit Masonry" to be in accordance with CSA A179-94 and as augmented by these specifications.
- .3 "Connectors for Masonry" to be in accordance with CSA A370-94 and as augmented by these specifications and the Contract drawings.
- .4 "Quicklime for Structural Purposes" to be in accordance with ASTM C5-79 (1992).
- .5 "Hydrated Lime for Masonry Purposes" to be in accordance with ASTM C207-91 (1992).

1.6 Inspection and Testing

- .1 Routine testing of materials, of proposed mortar mix and of final work for compliance with the specification, will be carried out by the Departmental Representative or his appointed representative. Mortar samples shall be taken from time to time for testing.
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- .2 If test results show that performance criteria are not met, removal and repair of rejected work shall be performed at no additional cost to the Owner. All work must be done to the original specification.

1.7 Standard Reference Test Panel

- .1 Before commencement of final pointing work, the Contractor shall complete test panels demonstrating all aspects of the repair procedure for each type of masonry materials specified. As well as achieving the desired colour (see 1.1.2).
- .2 The panel(s) shall be located as directed by the Departmental Representative or, can be the back-up mortar, provided all other aspects of the trial batch have been approved other than colour.
- .3 The completed panel is to be used as the standard reference for acceptance or rejection of all repointing work on the job.
- .4 Start work only upon receipt of written approval of the test panel by the Departmental Representative.

1.8 Samples

- .1 Submit mortar samples in quantity and size to the requirements of CSA A179M.
- .2 Clearly labelled samples of all materials to be used on the job shall be submitted to the Departmental Representative for approval before work starts.
- .3 The approved samples shall become the standard for the materials used on the job. Substitutions shall not be permitted without written approval from the Departmental Representative.

1.9 Storage and Handling of Materials

- .1 Store cementitious materials in accordance with CSA A5. Store aggregates in accordance with CSA A23.
 - .2 All materials are to be kept dry and protected from weather and contamination. Masonry units are to be stacked on pallets.
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- .3 Manufacturers' labels and seals must be intact upon delivery.
- .4 Any material that has deteriorated or has been contaminated shall not be incorporated into the work and must be removed from the site.
- .5 Store lime putty in plastic-lined, sealed drums. Do not allow lime putty to freeze at any time.

1.10 Environmental Requirements

- .1 When the air temperature is less than 5°C, sand and mixing water shall be heated to produce mortar at a temperature of not less than 5°C or more than 27°C.
- .2 No mortar may be placed when the temperature is below 0°C (32°F), or below 4°C (40°F) and falling. Repointing must not be done at temperatures above 27°C (80°F) unless shading and water-misted burlap is provided over new work.
- .3 All newly laid masonry mortar placed during cold weather, shall be protected and heated in a manner that will maintain an air temperature above 5°C for 24 hours beyond the required curing period, by means of a covering or enclosure and where necessary by supplementary heat. During cold weather and prior to placing new masonry, area is to be heated for a minimum of 24 hours so that the masonry or base materials to which the new masonry is to be placed is completely free of frost and above a temperature of 5°C.

1.11 Protection

- .1 All methods of enclosure and protection shall be to the approval of the Departmental Representative.
 - .2 Newly laid mortar shall be protected from excessive exposure to rain, full sunlight and wind until the surface is thumb-print hardened.
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- .3 Provide and maintain protection for masonry at all times, when work is suspended, to prevent water from entering partially repointed masonry or to prevent rapid drying of the joints resulting in the development of shrinkage cracking.
- .4 Protection shall consist of non-staining plastic sheets, tarpaulins or burlap, secured to prevent lifting in high winds.
- .5 Provide protection boards to exposed corners and vulnerable decorative work which may be damaged by construction activities. Maintain protection for the duration of operations. Remove and dispose of protective material as directed by the Departmental Representative.
- .6 Provide protection against the spread of dust, debris and water at or beyond the work area by suitable enclosures of sheeting and tarpaulins.

1.12 Existing Condition

- .1 The Contractor shall report to the Departmental Representative, in writing, all areas of severely deteriorated masonry revealed during the work, and shall await instruction regarding repair or replacement of masonry units.

1.13 Measurement for Payment

- .1 Measurement for payment for the following items shall be as indicated.
 - .1 "Mortar Fill"m3.
 - .2 "Mortar Fill for Crickets on Stairway"m3.
 - .3 "Remove and Reset Loose Masonry Units"m3.
 - .4 "Supply & Install Masonry Vents"(each).
- .2 No measurement for payment will be made for the items "Chipping and Repointing", "Installation of Special Masonry Joint Finish Sealant" and, "Removal of Existing Capping on Cairn". Payment shall be by lump sum.

- .3 Measurement for payment for the items, "Mortar Fill" and "Mortar Fill for Crickets on Stairway" shall be by the cubic metre (m3) of mortar fix acceptably placed as fill to voids (including deep joints), the mortar fill base to the lead flashing at the top of the Cairn and, as crickets on the stairway. Measurement shall be facilitated by calculating the average volume of material in a selected container to be used for measurement. A record, together with a description of location used, shall be kept by the Contractor and the Departmental Representative. The record shall be signed off by the Contractor's Representative and the Departmental Representative each day that fill mortar is used. Should the Contractor fail to have this completed daily when mortar fill is being used (shall give the Departmental Representative at least 24 hours notice), the volume shall be estimated by the Departmental Representative and compared to the Contractor's record. Should there be a difference, the Departmental Representative's estimate will be considered as final for payment purposes.

Note that the supply and installation of sealant on the cricket peripheries is to be included in item "Mortar Fill for Crickets on Stairway".

- .4 For the removal and resetting of loose masonry units, the volume shall be based on the average dimensions of the stone unit which is to be reset. Units dealt with under this item will only be as authorized by the Departmental Representative and shall not be considered as part of the work of sections 04 43 05, Masonry Removals, or 04 43 07, Installation of Masonry. Where large loose units are reset by packing voided joints with mortar, all mortar not paid for under the relevant Chip and Repoint item shall be paid for under the mortar fill item and no payment will be made under the Item "Remove and Reset Loose Masonry Units".
- .5 The item "Removal of Existing Capping on Cairn" is in regard to the removal of the cementitious capping of the Cairn around the cannon.
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| <u>1.14 Basis of Payment</u> | .1 | Payment at the unit or lump sum prices bid for the above items shall be full compensation for all labour, equipment and materials necessary to do the work of these items in accordance with the Contract drawings and these specifications. |
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PART 2 - PRODUCTS

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| <u>2.1 Mortar</u> | .1 | Mortar shall be Type 'S' in accordance with Table 3 of CSA A179-04. |
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| <u>2.2 Water</u> | .1 | Water shall be potable and free from contamination. |
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| <u>2.3 Cement</u> | .1 | Cement shall be a grey Portland Cement. |
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| <u>2.4 Lime</u> | .1 | Lime shall be preferably slaked quicklime putty made from finely ground crushed quicklime conforming to CSA A82.(quicklime for structural purposes, acceptable product as manufactured by Domtar Chemicals Ltd., Beechville, Ontario: 5 mm (3/16") - fines, dry-bagged quicklime). |
| | .2 | Dolomitic finishing hydrated lime (Type S) or Masons hydrated lime (Type N) conforming to CSA A82 may be used. |

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| <u>2.5 Pigments</u> | .1 | Pigments shall be approved dry, powdered, inorganic pigments compatible with the materials to which the pigment is added. |
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- 2.6 Aggregates
- .1 The sand aggregate shall be a well-graded sand (concrete sand conforming to CSA A-179) matching the texture and range of sizes found in the existing typical joints. The colour of the sand shall match that of the existing mortar; a blending of sands may be required to achieve a satisfactory colour match. The colour of the mortar should ideally be achieved through the mixing of colours of sand. Colour match using pigments must only be done after approval is given by the Departmental Representative.
 - .2 The crushed stone aggregate to be used in mortar fill for crickets on the stairway and in large mortar joints shall be a washed 6mm crushed limestone, to the approval of the Departmental Representative.

- 2.7 Masonry Vents
- .1 Masonry vents shall be a screened aluminum louvre fabrication with an example of an acceptable product being that by "Midget Louvre Co.".

- 2.8 Sealant for Special Masonry Joint Finish
- .1 Installation of special masonry joint finish sealant shall be completed using an acrylic latex sealant. An example of an acceptable product is "Perma Chink", as used for filling joints in log homes.
 - .2 Bond Breaker: use closed cell polyethylene backer rod recommended by sealant manufacturer. Where depth of joint prohibits use of backer rod, use recommended adhesive backed tape.

- 2.9 Sealant at Mortar Fill
Crickets
- .1 Sealant to be applied on periphery of mortar fill crickets shall be a one component, polyurethane based, non-sag elastomeric sealant. An example of an acceptable product is Sikaflex 15 LM.
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- 2.10 Air Entraining Agent
- .1 Air entrainment of the final mix shall be between 15% to 17% as measured in accordance with CSA A23.2-4c. If this can not be achieved by mixing, an air entrainment agent (an acceptable product is "AIREX-L", by Euclid Admixture Canada Inc.), shall be added. Dosage to be as recommended by the Manufacturer.
 - .2 The effectiveness of the air entraining is dependent on not only the quantity of the agent but the ratio of agent to water. The total quantity of agent used will be reported to the Departmental Representative and reviewed to ensure that ineffective overdosing is not occurring. Overdosing or even high ratio of agent can significantly reduce working time and may cause adverse effects to the mortars durability.
 - .3 Note that air entrainment in bedding mortars, for laying new stone units, may be reduced to facilitate the work.

PART 3 - EXECUTION

- 3.1 Cutting Out Deteriorated Jointing
- .1 In order to maintain structural stability of the Cairn, the Contractor shall complete the work of chipping and back pointing in limited areas and shall not proceed with successive areas until the current area is complete and the back pointing has at least set for a minimum of 24 hours. The appropriate size of a chipping area will be determined as the chipping proceeds, but generally will be as follows:
 - .1 Upper Third: shall be limited to a 1m x 1m section of removals at any given time.
 - .2 Middle Third: shall be limited to 3m (width) x 1m (height) of removals at any given time.
 - .3 Lower Third: shall be limited to 4m (width) x 2m (height) of removals at any given time.
- As per the limits stated above, no further removals shall proceed prior to completion of deep pointing of the given area. The limitations outlined above are a general guideline and based on site conditions may dictate a variation in these guidelines. The

Contractor is responsible to maintain structural stability of the Cairn at all times and must produce a written request to vary from the above limitations and not proceed with any variance to these guidelines unless approved by the Departmental Representative.

- .2 Unless otherwise noted herein, all joints are to be cut out to the full height of the joint and to minimum depths as follows.
 - .1 For joint removal requirements, refer to miscellaneous detail drawing.
 - .2 If loose material is encountered during removal for joints fitting any of the above definitions, removal and replacement of up to a 100 mm depth shall be included in the work of chipping and repointing.
 - .3 For joints greater than 50 mm, the Departmental Representative shall provide direction as to whether or not new stone "chinking" units are to be installed as part of the repointing operation. Where authorized, the supply and installation of new stone units shall be in accordance with Sections 04 43 07, "Installation of Masonry" and 04 43 19, "Cut Stone". Proceed as directed by the Departmental Representative.
 - .4 Loose, powdery or sandy joint material, or voids, are anticipated to be encountered during the raking out operation. As a general guideline, the joint shall be repointed to seal against water penetration and the intent is not necessarily to try to completely fill the voids with mortar; only replicate what is there with slightly more joint depth (in many cases). As work proceeds, the Departmental Representative will review the removal areas and provide direction as to the necessity to install mortar fill where required, the joint shall be packed with mortar fill to the level of the base of finish pointing or the unit shall be removed and reset in a complete bed of mortar. The installation of mortar fill shall be covered under the item "Mortar Fill" while removal and resetting shall be covered under the item "Remove and Reset Loose Masonry Units".
 - .3 Metal fittings such as nails, brackets, wood wedges, clips and the like must be removed from wall areas as cutting out proceeds.
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- .4 Foreign materials such as joint caulking and tar shall be considered to be defective and shall be removed in their entirety from the joints under this item.

3.2 Method of Cutting Out

- .1 All cutting out is to be done by skilled labourers under the direction of a competent mason experienced in this type of work.
- .2 For all joints, tools for removal shall be thinner than the mortar joint to ensure that stone arises are not damaged. Joints are not to be evened out. The Contractor may use a small diameter diamond saw for very fine joints subject to review of the contractor's workmanship by the Departmental Representative.
- .3 All cutting out of joints is to be done with hammer and chisel, unless otherwise specified herein or approved by the Departmental Representative.
- .4 Joints may be partially cut out with power saws and grinding wheels under the following conditions:
 - .1 All work to be done under the direct supervision of the foreman.
 - .2 Power equipment may be used only to score one cut in each joint at the centre of the joint; the cut is to be no more than one half the width of the joint; and cut to the full depth of the joint required.
 - .3 Final cutting out of the joints is to be made with serrated tools or sharp bolsters, to detach the upper and lower fragments remaining. Do not clean out joints with power equipment. All finish work is to be done by hand.

3.3 Air Cleaning

- .1 After chipping out joints, the joints (unless loose and powdery) shall be blown with compressed air with a pressure of at least 345 kPa (50 psi). Water should not be used to remove debris.
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- .2 In some areas, loose, powdery (sandy) mortar may exist and it is intended to be flushed out with low pressure 69 KPa (10 psi) compressed air or water. Prior to cleaning, the joints will be assessed by the Departmental Representative and direction given.
- .3 Care shall be taken so that stones do not lose all support.

3.4 Repointing

- .1 Preparation of Lime Putty
 - .1 Estimate the quantity of lime putty required to complete the work.
 - .2 Allow at least two weeks storage time for slaked lime putty before it is used.
- .2 Allow at least two weeks storage time for slaked lime putty before it is used.
 - .1 Slaked quicklime is prepared by filling a large mixing tray with approximately 300 mm of hot water. Lumps of fresh quicklime are added to the water, taking care that the water covers the lime.
 - .2 Stir and hoe the mass while the lime splits and breaks up with the generation of heat and carbon dioxide gas. Further water and quicklime are added until a sufficient quantity is produced.
 - .3 The reaction between the lime and water may be fierce and slaking operations must be carried out under strictly controlled conditions.
 - .4 A slaking operation produces a thick, creamy liquid which must be run through a 3 mm mesh screen into plastic-lined drums when cool. The putty is stored under 100 mm of water and left to cure, for at least two weeks, undisturbed.
 - .5 During this time, the consistency of the putty develops and the water over it clears.
 - .6 The drums should be dated and labelled, and the tops sealed.
- .3 Hydrated Lime
 - .1 Putty can be made from hydrated mason's lime by adding dry-bagged hydrated lime to water. The mass is stirred and hoed to form a thick cream. Allow to stand at least 24 hours under water before use, preferably longer.

- .4 Preparation of Roughage
 - .1 If the Contractor desires, the lime and aggregate may be pre-mixed to produce what is known as roughage or coarse-stuff. This compound may be stored indefinitely if kept sealed from air and kept from freezing
 - .2 The sand and lime should be accurately proportioned using measuring boxes constructed to contain the exact volume of each ingredient required to make one batch. These materials are to be thoroughly mixed in a mechanical mixer for about ten minutes, then stored in plastic-lined drums and sealed until required.
 - .3 When required for use, the correct portion of gauging cement should be added, and the mix worked up as specified and used immediately.
 - .4 As the strength and colour of even slightly different mixes varies dramatically, accurate portioning is a strict requirement of this specification.
 - .5 Cement Gauging of Mortars
 - .1 The addition of hydraulic cements to lime and aggregate mixes must be done immediately before the use of the mortar.
 - .2 All mortar must be used within two hours of gauging; do not re-temper mortars after this time has elapsed.
 - .3 All batching is to be done with wooden boxes or plastic pails of known volume to ensure standardization and conformity of measurement. Shovel measurement of materials is not permitted. Boxes should be of such a size that a batch sufficient for one mixer load is measured out.
 - .4 Initially, mortars should be mixed for five minutes without cement or addition of water.
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.5 Cement and air-entrainment should be added at the end of the initial 5 minutes of mixing and the mortar must be mixed for an additional 10 minutes before using. A total of 15 minutes of mixing is preferred to improve workability, increase air entrainment and plasticity, and ensure thorough mixing. The amount of water required should be recorded and added at the start of mixing for future batches. Careful addition of a small amount of water should produce a mortar that is just wet enough to hang on a trowel. Excess water creates a shrinkage problem, and water content in excess of 5% will retard carbonation significantly

.6 All mixing boards and mechanical mixing machines must be cleaned between batches.

.7 Strict control must be exercised so the masons refrain from using too wet a mix. The addition of water does improve workability, but does so at the sacrifice of mechanical strength and the increase in final shrinkage. Mortars must be just damp enough to hang on a trowel. Only water lost through evaporation should be replaced at the mortar-board by the mason; a spray bottle of water is used for this purpose.

.6 Mix Formula

.1 All Mortars.

.1 Cement: Lime: Aggregate (1:1/2:4).

.2 Air Entrainment: (15% to 17%). Add air entraining agent as required to achieve this level of air entrainment.

.3 For mortar fill to crickets in the stairway or for excessively wide joints, on part of the sand component of the mix shall be substituted with clear crushed stone aggregate.

.2 Mixing: Mix mortar as dry as possible to minimize shrinkage and cracking.

.7 Loose Units

.1 Where loose masonry units are encountered, notify Departmental Representative and obtain direction on how to proceed. In general, loose units less than 0.05 m² in face area are to be carefully removed and re-set in a full bed of mortar. Removal and resetting of loose masonry units less than 0.05 m² shall be included with the work of "Chip and Repoint Masonry Joints" and will not be measured for payment.

.2 Where units are removed and reset, the unit cavity is to be cleaned out of all loose material and washed with water to remove dust and pre-wet the adjacent material.

.3 Units are to be re-set in a solidly and evenly filled bed of mortar, notwithstanding current trade practice.

.4 Units are to be set true and level matching exactly the existing bond pattern and coursing throughout.

.5 All joint widths are to match existing work. Joints are to be squeezed full of mortar; slushing of joints is not permitted.

.6 Heavy masonry units that are loose are to be wedged tight into position with plastic wedges or wooden wedges previously soaked in water; the joints are to be cleaned out and the units repointed in situ. Wedges are to be removed when joint-filling mortar is set and prior to finish pointing.

.7 All masonry repairs must be completed before commencing repointing. Joints in repaired areas are to be recessed a minimum of 15 mm (back of finish pointing layers) and allowed to set and dry for at least 72 hours to allow shrinkage to take place.

.8 Repointing

.1 Immediately before repointing operations commence, the area to be pointed is to be thoroughly blown clean with compressed air (unless joint material is loose and powdery) to remove all dust and the surface is then to be well "wetted" until suction is controlled and the surface stays wet.

.2 Areas cleaned free of mortar are to be filled with mortar. Pointing is to be full depth when the removal depth is 30 mm. Where the joint depth is greater than 30 mm, back point in one lift to the 30 mm depth and then complete finish pointing in one lift. Pointing shall be well pressed in and the surface, except for the finish point layer, shall be "scratched"/roughened to provide mechanical bond between successive layers of pointing.

.3 After the final layer of mortar has set, the joint is to be tooled lightly to give the final required form. Do not overwork the face of the joint. Head joints must be tooled first.

.4 All masons are to use identical jointing tools.

.5 Joints are to be tooled behind the face of the masonry units.

.6 All excess mortar must be removed from the face of the masonry before it sets and the jointing neatly finished. The preferred joint finish will be as indicated on the drawings; a slightly concave finish.

.9 Cleaning Up

.1 Excess mortar shall be immediately removed from adjacent surfaces.

.2 As work proceeds, clean all masonry of mortar droppings, stains and other blemishes with a fibre-bristle brush or plastic brush. Do not use a metal brush at any time. Do not use acids or chemical cleaners.

.3 Wash down the completed sections of wall from top to bottom after the pointing has hardened for three days.

.4 Do not leave clean-up debris from mixes or mortars, etc., laying around the site. Remove excess mortar and debris from the site. Place tarps under the mixing area to facilitate clean up.

.10 Curing

.1 Cover all finish pointing with dampened burlap. The burlap shall be hung approximately 50 mm or less in front of the wall but, shall not be in contact with the wall since this could lead to unacceptable discoloration. The burlap shall be covered with white plastic tarps to reduce evaporation of the water from the building.

.2 Cure mortar joints by applying water with a portable pressurized sprayer a minimum of three times a day for three days. Note, more frequent misting, to maintain adequate humidity levels, may be needed if housing and heating is required. Maintain humidity levels to satisfaction of the Departmental Representative.

.3 For the three day curing period, protect all newly placed masonry and repointed joints with tarps, shade covers, etc. so as to prevent drying from wind and direct exposure to the sun or, the effects of housing and heating operations, if applicable.

.4 In the case of large voids, mortar fill to be installed with stone fill (quality as per Section 04 43 06, Cut Stone and angular in form), approximately 50 percent of volume, to form a complete mass. Stone fill to be supplied as per Section 04 43 06, Cut Stone.

3.5 Mortar Fill

- .1 Use mortar matching pointing mortar.
- .2 The intent of the item "Mortar Fill" is to fill voids in the masonry walls, joints or as a capping base on the Cairn and where not included under the work of installation of masonry or chipping & repointing joints.
- .3 Proceed with filling of voids with mortar fill only as directed by the Departmental Representative.
- .4 In the case of large voids, mortar fill shall be installed with stone fill (quality as per Section 04 43 06, "Cut Stone", and angular in form) as directed by the Departmental Representative, approximately 50 percent of volume, to form a complete mass. Stone fill to be supplied as per Section 04 43 06, "Cut Stone", but shall be paid for under the item "Mortar fill" as part of the overall volume. Cut-offs from preparation of cut stone elsewhere on the project, may be used for this application when approved by the Departmental Representative.

- 3.6 Masonry Vents
- .1 Drilling of 25 mm countersink and 20 mm diameter holes for installation of masonry vents shall be by drilling, without percussion, from the exterior face only and, through the completed re-pointing work.
 - .2 Drill 20 mm diameter hole at locations and depth as shown on the Contract drawings or as directed by the Departmental Representative. Holes are to be angled upwards to permit drainage of interior masonry to the exterior face.
 - .3 Drill start of hole 25 mm in diameter to countersink and place the screened vent.
 - .4 After blowing hole clean to the satisfaction of the Departmental Representative, caulk screened aluminum louvre in place ensuring no direct contact between aluminum and masonry. Caulking to be an approved clear coloured 20 year silicon sealant. Contractor to submit samples and/or product information concerning proposed sealant and only install sealant when approved by the Departmental Representative.
- 3.7 Installation of Expansion Joints
- .1 For expansion joints, as shown on Contract Drawings, sealant shall be applied as the finish layer of pointing rather than mortar.
 - .2 Install sealant complete with foam backer rod in accordance with manufacturer's recommendations.
 - .3 Colour of sealant to match adjacent stone units and to be approved by the Departmental Representative.
- 3.8 Removal of Capping and Installation of New Capping
- .1 Carefully remove the existing cementitious capping on the Cairn (around the cannons) to the level of the stone masonry, unless otherwise directed by the Contract Administrator.
 - .2 Prepare surface by thoroughly cleaning and wetting prior to installation of new mortar capping.
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- .3 Install new mortar capping (mortar fill) to provide a suitable base for the installation of the new lead flashing.
- .4 Cure the new capping and clean up as required.

3.9 Mortar Fill Crickets on Stairway

- .1 Clean treads of all deleterious materials prior to the installation of mortar fill. This may include pressure washing and stone chipping of old mortar.
- .2 Ensure stone surface has been saturated with water prior to installation of mortar but, no standing water is to be present at time of application.
- .3 Install mortar fill, complete with crushed stone aggregate, as directed and to ensure positive drainage of water from the steps. Back-cut the edges, before the mortar has set, to create a rebate for the purposes of installing sealant.
- .4 Install sealant on periphery of cricket a minimum of 7 days after the curing period so that the mortar is dry prior to sealant application.

PART 1 - GENERAL

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| <u>1.1 Scope</u> | .1 | Where not otherwise indicated on the Contract drawings, it is intended that the Contractor's representative and the Departmental Representative shall delineate stones for removal within the limits of the work. |
| <u>1.2 Related Work</u> | .1 | Section 04 43 01 - Bracing and Shoring. |
| | .2 | Section 04 43 04 - Repointing and Miscellaneous Masonry. |
| | .3 | Section 04 43 06 - Cut Stone. |
| | .4 | Section 04 43 07 - Installation of Masonry. |
| <u>1.3 Precautions</u> | .1 | Provide temporary supports, bracing, shoring, etc. to the masonry, in accordance with Section 04 43 01, around areas that are to be removed. All damage as a result of failure to adequately support the surrounding masonry shall be made good at the Contractor's expense. |
| <u>1.4 Control</u> | .1 | Mark the following: <ul style="list-style-type: none"> .1 Stones and other elements or components to show identity and position. .2 Spaces from which stones are removed. |
| <u>1.5 Measurement for Payment</u> | .1 | Measurement for payment for the following items shall be as indicated. <ul style="list-style-type: none"> .1 Remove Stone Masonrym3. <p>For this item, the volume shall be equal to the size of the actual finished new stone to be ordered. An Additonal removal up to 50mm (2in.) as well as the joint width surrounding the stone being removed will be included with this item. Any additional removal depth beyond 50 mm (2in.), shall be paid for under the Removals item. Additional removals shall only be done by direction from the Departmental</p> |

Representative if additional removals (beyond the 50 mm (2in.) are done without authorization, they will be at the expense of the Contractor and will not be compensated for in any way. If the Departmental Representative requires any additional removals beyond the 50mm (2 in), the Contractor and the Departmental Representative shall together make measurements of the depth of removal to establish the average depth. There may be significant voids uncovered during the removal of a stone unit, the void beyond the stone unit will not be measured for payment, only portions of the removal requiring removal of materials shall be measured. The depth measurement will be taken from the face of mortar joints excluding the stone pitch dimension, if any.

1.6 Basis of Payment

- .1 Payment at the unit price bid for the above item shall be full compensation for all labour, equipment and materials necessary to do the work of this item in accordance with the Contract Drawings and these specifications.

PART 2 - PRODUCTS

2.1 Stone

- .1 The Contractor shall dismantle and remove stone as directed by the Departmental Representative.

PART 3 - EXECUTION

3.1 Inspection

- .1 Record and report, to Departmental Representative, site conditions not described in Contract.

3.2 Support

- .1 Construct shoring and cradling, and other temporary framing work needed to support structure, or parts of it, during removing operations.

- 3.3 Loosening
Masonry (Full
Removal)
- .1 Loosen stones using approved methods which will cause no damage either to adjacent masonry or to other architectural elements.
 - .2 Do not use pneumatic chisel or hammer, or steel tools exerting concentrated pressure on edge of adjacent masonry.
 - .3 When temperature is below freezing point, do not attempt to loosen wet masonry.

- 3.4 Cleanup
- .1 Stone removals, not designated for salvage, shall be removed from the site on a daily basis unless otherwise approved by the Departmental Representative (in which case, specific stockpile areas will be required).
 - .2 Stones designated for salvage shall be promptly cleaned and stored on wood pallets within the work and storage areas to the satisfaction of the Departmental Representative.

PART 1 - GENERAL

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| <u>1.1 Description of The Work</u> | .1 | The work of this section covers the requirements for the supply of all new cut stone on this project. |
| | .2 | Included with the work of new stone supply shall be that of all chiseled finishes to match the original finish on the stone to be replaced. |
| <u>1.2 Related Work</u> | .1 | Section 04 43 04 - Repointing and Miscellaneous Masonry. |
| | .2 | Section 04 43 05 - Masonry Removals. |
| | .3 | Section 04 43 07 - Installation of Masonry. |
| <u>1.3 References</u> | .1 | ASTM C568-99 Specification for Limestone Building Stone. |
| <u>1.4 Samples</u> | .1 | Samples of all types of stones are required. Samples will be of sufficient size to demonstrate all finishes and profiles and shall be clearly marked as to location of quarry of origin and the supplier(s). Samples which are approved may be incorporated in the work provided that they match all dimensions of stones scheduled as being replaced. The surface shall be finished to match the undeteriorated finish of each type of stone and in no case shall the finish be rougher than stones of this type in good condition elsewhere. |
| | .2 | Acceptability of the source of stone will also be determined by the weathered colour of the stone samples. Samples should include weathered examples and a possible visit to the quarry may be required for acceptance. In general, the weathered colour should match the predominant stone colour of the overall structure. The colour of the new stone should not be close in colour to the extreme ends of the range of stone colours present in the structure. |
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- .3 Limestone sources which have stylolitic inclusions in the stone matrix (occurs in large bed depths) may not be acceptable. The standard of acceptance of stones with stylolitic inclusions may vary due to stone supply. The Departmental Representative's decision will be considered final on the acceptance of stones with stylolitic inclusions. In general, stones that have stylolitic inclusions within 40 mm of an edge or if there are more than three inclusions in the stone, the stone will be considered as unacceptable.

1.5 Delivery and Storage

- .1 Deliver, store and handle cut stone in a manner to prevent damage, adulteration, deterioration and soiling in accordance with the manufacturers' written instructions.

1.6 Measurement for Payment

- .1 Measurement for payment for the following items shall be as indicated.
 .1 Supply New Stonem3
- .2 Measurement will be taken as equal to the actual finished stone dimensions prior to placement.

1.7 Basis of Payment

- .1 Payment at the unit price bid for the above item shall be full compensation for all labour, equipment and materials necessary to do the work of this item in accordance with the Contract drawings and these specifications.
- .2 Payment will normally be made after new stone is placed in its final location. If stone is manufactured in advance to the need for placement in the structure, payment in the amount of 50 percent of the invoiced amount, from the stone supplier, may be authorized by the Departmental Representative provided the stone has been delivered and stored on site and accepted by the Departmental Representative. It is understood that any stone that is damaged after this acceptance will be replaced at no additional cost to the Contract.

PART 2 - PRODUCTS

- 2.1 Materials
- .1 Limestone: to ASTM C568, Category III, high density, colour, pitch and texture to match existing and to have a minimum thickness of 200 mm. Limestone shall be from the Black River Geologic formation (Kingston Limestone and selective areas in Ontario and Quebec). Geologic maps are available for review in the Departmental Representative's office.
 - .2 Possible Supplier:
 - .1 St. Marc Quebec Limestone: various suppliers.
 - .3 Samples of this and other quarries submitted for acceptance will be required. There are variations in colour within each quarry and not all stone, from each quarry, will be acceptable.
- 2.2 Cutting
- .1 Cut stone to shape and dimensions and full to square with jointing to match existing. Dress exposed faces true. Cut stone to lay on its natural quarry bed and to suit the angle of placement in the Cairn face, at the particular replacement location, and to an accuracy of 3 mm.
 - .2 Make beds and joints to match adjacent masonry and at the same angle as the stone being replaced.
 - .3 Where applicable, cut stones for support systems. Provide holes, to suit special lifting devices, in pieces which cannot be manually or mechanically lifted without damage. Do not cut holes in exposed surfaces.
- 2.3 Finish
- .1 Tool the face to match the finish of the stone being removed, to match adjacent masonry to which the stone is being placed or, as otherwise indicated on the drawings.
 - .2 Score machine cut faces to provide a rough surface for mortar adhesion (see Section 04 43 07, Installation of Masonry).
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PART 3 - EXECUTION

3.1 General

- .1 Early in the project, inspect the masonry with the Departmental Representative and determine as near as possible the extent of stone replacement required. As the work progresses, additional stones for replacement may be identified and shall be replaced as part of the work and as directed by the Departmental Representative. Supply replacement stones by number and size.
- .2 Supply stones to the site and protect from damage. Cut stones as required to match existing and to CSA S304.1-94 (R2001). Finish stone to match existing.
- .3 In order to expedite stone delivery, the intent is to immediately supply and finish as much stone as possible.
- .4 All face finishing debris and end cut-offs which are not used shall be removed from the site.
- .5 Cut face stones to match existing coursing or, to dimensions as indicated.

3.2 Stone Finish

- .1 Face stones shall be finished with hammer and chisels and where bush hammering is called for, suitable pneumatic tools may be used. Finish stone arrises to match existing. Pitched faces, where required, shall match existing.

3.3 Setting

- .1 Clean stone exposed surfaces by washing with stiff fibre brush and water.
 - .2 Wet dry stones with clean water just before setting and ensure all surfaces in contact with mortar are saturated but not having standing water.
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- 3.4 Stone Supply .1 As part of this Contract, review the work to establish the actual quantity required to finalize the supply and minimize over-supply and losses. The Departmental Representative shall be responsible for acceptance of the supplied and finished stone.

PART 1 - GENERAL

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| <u>1.1 Description of Work</u> | .1 | Work of this section includes the installation of all stone masonry. |
| | .2 | Included with the work of this section shall be the supply of lead bar markers to be installed under the Chipping & Repointing items. The intent of these markers is to provide a means of readily identifying new stone in the future. |
| <u>1.2 Related Work</u> | .1 | Section 04 43 04 - Repointing and Miscellaneous Masonry. |
| | .2 | Section 04 43 05 - Masonry Removals. |
| | .3 | Section 04 43 06 - Cut Stone. |
| <u>1.3 Workshop Inspection</u> | .1 | Make mason's workshop accessible to Departmental Representative for inspection of current work-in-progress. |
| <u>1.4 Precautions</u> | .1 | Move and lift stone units using means to prevent dropping or sudden impacts. Submit stone units dropped or impacted to Departmental Representative for approval. Do not make holes or indentations, for lifting devices, on face or top side of stone. |
| | .2 | Indicate bedding planes of stone units. Duplicate bedding marks on usable pieces of cut stone. |
| <u>1.5 Protection</u> | .1 | Cover top of completed and partially completed wall, not enclosed or sheltered, with weatherproof coverings at end of each working day. Anchor securely in position. |
| | .2 | Protect adjacent work from marking or damage due to work. |
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- .3 Provide temporary bracing of masonry work during erection until permanent structure provides adequate bracing.

1.6 Measurement for Payment

- .1 Measurement for payment for the following item shall be as indicated.
 - .1 "Install Stone Masonry".....m3.
- .2 Measurement will be taken as equal to the actual finished stone dimensions prior to placement.

1.7 Basis of Payment

- .1 Payment at the unit price bid for the above item shall be full compensation for all labour, equipment and materials necessary to do the work of this item in accordance with the Contract drawings and these specifications including:
 - .1 Placing of all mortar and back-up (if required depending on voided conditions behind stone) masonry.
 - .2 Placing of the stone.
 - .3 Pointing of joints around the stone units.
 - .4 Payment for installation includes 50 mm (2 in.) of backup mortar. If Departmental Representative requires any additional removals, anything beyond 50 mm (2 in.) will be paid for as mortar fill, the Departmental Representative and Contractor will measure an average depth for this payment or an alternative method approved by the Departmental Representative.

PART 2 - PRODUCTS

2.1 Cut Stone

- .1 Supply cut stone in accordance with Section 04 43 06 - Cut Stone. Dress face of cut stone to match existing stonework after unit is roughly sized to opening.

- .2 All stone surfaces of new cut stone against which mortar is to be placed shall be intentionally roughened (if the face is "smooth" as a result of sawing) by scoring with saw or grinder. Score lines shall be spaced at no more than 25 mm on centre and shall be not less than 3 mm in depth.

PART 3 - EXECUTION

3.1 Cutting / Sizing of Stone

- .1 Use calipers, squares and levels to measure opening for new stone. Allow for mortar joints to match existing or, as directed by the Departmental Representative, around the stone perimeter.

3.2 Moving Stones

- .1 Use lifting devices, requiring drilling of the stones, on sides of stones only.
- .2 Move stones horizontally in wheelbarrows, on carts or on sleds.
- .3 Slide stones into place on wood ramps.

3.3 Stone Installation

- .1 Clean stone by washing with water and natural fibre brush before laying. Stone should not be dry at time of placing.
 - .2 All stones shall be placed with the bedding planes perpendicular to the slope of the Cairn exterior at the location for a specific stone, unless the Departmental Representative directs otherwise.
 - .3 Dampen surfaces of slot and apply mortar to stone perimeter.
 - .4 Where there is more than one course of stone replacement, lay successive stone courses only after mortar in courses below has hardened sufficiently to support weight.
 - .5 Prop and anchor stones until mortar has set.
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- .6 Set large stones on water soaked softwood wedges to support stone in proper alignment until mortar has set. Remove wedges when dry, do not break off. The use of stone wedges is not permitted.
- .7 Remove mortar droppings from face of stone before mortar is set. Sponge stone free of mortar as work progresses.
- .8 Set stones plumb, true, level in full bed of mortar with vertical joints flushed full except where otherwise specified. Completely fill anchor, dowel and lifting holes.

3.4 Filling Joints
/ Pointing

- .1 Fill joints and point: in accordance with Section 04 43 04 "Repointing and Miscellaneous Masonry".
- .2 Moist cure new mortar for 3 days.

PART 1 - GENERAL

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| <u>1.1 Description of Work</u> | .1 | The work of this section covers the requirements for all masons to attend an orientation prior to working on the project. |
| <u>1.2 Related Work</u> | .1 | Section 01 35 30 - Health and Safety |
| | .2 | Section 01 54 23 - Access and Protection. |
| | .3 | Section 04 43 01 - Bracing and Shoring. |
| | .4 | Section 04 43 04 - Repointing and Miscellaneous Masonry. |
| | .5 | Section 04 43 05 - Masonry Removals. |
| | .6 | Section 04 43 07 - Installation of Masonry. |
| <u>1.3 Measurement and Payment</u> | .1 | No measurement for payment will be made for the work of this section. All costs for the work of this section shall be included in the tendered prices for related work items. |
| | .2 | The contractor shall be fully familiar with the specification and inform the Departmental Representative of any direction during the orientation that would result in an extra cost to the contract prior to commencing the work. Work that is completed according to the orientation that contradicts the specification shall not receive extra compensation beyond the tendered prices. |

PART 2 - ORIENTATION

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| <u>2.1 Orientation Meeting</u> | .1 | The content of the orientation meeting shall be generally as follows:
.1 Pre-Construction Orientation for Masons. |
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.1 The intent of this orientation is to have all masons understand what will be expected of them with respect to joint removal, stone removal, stone preparation, stone installation, scratch coat pointing and final coat pointing. As a result, more consistent results are anticipated from all masons with a minimization of rejected work. ALL MASONS, that will be associated with any element on this project as described above, are required to attend the orientation meeting prior to beginning the work. The orientation time should not last for more than one (1) hour.

.2 The material discussed in this orientation is taken directly from the specification and reflects the expectations of that specification.

.3 Test panels will still be required to establish the standard of workmanship. All masons should be aware of the work in preparing the panels at the various steps. If a mason is not present, for the test panel it will not excuse that mason from understanding and implementing the procedures used for the preparation of that panel.

.2 Joint Removal

.1 Masons shall take care so as not to damage the surrounding stone that is to remain.

.2 If a grinder is required to remove the joint, the mason shall only make one (1) pass on the joint and shall locate the pass in the center of the joint.

.3 The mason is not permitted to allow the grinder to score the surrounding stone that is to remain.

.4 Chisels shall be thin enough so as not to bind on the adjacent stones and potentially damage the stones.

.5 Joint material shall be completely removed back to the required depth as described on the drawings.

.6 Loose jointing material is to be removed; any additional joint material removal is to be reviewed by the Departmental Representative and direction given prior to removal.

.7 Thoroughly clean joint with a non-metallic brush and compressed air. Water is not to be used for the cleaning of the joints.

.3 Stone Removal

.1 Mortar joints shall be removed, as much as possible, on all of the surrounding joints of the stone that has been marked for removal prior to its removal.

.2 If the stone is to be salvaged, the mason shall exercise care while removing the stone unit. If the stone is not to be salvaged, the mason may use whatever means he feels is necessary to remove the stone while preserving the surrounding stones to remain.

.3 Under no circumstances shall adjacent stones be used as lever points for pry bars, pneumatic chisel bits, percussion drills, etc. to help in the removal of the stone. If the Contractor thinks that removal of an individual stone will not be possible without damaging an adjacent stone, this must be discussed with the Departmental Representative prior to removal. The Contractor will be responsible for damages unless the Departmental Representative agrees that damage is unavoidable.

.4 Damaging of adjacent stones will result in the repair or replacement of the stone at the Contractor's expense.

.5 The resulting cavity shall be braced, cleaned, and protected from the elements until a new matching stone is installed in the cavity.

.6 If adjacent stones become loose during the removal process, the mason shall quickly stabilize the area and the Departmental Representative is to be informed.

.4 Stone Preparation

.1 Stones are to be handled carefully so as not to excessively stress or damage the stones.

.2 Cut stones to the dimensions required allowing for the correct joint width, usually 10 to 15 mm or to match the surrounding joint work. Seek direction from the Departmental Representative before creating joints wider than 15 mm.

.3 Stones cut using a saw, must have the smooth cut faces roughened with grooves as described in the specification.

.4 Stones are to be cut square and straight on the exposed faces. The pitch of the exposed face shall match that of the adjacent, existing stone.

.5 In situations where several stones are to be replaced, the mason shall ensure that the layout matches, as closely as possible, the existing stone layout and furthermore avoids small "slivers" of stone to fill irregular spaces. Eliminate stone "slivers" when possible.

.6 Creating stack bonding is to be avoided and will be rejected and must be replaced.

.7 Stones are to be laid with the bedding planes in the horizontal orientation unless otherwise approved by the Departmental Representative.

.8 Stones shall be cleaned with water and a soft, non-metallic, bristle brush to remove dust.

.9 Carefully transport the stones so as to do no damage.

.5 Stone Installation (The mortar used for the installation of stone units may have a slightly lower air percentage; this should be reviewed on site with the labourer responsible for preparing mortar)

.1 Cavity is to be free of loose mortar or debris.

.2 Lightly wet the cavity with water prior to applying the mortar bedding or backup. Just apply enough water to moisten the area; avoid standing water situations.

.3 The stone unit should also be lightly wetted.

.4 Install stone on a bed of mortar, pack mortar around the stone. Make sure that the head joints are equal in width and that the top and bottom joints are also equal in width.

.5 Stone is to be placed square and plumb and in alignment to adjacent stone. Shim stones as required maintaining the position. The shims shall be soaked softwood wedges. Under no circumstances shall stone chips be used as shims.

.6 Clean excessive mortar away from stones immediately. Clean stone with a damp sponge.

.7 Once the mortar has stiffened remove excess joint material and finish joint to accept the finish coat of mortar. Thin joints should be finished to the final state as shown on the drawings.

.6 Scratch Coat Pointing

.1 Thoroughly clean joint with a non-metallic brush and compressed air.

.2 Slightly moisten the joints. Over wetting will result in the mortar thinning out and being "messy" to work with. By not wetting the joints prior to mortar installation, the surrounding joint and stone will wick away the water in the newly placed mortar resulting in a weakened mortar joint.

.3 Install mortar to a point just proud of the required depth for the final finished pointing. Press the mortar in firmly. Allow the mortar to stiffen. When the mortar has stiffened, remove the excess mortar being careful not to smooth out the joint.

.4 The finish of the scratch coat pointing should be rough but not "messy". The intent is to provide a good mechanical bond between the scratch and the finish coats of pointing.

.5 Wide joints should be treated in the manner specified, with coarser sand and stone chip aggregate in the mix.

.6 Additional lifts of mortar shall be placed after a minimum of 24 hours of moist curing on the previous lift.

.7 Protect mortar joints, during the curing period, from the effects of weather. Joints should be misted regularly with water but, not overly.

.7 Final Coat Pointing

.1 Lightly clean joints with non-metallic brush and compressed air.

.2 Slightly moisten the joints. Over wetting will result in the mortar thinning out and being "messy" to work with. By not wetting the joints prior to mortar installation the surrounding joint and stone will wick away the water in the mortar resulting in a weakened mortar joint.

.3 Install mortar to a point just proud of the face of the adjacent stone. Press the mortar in firmly.

.4 Allow the mortar to stiffen to 'thumb print' hard. Once mortar has stiffened, remove the excess mortar with a wooden dowel in a firm consistent stroke. The mortar is to have a slightly concave appearance. The head joints should be finished first. The dowel will 'pull' the mortar exposing the aggregate.

.5 Lightly brush the joint with a bristle brush, taking care not to remove the texture but to ensure consistency in the final appearance.

.6 Clean excessive mortar away from stones immediately. Clean stone with a damp sponge.

.7 Cover the area with burlap and moist cure for three days. If excessive drying of burlap is occurring due to wind or sun, the burlap is to be covered with white plastic. The burlap is not to be in prolonged contact with the masonry since discolouration can occur.

.8 Final Inspection (Acceptance of the completed installation will include conformance to the following. Note that this is not all inclusive).

.1 No joint cracking after drying.

.2 Uniformity of mortar colour.

.3 Consistency of joint profile and texture.

.4 Crisp lines at interface between mortar and stones.

.5 Clean stones.

PART 3 - EXECUTION

3.1 General

- .1 Prior to working on the project all masonry personnel shall attend an orientation session conducted by the Departmental Representative in which the expectations of the level of workmanship is described.
- .2 The content of the orientation shall generally be as outlined in Part 2 of this section. "Orientation Content."
- .3 The orientation will describe the expectations of the Departmental Representative. Any discrepancy between the orientation and the specification should be immediately brought to the attention of the Departmental Representative. The resulting direction will be confirmed in writing.
- .4 Other sections of the specification shall take precedence over all information described in the orientation. It is anticipated that the orientation will not contradict the specification.
- .5 The contractor shall follow the methods described by the Departmental Representative. If the contractor suggests other methods they will not be used unless approved by the Departmental Representative.
- .6 Any work not completed in conformance to this Section shall be subject to rejection at the discretion of the Departmental Representative.

PART 1 - GENERAL

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| <u>1.1 Items of Work</u> | .1 | The cleaning/conservation and painting of the railings on the stairway. |
| | .2 | Note that the existing paint contains lead (see attached) and removal and disposal shall be completed in strict conformance with applicable legislation. |
| <u>1.2 Measurement and Payment</u> | .1 | No measurement for payment will be made for the item "Conservation of Stair Railing". Payment shall be by lump sum. |
| | .2 | Payment at the lump sum price bid for the item "Conservation of Stair Railing", shall include all costs for labour, equipment and materials necessary to complete the work for this item in accordance with the drawings and this specification. |

PART 2 - PRODUCTS

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| <u>2.1 Rust Converter</u> | .1 | Equivalent to 'CONQUEST', National Chem Search Limited. |
| <u>2.2 Paint</u> | .1 | Multi-Purpose Epoxy Coating equivalent to Bar-Rust 235 by Altex Coatings. |

- 2.3 Cleaning .1 The intent of the cleaning process is to remove only dirt, loose or flaking paint and, rust deposits. The removal of dirt and loose and flaking paint shall be completed with the use of chemical strippers with collection of stripped materials and disposal to be carried out with applicable legislation for the removal and disposal of paint containing lead. Abrasive grit blasting shall not be used. The removal of rust deposits shall be completed by heating the effected area and brushing off the rust when it has loosened. Do not overheat the metal, only enough to permit the removal of the rust.

PART 3 - EXECUTION

- 3.1 Painting .1 Following the cleaning procedures described above, all surfaces are to have rust areas treated with rust converter followed by two coats of paint. All work is to be carefully executed with special attention to avoiding and correcting any drips and runs and prevent spillage of converter or paint on the adjoining masonry. All paint to be applied in even coats to the manufacturer's recommended dry film thickness. All preparation to be in accordance with manufacturer's instructions to produce a durable finished appearance.

PART 1 - GENERAL

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| <u>1.1 Items of Work</u> | .1 | The installation of lead flashing on the top of the Cairn as noted and detailed on the drawings and/or as described herein. |
| <u>1.2 Related Work</u> | .1 | Section 01 35 30 - Health and Safety Requirements. |
| | .2 | Section 04 43 04 - Repointing and Miscellaneous Masonry. |
| <u>1.3 Qualification</u> | .1 | The sheet metal fabricator and applicator shall be of recognized standing with a proven record of satisfactory installations using traditional materials and installation techniques. |
| <u>1.4 Warranty</u> | .1 | Furnish a three (3) year warranty on all metalwork installed under this Contract, undertaking to repair promptly all defects becoming evident during the period of this guarantee. |
| <u>1.5 Workmanship</u> | .1 | All workmanship shall be of the highest quality conforming to the best traditional practice and be to the approval of the Departmental Representative. |
| <u>1.6 Shop Drawings, Samples & Mock-ups</u> | .1 | Submit to the Departmental Representative for approval all materials specified prior to fabrication or commencement of work on site. |
| | .2 | Provide job site or shop mock-ups of typical sections of the work as and when required by the Departmental Representative. |
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- 1.7 Definitions
- .1 Welt: A flat-seamed joint between two sheets of lead, held down by copper cleats. The two sheets are turned up 25 mm and 50 mm with the cleat between, the longer sheet lapped over the cleat, and all three sheets turned down to form a 25 mm wide joint.
 - .2 Bossing: The shaping of sheet lead to fit a corner or other configuration with wood blocks and a mallet.
 - .3 Leadburning or leadwelding: Welding lead without solder. It requires a more directional flame than solder.
 - .4 Undercutting or cutting in: Causing an unwanted reduction in the thickness of the lead by misdirecting the flame during leadburning.

- 1.8 Measurement and Payment
- .1 No measurement for payment will be made for the item "Lead Flashing, Capping on Cairn". Payment shall be by lump sum. All costs for labour, materials, and equipment, are to be included in the lump sum bid for this item all in accordance with the Contract Drawings and these specifications.

PART 2 - PRODUCTS

- 2.1 Lead Flashing
- .1 New lead flashing shall be milled sheet conforming to U.S. Federal Specification QQ-L-201F, Lead Sheet, Weight 5 (5 lbs/ft²).
 - .2 Metal sheet shall be free of pin holes, uniform in quality and temper, clean, smooth, commercially flat and straight, free from injurious defects. Materials not conforming to this specification shall be rejected.

- 2.2 Fasteners
- .1 Fasteners and Anchors: Brass or stainless steel pan-head screws and washers for masonry fastening, sized as appropriate. Other fasteners suitable for each condition.
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| <u>2.3 Expansion Shields</u> | .1 | Shields shall be 100% pure lead shields. Plastic or galvanized fixings are not permitted. |
| <u>2.4 Solder and Flux</u> | .1 | All solder for lead flashing work shall be 67% pig lead and 33% pure block tin conforming to ASTM B32-83. |
| | .2 | All flux shall be rosin type only. |
| <u>2.5 Caulking</u> | .1 | Caulking shall be polyurethane based, an approved product is SIKAFLEX-15M. |
| <u>2.6 Wood Blocking And Furring</u> | .1 | Lumber: non-resinous wood (eg. white pine preservative treated with low toxicity preservative - ie. zinc or copper naphthanate). |
| <u>2.7 Slip Sheets (under lead flashings)</u> | .1 | Slip Sheets: Geotextile underlay, needled non-woven polyester textile, minimum weight of 210 g/m2. |
| <u>2.8 Accessories (for lead flashings)</u> | .1 | Isolation Tape: pressure sensitive, non-bonding to sealant. |
| | .2 | Patination Oil: proprietary lead patination oil, acceptable. Standard: Cookson Industrial Minerals Group or British Lead Mills. |
| <u>2.9 Leadwork Fabrication</u> | .1 | Fabricate flashings in Code 5 lead. |
| | .2 | Fabricate break corners by lead welding. |
| | .3 | Fabrication and installation details to be as outlined in Lead Development Association handbook "Lead Sheet in Building". |
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PART 3 - EXECUTION

- 3.1 Lead Flashings
- .1 Preparation:
 - .1 Isolate all metalwork from masonry with a continuous layer of geotextile underlay fabric. Install as work proceeds to ensure a bond-breaker.
 - .2 Installation:
 - .1 Set out work to maximize sheet size.
 - .2 Install 50 mm wide copper clips and lead-coated copper clips for all weltd joints as detailed.
 - .3 Install Code 5 lead flashing to top of Cairn as detailed, and forming drips. Top edges to be turned up the cannon barrel as indicated (min. of 50 mm).
 - .4 Form inside and outside corners by bossing and leadburning in accordance with recommended detailing and to ensure proper fit and performance.
 - .5 Install intermediate fasteners as required using screws and washers and lead burn dot over screw fixings.
 - .3 Application of Patination Oil:
 - .1 Apply patination oil in accordance with manufacturer's and Lead Sheet Association's recommendations.
 - .2 Shake container vigorously for minimum two minutes prior to use and periodically during application.
 - .3 Apply one even coat, using soft cloth, working systematically from top to bottom, keeping lower edge wet. Do not scrub with circular motion. Do not spill or smear oil on adjacent stone or concrete.
 - .4 Protect untreated lead from rain.
 - .5 Lead that shows signs of oxidation staining shall be cleaned with 5% solution of nitric acid.
 - .6 Apply patination oil as the work progresses and no later than the end of each working day so that lead does not remain unpatinated for more than 8 hours after installation.
 - .7 Protect from construction dust and damage.
 - .8 Where patinated lead becomes scuffed, marred or damaged in any way, apply second coat to affected areas as necessary.
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.9 Apply patination oil to bottom edge of all drip details and to lead tabs prior to forming.