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Project No. 15-05-RPA-1174		January 2018

Project Title Fort Henry - Redoubt Terreplein Repairs

Project Number 15-05-RPA-1174

Project Date January 2018

Structural

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END OF SECTION

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PART 1 - GENERAL

1.1 Description

.1 General

1. The intent of the Contract is to have the Contractor provide the furnishing of all labour, materials, tools, equipment, power plant, systems, transportation and supervision necessary to completely perform the work, as described by the Drawings and the Specifications for the installation of a new waterproofing/walkway system on the Terreplein of the Fort Henry Revetment.

.2 Description of Work

1. The intent of the project is to complete the installation of a new waterproofing membrane on the Terreplein of the Fort Henry Revetment. The membrane is to be applied directly over the existing mastic asphalt membrane on the Curtain Wall, Blocks 03 and 10 and, barbettes and firing steps. At paver locations, the waterproofing membrane is to be applied directly on the membrane, under the pavers. The work is intended to be completed in three phases. Phase I - Block 3, Part of Block 4, Phase II - Blocks 4, 5 to 10 and Phase III - Block 2 - 11. More specifically, the work consists of the following and as detailed on the drawings and in these specifications.

.1 All work required for site access, provision of work trailer(s), sanitary facilities, etc. and, including restoration of all surfaces including paved, graveled and grassed areas disturbed by this work. Note that primary access to the Terreplein level shall be via a foot bridge which is to be provided and installed, maintained and removed as part of the work and located as indicated on the drawings. Access via the Parade Square shall generally not be allowed as per the Operational Constraints.

.2 For materials and equipment which cannot be transported to the work via the foot bridge, those materials and equipment shall be craned to the Terreplein with permissible crane set-up areas to be as indicated on the drawings.

.3 Provision of all protection/barricades to the work site to prevent Public access to the work areas.

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

.5 All equipment and vehicle access must be pre-approved by Departmental Representative and Owner. Where access is permitted via the Parade Square, no equipment (skid steering or other) shall be used in the Parade Square area which may cause damage to the asphalt surface. All travelled surfaces must be protected throughout the course of construction. Any damage that occurs to the asphalt

surface as a result of this work, shall be repaired to the satisfaction of the Departmental Representative at no additional cost to the Contract. Cold patching will not be accepted as a method of repair. Any repairs must be done by an experienced paving crew and, full width and/or length of the Parade Square.

.6 All electrical equipment is to be removed or set aside (by others). Provide minimum of two weeks' notice to the Departmental Representative to allow for these removals.

.7 Complete repairs to mastic asphalt surfaces as needed and as called for elsewhere in these specifications and on the drawings.

.8 Install primers on mastic asphalt surfaces or existing waterproofing in strict conformance with the manufacturer's recommendations.

.9 Install new waterproofing/walkway system to the limits as indicated on the drawings and, including all treatments at expansion joints, railing post bases, firing steps, barbettes, etc. as per the details indicated on the drawings and as per manufacturer's recommendations.

.10 Completion of clean-up and reinstatement of site.

1.2 Location of the Work

- .1 Fort Henry is located on the east shore of the Cataraqui River, in the City of Kingston at the confluence with Lake Ontario.

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. When found, protect such articles and request directions 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.

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 and it is the contractor's responsibility to have access to or, have possession of these standards for purposes of completing the work of this contract in accordance with these standards.

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 Redoubt - the main fortress works at Fort Henry consisting of escarp walls and a gorge wall surrounding a parade square.
 - .2 Plans - the drawings listed in the "List of Drawings".
 - .3 Specification - the subject matter listed in the "Index to Specifications", Addenda to the Specifications and all relative written communications sent by the Departmental Representative to the Contractor in connection with the work.
 - .4 Department - Parks Canada - Georgian Bay and Ontario East Field Unit and the Ontario Waterways Group.

1.7 Sub-Surface Information

- .1 Sub-surface information, when given, is for general information and is not guaranteed.

1.8 Pedestrians and the Public

- .1 Provide barricades of not less than 1.8 m high modular fencing complete with dust screen/scaffold netting where indicated to block off work areas from public access. Posts shall not be anchored by drilling into the existing pavement or other existing features, nor shall existing loose rock or other site materials

be used as counter balance material. Contractor shall obtain approval on "securing" measures for post stability prior to proceeding with work.

- .2 Provide secure coverings to all openings to prevent Public access to the work areas at all times during construction.

1.9 Protection of the Work

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

1.10 Measurement for Payment

- .1 No quantities associated with items of work described in this section will be measured for payment purposes.

PART 2 - PRODUCTS

2.1 Acceptance of Materials

- .1 Where materials and equipment are specified to OPSS, CSA, CGSB, ASTM or similar standards, 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. The weather proofing membranes have been tested for a period of more than one year for longevity and therefore substitutions for these products will not be considered.

2.2 Samples

- .1 The Contractor shall be responsible for samples and sampling. The Departmental Representative will be responsible for testing.

2.3 Rectification of Existing Surfaces and Materials

- .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 any grassed areas which have been disturbed by the Contractor's operations under this Contract and which are not covered by other items of the Contract. All topsoil and seeding and mulch repairs to be carried out in accordance with OPSS 570 and 572 (Standard Roadside Mix for seed mix).
- .4 Restoration must occur as soon as possible after construction is completed.
- .5 Seeded areas will be accepted when the turf is properly established. (Usually requires a minimum of one month maintenance after growth).

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, including all aspects of the pedestrian bridge and shall comply with 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 Phase 1 of the work must be completed no later than June 15th, 2018, Phase 2 no later than July 15th, 2018 and Phase 3 no later than September 1st, 2018. Anticipated start of Phase 1 is May 7th, 2018, however work could commence earlier pending that all of St. Lawrence Parks Commission's Public Events occurring at the Fort finish prior to that date. Phase 2 can commence as soon as Phase 1 is finalized and Phase 3 can commence as soon as Phase 2 is finalized, keeping in mind that Phase 3 must be finalized no later than September 1st, 2018. During the scheduled available working dates described above the Contractor shall have full access to each Phase area in question, as delineated in the Contract Drawings. That being said the Contractor must work only during the daytime hours and must be conscientious and ensure to in no way interfere with the Public Events organized and ongoing by the St. Lawrence Parks Commission.
- .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.
- .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 for the work.

3.4 Temporary Services

- .1 The Contractor will be allowed access to the power service at the Fort as approved by the Departmental Representative and within the capacity of the existing power supply. Any power requirements in excess of that which may be provided by the Fort's supply will be provided for by the Contractor. Temporary sanitary services will be provided by the Contractor. The Contractor shall make his own arrangements to obtain all water required to carry out the work.

3.5 Temporary Facilities

- .1 Provide and Maintain:
 - .1 Suitable storage facilities, of types and at locations approved by the Departmental Representative;
 - .2 A site trailer/office at the work and storage location indicated on the drawings and as approved by the Departmental Representative, open during working hours;
 - .3 Necessary scaffolding, ladders and platforms to Canadian Construction Safety Code, NRCC 15562;
 - .4 All necessary enclosures, guards, guardrails, hoarding, barricades, warning signs, flashing warning lights (for night) and similar items.

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.

PART 4 - DOCUMENTS

4.1 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,
and
 - .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,
 - .11 Waste Management Plan, and
 - .12 Site Specific Safety Plan.

PART 5 - ENVIRONMENTAL CONSIDERATIONS

5.1 Fires

- .1 Fires and burning of rubbish or any material on site is not permitted.

5.2 Disposal of Waste

- .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of waste (including slurry) or volatile materials, such as mineral spirits, oil or paint thinner on site (i.e. into drains and catch basins).
- .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.

5.3 Disruption of Site

- .1 Minimize disruption of site and restore all damaged features to satisfaction of Departmental Representative and at least to the condition before damage occurred.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Related Requirements

- .1 All Sections.

1.2 Access and Egress

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

1.3 Use of Site and Facilities

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Special requirements to accommodate events must occur.
- .3 Maintain existing services to building and provide for public, personnel and vehicle access.
- .4 Where security is reduced by work provide temporary means to maintain security.
- .5 Use only designated routes and access points for moving workers and material.
- .6 Closures: protect work temporarily until permanent enclosures are completed.

1.4 Special Requirements

- .1 The list of know special events and accommodations is attached to this specification
- .2 In addition to the accommodations to prevent interference with day to day operations the events must be accommodated as well
- .3 Events are broken into the following categories and a single event can belong to multiple categories
 - .1 A - Contractor has access to the current phase area.
 - .2 SHL - Shared/ Limited Access - Constructor issue must be addressed
 - .3 DE - Day Time Event
 - .4 EE - Evening event
 - .5 ON - Overnight visitor stays
 - .6 DC - Ditch Event Ditch to be clear of all item - No ditch access is intended these should not be an issue.

- .7 CH - Chill on the Hill Event on Back hill with significant parking requirements
- .4 A - Contractor has access to the phase Area - This is the condition when an event is not occurring. The contractor has access to the phase area and to the access route.
- .5 SHL - indicates shared limited access and the contractor while the contractor will only have access to the designated phase area there will also be adjacent contractors that must be accommodated. They will not be allowed into the phase area as this would create a constructor issue.
- .6 DE - the fort is running a day time event (times as shown plus 30 minutes before and after to allow transition) where no work can occur during the hours designated plus the transition period.
- .7 EE - The fort is running an evening event (times shown plus 30 minutes before and after to allow transition) where no work can occur during the hours designated plus the transition period.
- .8 ON - The fort is running an overnight event and no work can occur between the hours of 6:00 pm and 8:30 am
- .9 DC - The fort is conducting an event in the ditches. - No ditch access is intended these should not be an issue.
- .10 CH - The Chill on the Hill event is occurring restrictions are as listed.
- .11 NR - Work can continue but Noise restrictions are in effect. Any work requiring equipment or procedures which generate any significant noise are not allowed.

1.5 Operating in a National Historic Site

- .1 The Contractor must be aware and take into consideration that the entire Fort Henry Property is a National Historic Site, as such:
 - .1 All work and access must do no damage or alter existing surfaces.
 - .2 Lost Heritage fabric is not acceptable and if damage occurs the Departmental Representative may require extensive repairs to be completed by a qualified Heritage Conservation Specialist. All costs will be deducted from any payments due under the Contract.
 - .3 The entire site is an archeological resource. No digging or damage to the existing ground surface is to occur during the installation of the bridge or during access to the site. Protect all surfaces and do not allow tire rutting or damage below 75 mm of the existing surface.
 - .4 During the installation of all toppings, membranes and contract work no overspray, dripping, staining or marking of any kind will be allowed to occur to the adjacent stone and heritage surfaces. The Departmental Representative will review and approve corrective measures which will be completed by qualified individuals at the Contractor's expense.

1.6 Parking and Vehicle

- .1 Parking at all times is considered to be at a premium try to reduce the requirements for parking.
- .2 Contractor's vehicles can be parked in the parking lot at the east end of the Fort Henry National Historic Site at the site of the former hospital.
- .3 When the main parking lot is less than 50% full limited parking will be allowed away from the visitors center and main entrance. The first six spots adjacent to the road at the area farthest from the entrance and visitor center shall be designated. If the parking lot reaches 50% occupied even if this is in the middle of a shift all cars will be moved from the lot. At no time shall more than 8 spots be used.
- .4 Vehicles not involved in delivery shall not be driven across or parked on the access route. All vehicles on the access route must not discharge fluids as all spills must be cleaned up at the contractors expense including all archeological costs associated with investigating and review all removals and disturbed ground.

1.7 Security

- .1 Where security has been reduced by Work of the Contract, provide temporary means to maintain security.

1.8 Building Smoking Environment

- .1 Smoking is not permitted.

PART 2 - PRODUCTS

2.1 Not Used

- .1 Not Used.

PART 3 - EXECUTION

3.1 Not Used

- .1 Not Used.

***** END OF SECTION *****

FHNHS Operational Schedule by Year

Date	Hours	Description	Consequence	Event Categories
Jan 1 - Feb 19	Night	Lumina Borealis, weeknights up to Jan 7 th , and weekends after	No work during evenings/night, limited ditch access	EE DE
Feb 20 - Feb 28	Day	Lumina Borealis Event Projector demobilisation	Shared/limited access	SHL DE Constructor
Mar 15 - Apr 15	Day	Lumina Borealis Event Remainder demobilisation	Shared/limited ditch space	SHL DE Constructor
May 7 - Victoria Day Weekend	0930 - 1700	SLPC Staff Training, weekdays	Vehicle access shared/limited after 1000hrs. Dust generation and high noise activities are restricted to non-operating hours. Deliveries and major movements to occur before 0930	No Restrictions - Day
Victoria Day Weekend - Labour Day	0930 - 1700	SLPC Operating Season, weekdays and weekends		
July - Aug	1800 - 2130	World Heritage Sunset Ceremonies, every Wednesday evening	No evening work to be done after 1800 hrs	EE
	0830 - 1900	Lower fort tourism hours	Disruption kept to a minimum	
Apr 15 - Jul 20	Night	Overnight visitor stays inside Fort Henry	No disruption during overnight stay events, site and storage areas to be secured	EE ON
Jun 9 & 10	0730 - 2000	Cannonball Rush & Beer Fest Events	Ditch to be clear of equipment / material during event weekend	DE
Jul 22	1830 - 2200	Fort Henry Annual Tattoo Event	No disruption during event	EE
5 Days during end of July/early Aug	1700 - 2300	Chill on the Hill Event	Parking restricted, back hill off limits, site and storage area to be secured	CH
Sept 15 - Oct 18	Day	Fort Fright Event mobilisation	Limited ditch access/space	SHL
Oct 4 - Oct 2	Evening & Night	Fort Fright Event	Limited ditch access/work space, work limited to regular work day hours, no evenings	EE
Nov 1 - Dec 1	Day	Fort Fright Event demobilization & Lumina Borealis set up	Shared/limited ditch space	SHL
Dec 1 - Dec 31	Nights	Lumina Borealis Event	Refer to first row	EE DE

Event Categories (per NMS Section 01 14 00 – Work Restrictions, Item 1.4 Special Requirements)

- A = Contractor has access to the current phase area
- SHL = Shared/Limited Access – Contractor issue must be addressed
- DE = Day Time Event
- EE = Evening Event
- ON = Overnight Visitor Stays
- DC = Ditch Event – Ditch to be cleared of all items. No ditch access is intended these should not be an issue.
- CH = Chill on the Hill Event on Back Hill with significant parking requirements

PART 1 - GENERAL

1.1 Administrative

- .1 Project meetings will be scheduled at regular intervals that will vary depending on the complexity of work being undertaken throughout the progress of the work and at the call of the Departmental Representative. Meetings will generally occur every two weeks or as required by the Departmental Representative.
- .2 Representative(s) of Contractor, Subcontractor and suppliers must attend the meetings and the individual(s) attending the meetings must be qualified and authorized to act on behalf of the Contractor, Sub-contractor or supplier(s) they represent.

1.2 Preconstruction Meeting

- .1 Within 5 days after award of Contract, request a meeting of parties in Contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 The time and location of meeting will be established and notification of the parties concerned will occur a minimum of 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.07.
 - .3 Schedule of submission of shop drawings, samples, etc. Submit submittals in accordance with Section 01 33 00.
 - .4 Schedule, location for provision of temporary facilities, site sign, offices, storage sheds, utilities, and, fences in accordance with Section 01 52 00.
 - .5 Site security in accordance with Section 01 56 00.
 - .6 Procedures for: proposed changes, change orders, approvals, time extensions, overtime, administrative requirements.
 - .7 Record drawings in accordance with Section 01 33 00.
 - .8 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00.
 - .9 Schedule and Progress
 - .10 Monthly progress claims, administrative procedures, photographs, hold backs.
 - .11 Appointment of inspection and testing agencies or firms.
 - .12 Insurances, transcript of policies.
 - .13 Cash Flow Breakdowns at Federal Year End (March of each year).

1.3 Progress Meetings

- .1 During course of Work, schedule regular progress meetings at varying intervals depending on construction activities. The Meetings shall have a normal frequency of two weeks but this can be adjusted by the Departmental Representative.
- .2 Contractor, major Sub-contractors, involved in Work, and Departmental Representative are to be in attendance.
- .3 Agenda will include the following:
 - .1 Review minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which will impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for effect on construction schedule and on completion date.
 - .12 Other business.

1.4 Measurement and Payment

- .1 No measurement for payment will be made for the work of this section. All costs for the work of attendance at pre-construction and progress meetings shall be deemed to be included in the lump sum items, "Site Work - Phase 1", "Site Work - Phase 2" and "Site Work - Phase 3".

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

***** END OF SECTION *****

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 the 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.

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 business 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.

1.3 Shop Drawings

- .1 Contractor to provide Shop Drawings for the tie-in locations between existing mock-up locations and new waterproofing.
- .2 Contractor to provide Shop Drawings for lap details at active joints and expansion joint and crack details.
- .3 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.
- .4 Submit Shop Drawings as follows:
 - .1 Electronic format will be retained by the Departmental Representative plus a reasonable number of prints the Contractor wants returned for the Contractor's use.
- .5 Cross-reference shop drawing information to applicable portions of the Contract Documents.

1.4 Electronic Submissions

- .1 Electronic Submissions shall:
 - .1 Be submitted in PDF Format.
 - .2 Shall have a title indicating
 - .1 Project
 - .2 Submission Number from Submission list
 - .3 Type of submission i.e. shop drawing, mill certificates, etc.
 - .3 All submissions shall be less than 5 mb so as to conform with government mail system.
 - .4 Submission of PDF's with titles nor conforming will be rejected.

1.5 Product Data

- .1 Product data: manufacturers catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products for any product used in this Project.
- .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, listing Specification Sections.

1.6 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.

1.7 Mock-ups

- .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.

1.8 Shop Drawings Review

- .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 coordination of the work of all sub-trades.

PART 2 - PRODUCTS

2.1 Not Used

- .1 Not Used.

PART 3 - EXECUTION

3.1 Not Used

- .1 Not Used.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 References

- .1 CSA S269.1-1975 (R1998) Falsework for Construction Purposes.
- .2 CAN/CSA-S269.2-M87 (R1998) Access Scaffolding for Construction Purposes.

1.2 Related Work

- .1 Section 01 54 23 - Access and Protection.

1.3 Construction Safety Measures

- .1 Observe construction safety measures of National Building Code, Provincial Government, Workers'/Workmen's Compensation Board and municipal authority provided that in any case of conflict or discrepancy more stringent requirements shall apply.
- .2 Comply with requirements of FCC No. 301.
- .3 If using a crane for movement of materials and equipment, comply with all applicable regulations including OHSA and CAN/CSA - Z/50-98 (2004).

1.4 Overloading

- .1 Ensure no part of Work is subjected to loading that will endanger its safety or will cause permanent deformation.

1.5 Falsework

- .1 Design and construct falsework in accordance with CSA S269.1.

1.6 Scaffolding

- .1 Design and construct scaffolding in accordance with CSA S269.2.

1.7 WHMIS

- .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.
- .2 Deliver copies of WHMIS and Materials Safety Data Sheets (MSDS) to Departmental Representative on delivery of materials.

PART 2 - PRODUCTS

2.1 Not Used

.1 Not Used.

PART 3 - EXECUTION

3.1 Not Used

.1 Not Used.

***** END OF SECTION *****

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 Crane Work: CAN/CSA-Z/50-98(2004) Safety Code on Mobile Cranes AND OHSA for safe housing and rigging practices.
 - .3 National Building Code 2010 (NBC):
 - .1 Division B, Part 8 Safety Measures at Construction and Demolition Sites
 - .4 National Fire Code 2010 (NFC):
 - .1 NFC 2005, division B, Part 2 Emergency Planning, subsection 2.8.2 Fire Safety Plan.
 - .5 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.
 - .6 Canada Labour Code - Part II, Occupational Health and Safety Regulations.
- .2 It is the intent that the Contractor will be the Constructor under the Occupational Health and Safety Act and have full authority to ensure safety on the site.

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 an 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.
- .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 and controls for mitigation of 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 site will also involve
 - .1 A Hazard Assessment and listing of designated substances on site.
 - .2 Contact with
 - .1 Silica/dust in Concrete and masonry rubble.
 - .2 Work at heights.
 - .3 Work in areas with vehicle access.
 - .4 Work near utilities.
 - .5 Work with lime and water.

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.

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.

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.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Reference Standards

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-2008 Stipulated Price Contract.
- .2 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.
 - .2 EPA General Construction Permit (GCP) 2012.

1.2 Definitions

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.3 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Shop Drawings, Product Data, Samples and Mock-ups.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for new waterproofing product and joint sealant and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 30 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.
- .3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.
- .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .6 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.

- .3 Names and qualifications of persons responsible for training site personnel.
- .4 Descriptions of environmental protection personnel training program.
- .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations and EPA 832/R-92-005, Chapter 3.
- .6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
 - .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
- .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
- .9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
- .12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .13 Waste Water Management Plan identifying methods and procedures for managing discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
- .14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

- .15 Pesticide treatment plan to be included and updated, as required.

1.4 Fires

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

1.5 Drainage

- .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations, EPA 832/R-92-005, Chapter 3.
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.
- .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 Pollution Control

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

1.7 Historical / Archaeological Control

- .1 Provide historical, archaeological, cultural resources, biological resources, and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site: and identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in area are discovered during construction.

- .2 Plan: include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.

1.8 Notification

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
 - .1 Take action only after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

PART 2 - PRODUCTS

2.1 Not Used

- .1 Not Used.

PART 3 - EXECUTION

3.1 Cleaning

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Bury rubbish and waste materials on site where directed after receipt of written approval from Departmental Representative.
- .3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Related Requirements Specified Elsewhere

- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Departmental Representative are specified under various sections.

1.2 Appointment and Payment

- .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.

1.3 Contractor's Responsibilities

- .1 Furnish labour and facilities to:
 - .1 Provide access to work to be inspected and tested.
 - .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.
- .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 the Departmental Representative.

PART 2 - PRODUCTS

2.1 Not Used

.1 Not Used.

PART 3 - EXECUTION

3.1 Not Used

.1 Not Used.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Section Includes

- .1 Temporary Utilities.

1.2 Related Sections

- .1 Section 01 01 00 - General Requirements.
- .2 Section 01 52 00 - Construction Facilities.
- .3 Section 01 54 23 - Access and Protection.

1.3 Submittals

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

1.4 Installation and Removal

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

1.5 Water Supply

- .1 Departmental Representative will not provide a supply of water. Water is not available on site. The Contractor to supply all water required for the work.

1.6 Temporary Power and Light

- .1 Limited temporary power is available for use by the Contractor and any requirements for power hook-ups and disconnect shall be the responsibility of the Contractor. If power beyond what is available is required, the power shall be supplied by the Contractor at no additional cost to the Contract.

1.7 Fire Protection

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

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Description

- .1 This section covers the work of supplying, maintaining, and removing temporary access, housing, and supplementary heating and ventilating (if required) for the workspaces and the work described by the drawings and the specifications.
- .2 The housing, heating and ventilating must be sufficient:
 - .1 To ensure a safe working environment.
 - .2 To facilitate progress of Work in an efficient manner.
 - .3 To protect Work and products against dampness and cold.
 - .4 To prevent moisture condensation on surfaces.
 - .5 To provide ambient temperatures and humidity levels for storage, installation and curing of materials specifically:
 - complete housing and heating a minimum of four days in advance of need.
 - Heat, for the initial four day period, to a temperature of 20 degrees C and not less than 10 degrees C during other heating periods.
- .3 The requirements of this section apply to all other sections of the specification that call for cold and weather protection or where heating is required to ensure the quality or durability of the work.

1.2 Related Sections

- .1 Section 01 54 23 - Access and Protection.
- .2 Section 04 43 04 - Repointing and Miscellaneous Masonry.
- .3 Section 07 12 15 - Waterproofing-Walkway System.

1.3 Definitions

- .1 Housing: enclosure placed around work or around scaffolding and work to provide either protection for the work taking place or to provide a micro-climate more suitable to the work than ambient atmospheric conditions, or both.

1.4 Submittals

- .1 Heater numbers, types, locations, and capacities.
- .2 Number and location of fire extinguishers associated with heating equipment.

1.5 Housing

- .1 Provide housing consisting of 2x4 construction c/w plywood, vapor

barrier and insulation for portions of the work which must be protected, heated, and/or ventilated during the work. Design housing to be strong enough to withstand loads from rain, wind and snow.

- .2 Prior to commencing heating, inform Departmental Representative of the intent and obtain approval prior to starting. The Departmental Representative will make periodic inspections of the housing and heating works throughout the duration of construction. Cooperate with and make adjustments/changes as directed.
- .3 Use suitable new materials or used materials in good condition, approved by the Departmental Representative, or use suitable prefabricated, portable components in a good, safe condition, approved by the Departmental Representative as to type, materials and detail.

1.6 Storage

- .1 Store heating fuels and gas to the requirements of the Departmental Representative and in accordance with the environmental sections of these specifications.

1.7 Temporary Heating

- .1 Provide temporary heating required during construction period.
- .2 The Contractor shall be responsible for posting a watchperson when workers are not present to ensure temperatures are maintained and heating equipment is operating safely.
- .3 The Contractor shall be responsible for damage to work and/or work area due to failure in providing adequate heat, protection and supervision during construction.
- .4 For Masonry Restoration: Apply in strict conformance with this and related masonry sections of these specifications and manufacturers requirements for specific products used for the masonry repairs.

1.8 Temporary Ventilating

- .1 Ventilate storage spaces containing hazardous or volatile materials.

1.9 Measurement and Payment

- .1 No measurement for payment will be made for the item, "Housing and Heating". Payment shall be by lump sum and shall include all costs for labour, housing and heating as required, as well as for all hook-ups/metering (if required). It should be possible to schedule the work so that heating and housing is not required.

- .2 No measurement for payment will be made for the work of providing a watchperson, if required. All costs for the provision of a watchperson, shall be deemed as included in the tendered prices for the above items.

PART 2 - PRODUCTS

2.1 Materials

- .1 Only new materials are to be used unless approved otherwise by the Departmental Representative.

PART 3 - EXECUTION

3.1 Heating Equipment

- .1 Use only heating equipment types acceptable to Departmental Representative.
- .2 Heating fuels:
 - .1 Use electricity, gas, diesel oil or other fuels approved by the Departmental Representative. Note that electricity availability is limited and an outside source will be required. The Contractor will be responsible for all arrangements and paying of accounts with Hydro if this is the selected method of heating.
 - .2 Fuel Storage: to the requirements of the Fire Commissioner of Canada.
 - .3 Heating fuel usage quantities will be recorded monthly and the Contractor will be billed "at cost". Monthly cost shall equal total consumption times the effective volume times rate for the given month as dictated by the heating fuel provider.

Note that a natural gas line with operating Valve is located at the site. A line with usage meter may be installed for use on project upon approval by the Departmental Representative. Adequate lock and tagging procedures are to be implemented at all times when gas is not in use.

- .4 Provide and maintain temporary fire protection equipment during performance of work commensurate with fuel source selected.
- .3 All installation and removals of meters and/or piping shall be performed by a Fitter/Installer CSA certified for the type of fuel being used. Contractor is responsible to maintain piping and associated heating systems at no additional cost to the Owner.

- .4 Ensure that the heating requirements are met by providing, at optimum efficiency of the equipment, a capacity of 125% of the heat requirement and a sufficient number of standby heaters ready for use at the site.
- .5 Vent the exhausts of heating equipment to the outside of the housing and well clear of combustible materials.

3.2 Removal of Heating and Ventilating Equipment

- .1 Upon receipt of the Departmental Representative's approval:
 - .1 Discontinue heating operations;
 - .2 Remove housing and heating equipment from the site.

3.3 Field Quality Control

- .1 Provide acceptable maximum-minimum thermometers inside the housing and maintain to satisfaction of Departmental Representative.
- .2 Ensure continuity of protection by posting a watchperson at Contractor's discretion when work is not in progress.
- .3 The watchperson's qualifications, under this section of the specification, are to be sufficient to perform, on heating equipment, such duties as:
 - .1 Preventative maintenance and re-fueling normally performed during any shift.
 - .2 Emergency repairs of minor complexity.
 - .3 Place standby items in service.
 - .4 Record maximum and minimum temperature at each thermometer on a daily basis and re-set the thermometers when requested by Departmental Representative or at prescheduled intervals.
 - .5 The temperature records are to be available to the Departmental Representative on a daily basis and certified written records are to be provided to the Departmental Representative on a weekly basis.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Section Includes

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

Note: in the summer of 2018, work, under another contract, will be underway in the central area of the north dry moat. The contractor for this project will be responsible for ensuring that sufficient fencing is provided to separate the two contracts so that there are no constructor issues so far as the Ministry of Labor is concerned.

1.2 References

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.189-2000, Exterior Alkyd Primer for Wood.
 - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-0121-M1978(R2003), Douglas Fir Plywood.
 - .3 CAN/CSA-S269.2-M87(R2003), Access Scaffolding for Construction Purposes.
 - .4 CAN/CSA-Z321-96(R2006), Signs and Symbols for the Occupational Environment.
- .3 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 Submittals

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

1.4 Installation and Removal

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to be used and fenced area and details of fence installation.

Note that it is anticipated that the areas delineated on the drawings are sufficient for the purposes of this work. Any additional areas or change in location from that indicated are to be approved by the Departmental Representative.

- .2 Identify areas which have to be graveled to prevent tracking of mud or where rutting deeper than 100 mm will occur. Where gravel is to be applied on any grounds, an approved geotextile fabric shall be applied to the ground area prior to placement of gravel. The grounds of the site are part of a Heritage Site and are to be disturbed as little as possible. Limit areas where the surface of the earth is disturbed. If any artifact is uncovered stop work in the area of the artifact.
- .3 Indicate use of supplemental or other staging area.
- .4 Secure the site whenever workers are not present on the site. Visit the site or arrange for the site to be checked at a minimum of one week intervals.
- .5 Provide construction facilities in order to execute work expeditiously.
- .6 Remove from site all such work after use and restore all ground and other surfaces to the satisfaction of the Departmental Representative.

1.5 Scaffolding

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging platforms and temporary stairs. See section 01 55 50 Access Housing, Heating and Ventilation.

1.6 Hoisting

- .1 Provide, operate and maintain hoists/cranes required for moving of workers, materials and equipment.
- .2 Hoists/cranes shall be operated by qualified operator.

1.7 Site Storage/Loading

- .1 Confine work and operations of employees to areas defined by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work or Workers or any existing part of the Fort.

1.8 Construction Parking

- .1 Parking will be permitted on site provided it does not disrupt performance of Work and access required by Parks Canada or, the use of the roadway by the public. All work and parking must be within the Parks Canada land.
- .2 Provide and maintain adequate access to project site. Reserve parking spaces for Parks Canada, Designated Representatives and Inspectors.

1.9 Equipment, Tool and Materials Storage

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

1.10 Sanitary Facilities

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

1.11 Construction Signage

- .1 Provide and erect, one week before access to site two project signs in locations designated by the Departmental Representative.
- .2 No other signs or advertisements, other than warning signs and traffic control signage, are permitted on site except with the express written consent of the Departmental Representative.
- .3 While it is unlikely they will be approved direct requests for approval to erect a Consultant/Contractor signboard to Departmental Representative. For consideration general appearance of Consultant/Contractor signboard must conform to project identification site sign. Wording shall be in both official languages.
- .4 Signs and notices for safety and instruction shall be in both official languages Graphic symbols shall conform to CAN/CSA-Z321. Traffic signs shall conform to the Ontario Manual of Uniform Traffic Devices and any specific references in the specifications and on the drawings.
- .5 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed by Departmental Representative.

1.12 Clean-up

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways to satisfaction of Departmental Representative.
- .3 Store materials resulting from demolition activities that are salvageable and requested by the Departmental Representative.
- .4 Stack stored new or salvaged material.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Items of Work

- .1 This section covers the requirements for the provision of access to permit work to be carried out for the installation of the new waterproofing/walkway system on the Terreplein of the Redoubt. Permissible work and storage areas are delineated on the drawings and the location for a temporary foot bridge is also indicated. Except as indicated otherwise on the drawings, all access to the Terreplein (workers, materials and equipment) shall be via this foot bridge. When materials and equipment are of a size and weight which do not allow the foot bridge to be used, these materials and equipment shall be craned to the Terreplein using a crane located at the permissible crane set-up areas shown on the drawings.
- .2 The supply, installation, maintenance and removal of the temporary foot bridge and including the submission of shop drawings.
- .3 The supply, maintenance and removal of all plywood covers or, other protective measures deemed necessary by the Departmental Representative, to protect existing architectural features.
- .4 Access to permit work to be carried out to the tops of the walls shall be by means of standard scaffolding.
- .5 Provide shop drawings of all scaffolding methods and locations.

1.2 Related Work

- .1 Section 01 01 00 - General Requirements.
- .2 Section 02 41 23 - Selective Site Demolition.
- .3 Section 04 43 04 - Repointing and Miscellaneous Masonry.
- .4 Section 07 12 15 - Waterproofing-Walkway System.

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.

1.4 Phasing

- .1 Provision of access to permit work to be carried out for the installation of the new waterproofing / walkway system on the Terreplein of the Redoubt as specified in Clause "1.1 Items of

Work" of this Section will be required for the items "Access and Protection - Phase 1", "Access and Protection - Phase 2", Access and Protection - Phase 3", "Temporary Foot Bridge - Phase 1", "Temporary Foot Bridge - Phase 2" and "Temporary Foot Bridge - Phase 3".

PART 2 - PRODUCTS

2.1 Scaffolding

- .1 Scaffolding materials shall be new, or used materials in good condition.
- .2 Provide three sets of shop drawings to the Departmental Representative for review and approval.

2.2 Temporary Foot Bridge

- .1 The location for a temporary foot bridge over the dry ditch is shown on the drawings. Shop drawings shall be submitted for the bridge showing all details for the construction with the location conforming to that shown unless otherwise approved by the Departmental Representative. Design and Drawings to be stamped by a Professional Engineer registered in the Province of Ontario, paid for by the Contractor.
- .2 Install temporary foot bridge as per the reviewed shop drawings. Maintain foot bridge for duration of the work and remove only after approval has been given by the Departmental Representative.
- .3 No part of foot bridge shall obstruct the access around the ditch. Events and other activities occur in the ditch.

PART 3 - EXECUTION

3.1 Scaffolding, Hoarding and Barriers

- .1 Provide all scaffolding, ladders, access, lifting equipment, etc. as necessary to carry out the work of all trades and as per the requirements of the work. All work to be in accordance with the Occupational Health and Safety Act. Field measure to ensure proper fit of all works.
- .2 Where used, scaffolding shall be erected on wood sills which are placed on tarps to prevent discoloration or contamination of surfaces. No stockpiling of materials (new or waste) directly on Historic surfaces or surface of the pavers. Plywood or other protective matting must be placed as a base.
- .3 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 workers and materials can easily enter.

- .4 Install, maintain and remove all plywood covers or other measures to protect existing architectural features.

- .5 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.

- .6 Install, maintain and remove all barriers around the site to prevent access by the Public to the immediate work areas. All barriers to be in accordance with the Occupational Health and Safety Act.

- .7 In order to prevent Public access to the temporary access (walkway) foot bridge, all hoarding to be panelized 1.2 metres wide x 2.4 metres high. Provide locks on all doors accessing the scaffolding through the hoarding. Securely brace and fasten to resist all wind loads.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Related Sections

1. Section 01 54 23 - Access and Protection.

1.2 References

1. Canadian Standards Association (CSA International)
 1. CSA-O121-08 (R2013), Douglas Fir Plywood.
2. Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions.

1.3 Installation and Removal

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

1.4 Modular Fencing

1. Provide surface mounted modular fencing around the work area to limit public access and delineate the site.
2. Provide fencing as required to separate the work of this contract from that of the contract (by others) in the central section of the north portion of the dry moat. This work is anticipated to take place from April 15, 2018 to the end of August 2018. Separation is to be such as to satisfy the Ministry of Labor that there is no constructor issue.
3. Modular fencing should include a visual barrier obstructing the Public from viewing the work area proceedings.

1.5 Guardrails and Barricades

1. Provide appropriate barrels and signage transitioning into railings and around excavations, open edges of the work areas and areas of potential falls or in areas where the public should be excluded.

1.6 Access to Site

1. Provide and maintain access roads, ramps and construction runways as may be required for access to Work.

1.7 Public Traffic Flow

1. Provide and maintain competent signal flag operators, traffic signs, barricades and flares, lights, or lanterns as required to complete the Work while protecting the workers and the public.

1.8 Fire Routes

1. Maintain access to property and adjacent properties including overhead clearances for use by emergency response vehicles.

1.9 Protection for Off-site and Public Property

1. Protect surrounding private and public property from damage during performance of Work.
2. Be responsible for damage incurred as a result of construction operations or influenced by construction operations.

1.10 Measurement and Payment

1. No measurement for payment will be made for the items "Temporary Barriers and Enclosures - Phase 1", "Temporary Barriers and Enclosures - Phase 2" and "Temporary Barriers and Enclosures - Phase 3". Payment shall be by lump sum and shall include all costs for labour, materials and equipment necessary to complete the work of these items.

PART 2 - PRODUCTS

2.1 Not Used

1. Not Used.

PART 3 - EXECUTION

3.1 Not Used

1. Not Used.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Section Includes

1. Product quality, availability, storage, handling, protection, and transportation.
2. Manufacturer's instructions.
3. Quality of Work, coordination and fastenings.
4. Existing facilities.

1.2 Related Sections

1. Section 01 45 00 - Quality Controls.

1.3 References

1. Within text of specifications, reference may be made to reference standards.
2. Conform to these standards, in whole unless conformance in part is specifically requested in specifications.
3. If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
4. The cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
5. Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.

1.4 Quality

1. Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.
2. Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products

at own expense and be responsible for delays and expenses caused by rejection.

3. Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
4. Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout the work.
5. Permanent labels, trademarks and nameplates on products are not acceptable in highly visible locations, except where required for operating instructions or by Law.

1.5 Availability

1. Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
2. In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.6 Storage, Handling and Protection

1. Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
2. Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
3. Store products subject to damage from weather in weatherproof enclosures.
4. Store Cementitious products clear of earth or asphalted areas, and away from walls.
5. Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
6. Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

7. Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.7 Transportation

1. Pay costs of transportation of products required in performance of Work.

1.8 Manufacturer's Instructions

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

1.9 Quality of Work

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

1.10 Co-ordination

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

1.11 Remedial Work

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

1.12 Fastenings

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

1.13 Fastenings

1. Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
2. Use heavy hexagon heads, semi-finished unless otherwise specified. Use No.304 stainless steel for exterior areas.
3. Bolts may not project more than one diameter beyond nuts.

1.14 Protection of Work in Progress

1. Prevent overloading of any part of structure. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

1.15 Measurement and Payment

1. No measurement for payment will be made for the work of this section. All costs for the work of this section shall be deemed to be included in the related work items of the Contract.

PART 2 - PRODUCTS

1. Not Used.

PART 3 - EXECUTION

1. Not Used.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Section Includes

1. Progressive cleaning.
2. Final cleaning.

1.2 Project Cleanliness

1. Maintain Work in tidy condition, free from accumulation of waste products and debris.
2. Remove waste materials from site at regularly scheduled times. Do not burn waste materials on site.
3. Clear snow and ice.
4. Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
5. Provide on-site containers for collection of waste materials and debris.
6. Provide and use clearly marked separate bins for recycling.
7. Remove waste material and debris from site and deposit in waste container at end of each working day.
8. Dispose of waste materials and debris off site.
9. Store volatile waste in covered metal containers, and remove from premises at end of each working day.
10. Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
11. Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate systems or, constitute an annoyance to the public use of adjacent areas.
12. Prior to re-opening roadways clean all debris to satisfaction of Departmental Representative.

1.3 Final Cleaning

1. When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
2. Remove waste products and debris and leave Work clean and suitable for occupancy.
3. Prior to final review, remove surplus products, tools, construction machinery and equipment.
4. Remove waste products and debris.
5. Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
6. Remove stains, spots, marks and dirt.
7. Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds. Pay special attention to grassed areas be especially vigilant with regard to removing all items that could become projectiles during grass cutting operations.
8. Remove dirt and other disfiguration from exterior surfaces.
9. Sweep and wash clean paved areas.

1.4 Measurement and Payment

1. No measurement for payment will be made for the work of this section. All costs for the work of this section shall be deemed to be included in the items, "Site Work".

PART 2 - PRODUCTS

2.1 Not Used

1. Not Used.

PART 3 - EXECUTION

3.1 Not Used

1. Not Used.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Section Includes

1. Text, schedules and procedures for systematic Waste Management Program for construction, deconstruction, demolition, and renovation projects, including:
 1. Diversion of Materials.
 2. Waste Audit (WA) - Schedule A.
 3. Waste Reduction Workplan (WRW) - Schedule B.
 4. Demolition Waste Audit (DWA) - Schedule C.
 5. Materials Source Separation Program (MSSP).
 6. Canadian Governmental Responsibility for the Environment Resources - Schedule E.

1.2 Definitions

1. Demolition Waste Audit (DWA): Relates to actual waste generated from project.
2. Materials Source Separation Program (MSSP): Consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
3. Recyclable: Ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse by others.
4. Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
5. Recycling: Process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
6. Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 1. Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
 2. Returning reusable items including pallets or unused products to vendors.
7. Salvage: Removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
8. Separate Condition: Refers to waste sorted into individual types.

9. Source Separation: Acts of keeping different types of waste materials separate beginning from first time they became waste.
10. Waste Audit (WA): Detailed inventory of materials on project. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill. Refer to Schedule A. Target for this project is 30% diversion from landfill.
11. Waste Management Coordinator (WMC): Contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
12. Waste Reduction Workplan (WRW): Written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).

1.3 Documents

1. Maintain at job site, one copy of following documents:
 1. Waste Audit.
 2. Waste Reduction Workplan.
 3. Material Source Separation Plan.
 4. Schedules A, and B completed for project.

1.4 Submittals

1. Submittals in accordance with Section 01 33 00 - Submittal Procedures.
2. Prepare and submit following prior to project start-up:
 1. Submit 2 copies of completed Waste Audit (WA): Schedule A.
 2. Submit 2 copies of completed Waste Reduction Workplan (WRW): Schedule B.
 3. Submit 2 copies of completed Demolition Waste Audit (DWA): Schedule C.
 4. Submit 2 copies of Materials Source Separation Program (MSSP) description.
3. Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using deconstruction/disassembly material audit form.
 1. Failure to submit could result in hold back of final payment.
 2. Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled, co-mingled and separated off-site or disposed of.
 3. For each material reused, sold or recycled from project, include amount quantities by number, type and size of items and the destination.

4. For each material land filled or incinerated from project, include amount of material and identity of landfill, incinerator or transfer station.

1.5 Waste Audit (WA)

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

1.6 Waste Reduction Workplan (WRW)

1. Prepare WRW prior to project start-up.
2. WRW should include but is not limited to:
 1. Destination of materials and listing of material.
 2. Deconstruction/disassembly techniques and sequencing.
 3. Schedule for deconstruction/disassembly.
 4. Location.
 5. Protection.
 6. Clear labelling of storage areas.
 7. Details on materials handling and removal procedures.
 8. Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.
3. Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
4. Describe management of waste.
5. Identify opportunities for reduction, reuse, and recycling of materials. Based on information acquired from WA.
6. Post WRW or summary where workers at site are able to review content.
7. Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.
8. Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

1.7 Demolition Waste Audit (DWA)

1. Prepare DWA prior to project start-up.
2. Complete DWA: Schedule C.
3. Provide inventory of quantities of materials to be salvaged for reuse, recycling, or disposal.

1.8 Materials Source Separation Program (MSSP)

1. Prepare MSSP and have ready for use prior to project start-up.
2. Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.
3. Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
4. Provide containers to deposit reusable and recyclable materials.
5. Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
6. Locate separated materials in areas which minimize material damage.
7. Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.
 1. Transport to approved and authorized recycling facility or to users of material for recycling.
8. Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.
 1. Ship materials to site operating under Certificate of Approval.
 2. Materials must be immediately separated into required categories for reuse or recycling.

1.9 Storage, Handling and Protection

1. Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
2. Unless specified otherwise, materials for removal become Contractor's property.
3. Protect structural components not removed for demolition from movement or damage.
4. Support affected structures. If safety of structure is endangered, cease operations and immediately notify Departmental Representative.
5. Protect surface drainage, mechanical and electrical from damage and blockage.
6. Separate and store materials produced during dismantling of structures in designated areas.
7. Prevent contamination of materials to be salvaged and recycle and handle materials in accordance with requirements for acceptance by designated facilities.
 1. On-site source separation is recommended.

2. Remove co-mingled materials to off-site processing facility for separation.
3. Provide waybills for separated materials.

1.10 Disposal of Wastes

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

1.11 Use of Site and Facilities

1. Execute work with least possible interference or disturbance to normal use of project area.

1.12 Scheduling

1. Coordinate Work with other activities at site to ensure timely and orderly progress of Work.

1.13 Measurement and Payment

- .1 No measurement for payment will be made for the work of this section. All costs for the work of this section shall be deemed to be included in the related work items of the contract.

PART 2 - PRODUCTS

1. Not Used.

PART 3 - EXECUTION

3.1 Application

1. Do Work in compliance with WRW.

2. Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 Cleaning

1. Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
2. Clean-up work area as work progresses.
3. Source separate materials to be reused/recycled into specified sort areas.

3.3 Diversion of Materials

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

Material Type	Recommended Diversion %	Actual Diversion %
Metals	100%	
Rubble	100%	
Wood (uncontaminated)	100%	
Other	100%	

4. Construction Waste

Material Type	Recommended Diversion %	Actual Diversion %
Cardboard	100%	
Plastic Packaging	100%	
Rubble	100%	
Steel	100%	
Wood (uncontaminated)	100%	
Other	100%	

3.4 Waste Audit (WA)

1. The following pertains to Schedule A - Waste Audit (WA). Column-1 refers to the category and type of waste materials. and a physical description of the material (eg. off-cuts, clean drywall, etc). Column-2 refers to the total quantity of materials received by the Contractor. Measurement units must be specified. Column-3 refers to

the estimated percentage of material that is waste. Column-4 refers to the total quantity of waste (column-2 x column-3). Column-5 refers to the areas(s) in which the waste was generated. Column-6 refers to the total percentage of recycled material from the specified total quantity of waste (column-4). Column-7 refers to the total percentage of reused material from the specified total quantity of waste (column-4).

2. Schedule A - Waste Audit (WA)

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

3.5 Waste Reduction Workplan (WRW)

1. The following pertains to Schedule B - Waste Reduction Workplan (WRW). Column-1 refers to the category and type of waste materials. Column-2 refers to the persons responsible for completing the WRW. Column-3 refers to Column-4 of Schedule A. Column-4 refers to the amount of reused waste predicted and realized. Column-5 refers to the amount of recycled waste predicted and realized. Column-6 refers to the approved recycling facility.

2. Schedule B

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

Material Description							
Wood							
Metal							
Other							

3.6 Construction & Demolition Waste

1. Carefully deconstruct and source separate materials/equipment and divert from D&C waste destined for landfill to maximum extent possible. Reuse, recycle or sell material off site for reuse except where indicated otherwise. On site sales are not permitted.
2. For construction and demolition projects, source separate waste and maintain waste audits in accordance with the Environmental Protection Act, Ontario Regulation 102/07 and Ontario Regulation 103/94.
 1. Provide facilities for collection, handling and storage of source separated wastes.
 2. Source separate the following waste:
 1. Portland cement concrete.
 2. Corrugated cardboard.
 3. Wood, not including painted or treated wood or laminated wood.
 4. Steel and plastics products.
3. Submit a waste reduction workplan indicating the materials and quantities of material that will be recycled and diverted from landfill.
 1. Indicate how material being removed from the site will be reused or recycled.
4. Submit proof that all waste is being disposed of at a licensed land fill site or waste transfer site. A copy of the disposal/waste transfer site's license and a letter verifying that said landfill site will accept the waste must be supplied to Departmental Representative prior to removal of waste from the demolition site.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Section Includes

1. Administrative procedures preceding preliminary and final inspections of Work.

1.2 Related Sections

1. Section 01 78 00 - Closeout Submittals.

1.3 Inspection and Declaration

1. Contractor's Inspection: Contractor and all Sub-contractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 1. Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 2. Request Departmental Representative's Inspection.
2. Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
3. Completion: submit written certificate that following have been performed:
 1. Work has been completed and inspected for compliance with Contract Documents.
 2. Defects have been corrected and deficiencies have been completed.
 3. Certificates required have been submitted.
 4. Work is complete and ready for Final Inspection.
4. Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative, and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.
5. Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for Certificate of Substantial Performance.
6. Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement

of lien period unless required otherwise by lien statute of Place of Work.

7. Final Payment: When Departmental Representative considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.
8. Payment of Holdback: After issuance of Certificate of Substantial Performance of Work, submit an application for payment of holdback.

1.4 Measurement and Payment

- .1 No measurement for payment will be made for the work of this section. All costs for the work of this section shall be deemed to be included in the related work items of the contract.

PART 2 - PRODUCTS

1. Not Used.

PART 3 - EXECUTION

1. Not Used.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Section Includes

1. As-built, samples, and specifications.
2. Product data, materials and finishes, and related information.
3. Spare parts, special tools and maintenance materials.
4. Warranties and bonds.
5. Final site survey.

1.2 Submission

1. Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of product data and maintenance manuals (where applicable) in English.
2. If requested, furnish evidence as to type, source and quality of products provided.
3. Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
4. Pay costs of transportation.

1.3 Format

1. Provide three (3) hard copies and one (1) electronic copy in pdf format.
2. Data to be provided in the form of a manual.
3. Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
4. When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.
5. Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
6. Arrange content under Section numbers and sequence of Table of Contents.
7. Provide tabbed fly leaf for each separate product section with typed description of product.

8. Text: Manufacturer's printed data, or typewritten data.
9. Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
10. Provide 1:1 scaled CAD files in dxf format on CD provide 2 copies of cd.
11. Provide electronic version of binder contents in pdf format.

1.4 Contents - Each Volume

1. Table of Contents: provide title of project;
 1. date of submission; names,
 2. addresses, and telephone numbers of Consultant and Contractor with name of responsible parties;
 3. Schedule of products and systems, indexed to content of volume.
2. For each product or system:
 1. List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
3. Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete information that does not apply.
4. Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 61 00.

1.5 As-Builts and Samples

1. In addition to requirements in General Conditions, include in the binders one record copy of:
 1. Contract Drawings.
 2. Specifications.
 3. Amendments.
 4. Change Orders and other modifications to the Contract.
 5. Reviewed shop drawings, product data, and samples.
 6. Field test records.
 7. Inspection certificates.
 8. Manufacturer's certificates.
2. Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
3. Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

4. Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
5. Keep record documents and samples available for inspection by Departmental Representative.
6. Turn one set, paper copy and electronic copy, of AS-BUILT drawings and specifications over to Departmental Representative on completion of work.
7. If project is completed without significant deviations from Contract drawings and specifications submit to Departmental Representative one set of drawings and specifications marked "AS-BUILT".

1.6 Recording Actual Site Conditions

1. Record information on set of black line opaque drawings, and in copy of Project Manual.
2. Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
3. Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
4. Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 1. Field changes of dimension and detail.
 2. Changes made by change orders.
 3. Details not on original Contract Drawings.
 4. References to related shop drawings and modifications.
 5. Location of internal utilities and appurtenances referenced to visible and accessible features.
 6. Horizontal and vertical location of underground and sub-surface drainage installations referenced to visible surface features.
5. Specifications: legibly mark each item to record actual construction, including:
 1. Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 2. Changes made by Amendments and change orders.
6. .6 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records, required by individual specifications sections.

1.7 Storage, Handling and Protection

1. Store spare parts and maintenance materials, in manner to prevent damage or deterioration.

2. Store in original and undamaged condition with manufacturer's seal and labels intact.
3. Store components subject to damage from weather in weatherproof enclosures.
4. Store paints and freezable materials in a heated and ventilated room.
5. Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.8 Warranties and Bonds

1. Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
2. List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
3. Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.
4. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Certificate of Substantial Performance is determined.
5. Verify that documents are in proper form, contain full information, and are notarized.
6. Co-execute submittals when required.
7. Retain warranties and bonds until time specified for submittal.

1.9 Measurement and Payment

1. No measurement for payment will be made for the work of this section. All costs for the work of this section shall be deemed to be included in the related work items of the contract.

PART 2 - PRODUCTS

1. Not Used.

PART 3 - EXECUTION

1. Not Used.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Description of Work

1. This section covers the requirements for the removal of and disposal off site of:
 1. All stainless steel troughs.
 2. Any "Miscellaneous Removals" of items not covered by the above that are necessary for the completion of the work.
2. All removed materials that are not to be specifically incorporated back into the work or designated to be returned to Parks Canada, are to be disposed of in accordance with the appropriate regulations at an appropriate facility and in accordance with the waste management plan.
3. This section also covers the requirements for the removal, salvage and re-installation of all existing pavers, sleepers and associated hardware and all racer rail in order to complete the work. Provide a minimum of two weeks' notice to the Departmental Representative prior to completing the removals to allow for the de-energizing and removal (by others) of all existing cables affected by the work.
4. All removals are to be completed in strict conformance with the phasing of the project.

1.2 Related Sections

1. Section 01 54 23 - Access and Protection.
2. Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.3 References

1. Canadian Federal Legislation
 1. Canadian Environmental Protection Act (CEPA), 1999.
 2. Canadian Environmental Assessment Act (CEAA), 2012.
 3. Motor Vehicle Safety Act (MVSA), 1995.

1.4 Measurement and Payment

1. No measurement for payment will be made for the following items:
 - .1 "Remove Existing Stainless Steel Troughs - Phase 1, Phase 2 and Phase 3".
2. All costs for labour, materials and equipment necessary to do the work of the above items, in accordance with the Drawings and these

Specifications, shall be included in the Tendered Contract Lump sum Prices for the items.

1.5 Storage and Protection

1. Protect existing items designated to remain / be salvaged for re-use. In event of damage to such items, immediately replace or make repairs to the approval of the Departmental Representative and at no additional cost to the Owner.
2. In all circumstances ensure that demolition work does not adversely affect adjacent features to remain not specified for removal, or contribute to excess air and noise pollution.
3. Do not dispose of waste or volatile materials such as, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout the project.
4. Do not pump or allow water containing suspended materials to enter into watercourses, storm or sanitary sewers or onto adjacent properties.
5. Control disposal, or runoff of water containing suspended materials or other harmful substances, in accordance with local authorities.

1.6 Existing Conditions

1. Prior to the start of any demolition work remove contaminated or hazardous materials as defined by authorities having jurisdiction from site and dispose of at designated disposal facilities in safe manner in accordance with TDGA and all other applicable regulatory requirements.

1.7 Regulatory Requirements

1. Ensure all work is performed in compliance with CEPA, CEAA, TDGA, MVSA, and all applicable Federal and Provincial regulations.
2. Follow mitigation requirements of CEAA.

1.8 Submittals

1. Prior to commencement of work on site, submit detailed waste reduction workplan indicating anticipated percentages of reuse, recycling and landfill, schedule of selective demolition, material description and quantities of materials to be salvaged, number and location of dumpsters, anticipated frequency of tipping, and name and address of all waste receiving organizations.
2. Supply certified bills of lading from authorized disposal sites and reuse and recycling facilities for all material removed from site.

Written authorization from the Departmental Representative is required to deviate from the receiving organizations listed in waste reduction workplan.

PART 2 - PRODUCTS

2.1 Equipment

1. Equipment and heavy machinery used to meet or exceed all applicable emission requirements.
2. Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.
3. Chipping hammers shall be 7.0 kg maximum.
4. Air compressor for abrasive blast cleaning shall supply a minimum pressure of 620 kPa within 3 m of the hose.
5. The temporary pedestrian bridge during construction is to be used for pedestrian traffic only and no machinery is to cross the bridge under any circumstances. Furthermore, no heavy equipment or any machinery is to be placed, stored or left on the terreplein roof, at any time.

2.2 Materials

1. Grout or new waterproofing membrane product to be used for filling miscellaneous holes or chipped out or deteriorated sections of mastic asphalt or water proofing beneath stainless steel troughs as recommended by the waterproofing walkway system manufacturer. Submit details of proposed materials to Departmental Representative, for approval, in accordance with Section 01 33 00, Submittal Procedures.

PART 3 - EXECUTION

3.1 Preparation

1. Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling and items to remain.
2. Locate and protect utilities.

3.3 Restoration

1. Restore areas and existing works outside areas of demolition to conditions that existed prior to commencement of work.

2. Use only procedures which are not harmful to health, are not injurious to plants, and do not endanger adjacent water courses or ground water.

3.4 Cleanup

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

3.5 Reporting

1. Record off-site removal of debris and materials and provide following information regarding removed materials to Departmental Representative within 48 hours.
 1. Time and date of removal.
 2. Type of material.
 3. Weight and quantity of materials.
 4. Final destination of materials.
2. The Contractor is responsible for ensuring all reporting requirements are fulfilled to the satisfaction of Departmental Representative.

3.6 Removal Plan

1. Prior to completing removals, submit removal plan to Departmental Representative for review. Plan shall indicate sequence of removals, equipment to be used and, permissible loadings for removal equipment.

3.7 Miscellaneous Removals

1. During the course of the work should removals of items be required to complete the work or are shown on the plans, complete those removals as "Miscellaneous Removals" under this Contract.
2. All "Miscellaneous Removals" shall be completed to the satisfaction of the Departmental Representative and shall in no way cause any damage to structures to remain.

3.8 Removals on Barbettes

1. Carefully remove selected cannons and carriages to approved locations and as directed by the Departmental Representative. Remove selected racer rails and store for reinstallation. Reinstall racer rails, cannon carriages and cannons following installation of the new waterproofing walkway system on barbettes and, when approval is given by the Departmental Representative.

3.9 Removal of Stainless Steel Troughs

1. Remove existing stainless steel troughs and dispose off site. Take care in removal of the troughs so as not to damage the collector heads to the downpipes or to the base flashing to the edge of the capping stones.
2. Complete removals in accordance with the phasing requirements of the Contract.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Related Work

- .1 Section 01 33 00 - Shop Drawings.
- .2 Section 01 54 23 - Access and Protection.
- .3 Section 05 50 00 - Metal Fabrications.
- .4 Section 07 12 15 - Waterproofing - Walkway System.

1.2 References

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C67-03a, Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
 - .2 ASTM C 136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM C140-03, Standard Test Methods for Sampling and Testing Concrete Masonry Units and related Units.
 - .4 ASTM C936-01, Standard Specification for Solid Concrete Interlocking Paving Units.
 - .5 ASTM C 979-99, Standard Specification for Pigments for Integrally Colored Concrete.
- .2 Canadian Standards Association (CSA)
 - .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Method of Test for Concrete.
 - .2 CSA-A231.2-95, Precast Concrete Pavers.
 - .3 CSA A283-00, Qualification Code for Concrete Testing Laboratories.

1.3 Measurement for Payment

- .1 No measurement for payment will be made for the item, "Re-Installation of Concrete Pavers".

Payment shall be by lump sum and shall include all costs for material, labour and equipment required for the supply and re-installation of concrete pavers as called for on the Drawings.

PART 2 - PRODUCTS

2.1 Concrete Pavers

- .1 Concrete Pavers: to CSA-A231.2 and as follows:
 - .1 Size: nominally 500 mm x 500 mm x 45 mm height but to suit area of application.

- .2 Shape: square.
 - .3 Colour: natural grey concrete (matching existing pavers).
 - .4 Aggregates: limestone.
 - .5 Finish: Natural, medium to heavy sandblast finish. Degree of sandblasting to be approved by Departmental Representative: submit samples.
 - .6 Standard end, corner, border units as required.
 - .1 Exposed vertical faces of pavers installed on the stairs are to be finished as per clause 2.1.1.5 of this section.
 - .7 Uniform in material, colour, size and must be the product of one Manufacturer.
- .2 Concrete Pavers to meet the following physical properties.
- .1 Minimum Compressive Strength: 55 MPa (8000 psi) as per ASTM C140;
 - .2 Minimum Flexural Strength: 5560 N (1250 lbf) as per ASTM C140;
 - .3 Minimum Flexural Strength (reinforced).
 - .4 Maximum Water Absorption: 5% as per ASTM C140;
 - .5 Maximum Freeze/Thaw: 1% loss of dry as per ASTM C67;
 - .6 Dimensional Tolerance as per ASTM C936:
 - .1 length: ± 1.6 mm (1/16");
 - .2 width: ± 1.6 mm (1/16");
 - .3 thickness: ± 1.6 mm (1/16");
- .3 Pavers on stairs: Fabricate custom size pavers so that only 3 pavers are installed on each step. Center paver to be 900 mm long and end pavers to be sized accordingly to fit remaining gap. Paver may be sawcut or fabricated to width required. All exposed surfaces to receive sandblast finish.
- .4 Maintenance materials: At completion of final Phase of project, supply additional 100 standard size paver units for use in maintenance. Deliver to storage area designated by Departmental Representative.

2.2 Mechanical Installation

- .1 For mechanically installed concrete pavers, laying panels should be supplied with spacer bars on each unit to ensure correct joint width between pavers and also help prevent contact of the edges with adjacent pavers and subsequent chipping.

PART 3 - EXECUTION

3.1 Structural Surface

- .1 Verify that structural surfaces, i.e. HSS sleepers or shimmed areas at steps, conform to levels required for installation of unit pavers. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.

- .2 Verify that top of structural surface does not exceed plus or minus 3 mm over 3 m straightedge.
- .3 Ensure that structural surface is not frozen or standing water is present during installation.

3.2 Installation of Edge Restraints

- .1 Verify that edge restraints conform to elevations and alignments required for re-installation of unit pavers. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.

3.3 Temporary Removals of Concrete Pavers

- .1 Remove pavers as needed in order to apply waterproofing membrane below and tie into existing waterproofing membrane beneath pavers. Re-install existing pavers after waterproofing membrane installation.
- .2 Use methods that protect pavers during removal.
- .3 Inspect, remove, and replace chipped, broken and damaged pavers at Contractor's own cost as per Clause 2.1 of this section.

3.4 Re-Installation of Concrete Pavers

- .1 Lay pavers to pattern indicated. Joints between pavers: 2 mm wide.
- .2 Sawcut pavers to fit around obstructions, at abutting structures, or at changes in direction. Layout pavers around circular obstacles prior to cutting, trace curve on pavers, and sawcut and grind as required to ensure a smooth continuous curve.
- .3 Installation by mechanical equipment:
 - .1 Prepare installation sequence and obtain approval of sequence by Departmental Representative.
 - .2 Place paver pallets and other materials without exceeding load bearing capacity, or otherwise detrimentally affecting installations.
 - .3 Run equipment approved for installation only. Protect installed pavers from traffic wear with plywood sheet or other suitable surface protection.
 - .4 Inspect pavers and remove chipped, broken or otherwise damaged pavers as directed by Departmental Representative if structural performance or aesthetics is compromised.
 - .5 Replace pavers removed without altering layout and structural quality.
- .4 Inspect, remove, and replace chipped, broken and damaged pavers, as per Clause 2.1 and 3.3 of this section, at Contractor's expense.
- .5 Final surface elevations not to exceed plus or minus 3 mm under 3

m long straightedge.

- .6 Match existing elevations of pavers.
- .7 Ensure conformance of final elevations.
- .8 Broken pavers need to be re-supplied at Contractor's expense and need to match existing pavers in shape and appearance, as per Clause 2.1 of this section.
- .9 In areas where a paver (s) is rocking due to the underside not resting fully on the steel sleepers, shim by providing a thin layer of neoprene padding glued to the paver or sleeper until any movement is completely stabilized.

3.5 Pinning Pavers

- .1 Small pavers which are pinned and need to be taken out in order to apply the new waterproofing system at stairs and barbettes should be removed and re-instated accordingly in a careful manner. Special care should be taken to support and protect the pins from any damage. Any damaged or broken pins or small pavers shall be replaced at Contractor's expense.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Description of Work

- .1 Work of this section includes, but is not limited to:
 - .1 The areas of stonework to be chipped and repointed as shown on the drawings and/or as directed by the Departmental Representative.
 - .2 The re-setting of flashings in mortar joints together with special masonry joint finish.

1.2 Related Work

- .1 Section 01 54 23 - Access and Protection.
- .2 Section 07 62 01 - Waterproofing, Flashings 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.

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.
- .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 up to a 2.0 square metre (m²) test panel demonstrating all aspects of the repair procedure for each type of masonry materials specified.
- .2 The panel(s) shall be located as directed by the Departmental Representative.
- .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. A minimum of three repair mortar samples (for crack repair) shall be submitted for colour approval.
- .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.

- .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 air temperature is below 0°C (32°F), or below 4°C (40°F) and falling. Repointing must not be done at air temperatures above 27°C (80°) 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.
- .3 Provide and maintain protection for masonry walls 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 item, "Chip and Repoint Mortar Joints", will be by lump sum for the areas shown on the drawing of masonry joints not completed under other items of the contract and as directed by the Departmental Representative. Areas shown on the Drawings represent typical worst case scenarios. Other areas to be repaired as needed under direction of the Departmental Representative.
- .2 All costs for the work of chipping, repointing and sealing masonry joints associated with the removal and re-setting of existing flashings are to be included in the lump sum items for the installation of the new waterproofing system; see Section 07 62 00 - Waterproofing-Walkway System

1.14 Basis of Payment

- .1 Payment at the unit and 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.

PART 2 - PRODUCTS

2.1 Water

- .1 Water shall be potable and free from contamination.

2.2 Cement

- .1 Cement shall be a white non-staining Portland cement acceptable product, as manufactured by Federal Cement Ltd., Ingersoll, Ontario or equal.

2.3 Lime

- .1 Lime shall be either:
 - i) 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), or Graymont (Mason's Lime).

- ii) Dolomitic finishing hydrated lime (Type S) or, Masons hydrated lime (Type N) conforming to CSA A82.

2.4 Pigments

- .1 Pigments shall be approved dry, powdered, inorganic pigments compatible with the materials to which the pigment is added.

2.5 Aggregates

- .1 The aggregate shall be well-graded sand (concrete sand conforming to CSA A-179) matching the texture and range of sizes found in both the test sample and the joints that will not be repaired in the surrounding area. The colour of the sand shall match that of the surrounding 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.

2.6 Sealant for Special Masonry Joint Finish Sealant Joints

- .1 Installation of special masonry joint finish sealant shall be completed using pre-sanded acrylic latex sealant. 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.

2.7 Air Entraining Agent

- .1 Air entrainment of the final mortar mix shall be between 15% to 17% as measured in accordance with CSA A23.2-4c. If this cannot 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.

2.8 Stone Overlay

- .1 Account for need of extra 0.2 m³ of Sikatop 123 at stairs at Blocks 03 and 10 in case substantial deterioration of existing stone is discovered beneath concrete pavers at these locations.

PART 3 - EXECUTION

3.1 Cutting out Deteriorated Jointing and Removal of Efflorescence

- .1 Where joints are not part of the work of removal and re-installation of cap stones, 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 item.
 - .3 For joints greater than 50 mm, the Departmental Representative shall provide direction as to whether or not new stone units are to be installed as part of the repointing operation. Where authorized, the supply and installation of new stone units shall be as directed by the Departmental Representative.
 - .4 Where loose, powdery or sandy joint material is encountered during the raking out operation, notify the Departmental Representative who will provide direction on how to proceed. As a guideline, if the joint is otherwise full and the section of masonry is of medium to low structural importance, the joint shall be repointed to contain the loose, powdery material and seal against water penetration. If, on the other hand, the joint is voided and/or of primary structural importance, 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 deemed to be included in the item "Chip and Repoint Mortar Joints".
- .2 Metal fittings such as nails, brackets, wood wedges, clips and the like must be removed from wall areas as cutting out proceeds.
- .3 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.
- .4 Excess efflorescence on stone faces shall also be removed as part of the joint removal item. Removal shall only be that possible with hand chippers and stiff non-metallic brushes. Commence removals of excess efflorescence only after the method of removal

has been approved by the Departmental Representative.

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 center 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.
- .5 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.
- .6 When cutting out is completed in each area, all joints are to be brushed clean of debris and, in general, the joints blown clean with medium-pressure compressed air. Where loose, powdery joint material is encountered, obtain direction from Departmental Representative on method of final joint cleaning.

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.
- .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.
 - .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.

.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: 6)

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

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

.7 Loose Units

.1 In general, loose masonry units less than 0.08 m² in face area are to be carefully removed and re-set in a full bed of mortar. Large units are not to be removed.

.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 built up in layers not exceeding 15 mm in depth when the removal depth is 30 mm or less; the bottom layer must be allowed to set for not less than 24 hours before the subsequent layer of mortar is applied. For joints greater than 3 mm but less than 13 mm a single lift of finished pointing can be used provided that the depth of removal is 26 mm or less. If loose material is encountered in a joint of this dimension it shall be treated in the same manner as a joint wider than thirteen mm including a separate lift of scratch pointing and a separate lift of finish pointing. Where the joint depth is greater than 30 mm, back point in one lift to the 30 mm depth and then complete in two 15 mm lifts (a 15 mm backpoint lift and a 15 mm finish 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 slightly concave.

.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 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 (Phase III), 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 Installation of Special Masonry Joint Finish Sealant

- .1 Install sealant complete with bond breaking tape or foam backer rod in flashing reglets in accordance with manufacturer's recommendations.
- .3 Colour of sealant to match adjacent joints and to be approved by Departmental Representative.
- .4 Clean up excess sealant, following installation, to the satisfaction of the Departmental Representative.

***** END OF SECTION *****

PART 1 - GENERAL

1.1 Description of Work

- .1 Provide all materials, labour and equipment for the complete installation of a new waterproofing system on the Redoubt Terreplein.

1.2 Qualification

- .1 The waterproofing installer shall be approved by the waterproofing manufacturer for the installation of their system and shall have a minimum of two years of experience in installing this waterproofing system.

1.3 Warranty

- .1 Furnish a three (3) year warranty on all waterproofing installed under this Contract, undertaking to repair all defects becoming evident during the period of this guarantee, in a prompt and thorough manner.

1.4 Workmanship

- .1 All workmanship shall be of the highest quality conforming to the best traditional practice and be to the approval of the Departmental Representative.

1.5 Storage

- .1 All materials will be stored in a location approved by the Departmental Representative.

1.6 Related Work

- .1 Section 01 53 10 - Access and Protection.
- .2 Section 04 43 04 - Repointing and Miscellaneous Masonry.

1.7 Measurement and Payment

- .1 No measurement for payment will be made for the following items:
 - .1 "Installation of Waterproofing System - Phase 1".
 - .2 "Installation of Waterproofing System - Phase 2".
 - .3 "Installation of Waterproofing System - Phase 3".
- .2 Payment shall be by lump sum and shall include all costs for labour, materials and equipment necessary for the installation of the new waterproofing system in accordance with the drawings and these specifications and re-installation of flashings and the installation of the waterproofing membrane complete with primers, waterproofing and granule finishes.

PART 2 - PRODUCTS

2.1 Waterproofing Membrane

- .1 Waterproofing to be a polymethyl methacrylate (PMMA) or polymethacrylate (PMA) waterproofing system with the following systems being acceptable for this project:
 - .1 Tremco - Tremco Epoxy Primer, Tremco PUMA Primer, Tremco PUMA Base Coat R, Tremco PUMA Wear Course R, Tremco PUMA Top Coat R, Tremco PUMA Base Coat T (at corners of stairs of Blocks 3 and 10), Dymonic 100 (at corners of stairs of Blocks 3 and 10).
 - .2 Soprema - Alsan RS 287 with option to add more quartz manually to get more of a non-slip resistance surface (Quartz sizes are shown in the Data Sheet attached), Alsan RS 230, Alsan RS Fleece, Alsan RS 222, Alsan RS 233, Sopralene 180 SP 3.5 mm, Elastocol 500 Primer.
- .2 The terms Primer, Base Coat, Wear Course, Top Coat, Epoxy, PUMA, Alsan, Fleece, Elastocol, Sopralene are used interchangeably with and without the term system throughout the documents and drawings. The terms shall refer to the full waterproofing membrane system with all coats applied (as outlined in this Section of the Specifications) on a fully prepared and cleaned surface. This treatment is to be applied to all surfaces which are to have the new waterproofing membrane applied over them.
- .3 Waterproofing Membrane System at Existing Mastic Asphalt Areas:
 - .1 Tremco Product:
 - .1 Coat 1 - Tremco Epoxy Primer
 - .2 Coat 2 - Tremco PUMA Primer
 - .3 Coat 3 - Tremco PUMA Base Coat R
 - .4 Coat 4 - Tremco PUMA Wear Course R
 - .5 Coat 5 - Tremco PUMA Top Coat R
 - .2 Soprema Product:
 - .1 Coat 1 - Alsan RS 222
 - .2 Coat 2 - Alsan RS 230 + Alsan RS Fleece + Alsan RS 230
 - .3 Coat 2b- Alsan RS 233
 - .4 Coat 3 - Alsan RS 289
- .4 Waterproofing Membrane System at Existing Protection Board Areas:
 - .1 Tremco Product:
 - .1 Coat 1 - Tremco Epoxy Primer
 - .2 Coat 2 - Tremco PUMA Primer
 - .3 Coat 3 - Tremco PUMA Base Coat R
 - .4 Coat 4 - Tremco PUMA Wear Course R
 - .5 Coat 5 - Tremco PUMA Top Coat R
 - .2 Soprema Product:
 - .1 Coat 1 - Alsan RS 222
 - .2 Coat 2 - Alsan RS 230 + Alsan RS Fleece + Alsan RS 230
 - .3 Coat 3 - Alsan RS 289
- .5 Waterproofing Membrane System at Protection Board Areas at Stairs of Blocks 3 and 10:

- .1 Tremco Product:
 - .1 Coat 1 - Tremco Epoxy Primer
 - .2 Coat 2 - Tremco PUMA Primer
 - .3 Coat 3a - Tremco PUMA Base Coat T
 - .4 Coat 5 - Tremco PUMA Top Coat R
- .2 Soprema Product:
 - .1 Coat 1 - Alsan RS 222
 - .2 Coat 2 - Alsan RS 230 + Alsan RS Fleece + Alsan RS 230
 - .3 Coat 2b- Alsan RS 233
 - .4 Coat 3 - Alsan RS 289
 - .5 Coat 1b- Elastocol 500 Primer
 - .6 Coat 2a- Sopralene 180 SP 3.5mm

2.2 Alternatives

- .1 The two systems described above have been tested on site in their respective mock-up configurations and therefore no other alternative systems will be acceptable.

2.3 New Waterproofing Membrane Color

- .1 New waterproofing membrane color to be Benjamin Moore Series: CC-548 "Asphalt".

2.4 Samples

- .1 Contractor to provide final waterproofing finish samples clearly demonstrating the required texture of walking surface and color specified in this Section. Installation may proceed upon Departmental Representative's review and approval of the samples provided.

2.5 Mock-ups

- .1 Mock-ups will be required at each new condition where different techniques will be required or different conditions exist. For example and not limited to at each type of edge condition against each type of penetration (such as railing posts, electrical penetrations, gun mounts), at stair edges, at material transitions, against historic gun mounts, at expansion joints and cracks, etc. and at any unusual condition. The intent is to confirm each treatment and review how the product will be applied.
- .2 These mock-ups will include demonstration of cleaning and preparation techniques.

PART 3 - EXECUTION

3.1 Removals

- .1 Complete removals of all necessary pavers etc. to permit the installation of the new waterproofing system to the limits

indicated on the drawings and in the phases as indicated on the drawings.

- .2 Store removals that will be re-installed on site for re-installation after the waterproofing membrane is installed and approval is given by the Departmental Representative.

3.2 Installation of Waterproofing Membrane

- .1 Installer Qualifications: A Manufacturer approved firm with minimum five (5) years' experience in installation of specified or similar products employing workers trained by Manufacturer, including a full-time on-site Supervisor with a minimum of three (3) years' experience installing similar work and able to communicate verbally with Contractor and Employees.
- .2 All components of the waterproofing membrane system must be from one Manufacturer, be compatible and recommended for use together to form one waterproofing membrane system by the Manufacturer.
- .3 Work with the Manufacturer's Representative to obtain the results intended from the products specified. Report all adjustments and additives to the waterproofing membrane system. Record and provide records of any direction given by the Manufacturer's Representative. If the direction contradicts the written instructions on the product sheets in any way or approaches the product limits specifically, notify the Departmental Representative of the issues in writing before applying any coating.
- .4 Application and installation are to follow Manufacturer's specifications, attached to the back of this Specification.
- .5 Prepare existing mastic asphalt surface, stone surfaces and, concrete surfaces in accordance with waterproofing walkway system manufacturer's recommendations. Ensure all surfaces that will have the new waterproofing system installed over them are thoroughly inspected and cleaned of all debris, dirt and overgrowth and properly and correctly conditioned for new waterproofing system application. Activities include but are not limited to roughing up the mastic surface with a grinding/sanding stone, grinding of concrete and stone surfaces with a circular saw, cleaning surfaces with a chemical product, sweeping, etc.
- .6 Ensure all surfaces that are adjacent to the surfaces that will have the new waterproofing system installed over them are meticulously protected from any staining, contamination or any other impact from the new waterproofing membrane installation process.
- .7 Although it is not anticipated that any cleaning product or new waterproofing membrane are to get in contact with any stone or original historic fabric, the Departmental Representative must be consulted if a need arises to do so.

- .8 Confirmation is required that the cleaner or product is acceptable to Manufacturer of the waterproofing membrane.
- .9 Apply waterproofing walkway system in strict accordance with manufacturer's recommendations, to the limits indicated and in accordance with the details shown on the drawings and/or as recommended by the waterproofing walkway system manufacturer and as approved by the Departmental Representative.
- .10 Contractor to supply Product Data Sheets for any chemical cleaning product to be used, to be reviewed and approved by the Departmental Representative.
- .11 Any product not supplied by waterproofing membrane supplier must be acceptable to Manufacturer of waterproofing membrane.
- .12 Fill any holes, chipped out or deteriorated areas in the mastic asphalt with new mastic asphalt compound. Repair damaged surface of stone or concrete with grout or related product to bring to level surface prior to waterproofing layer application.
- .13 Any voids or cracks to be filled level with the waterproofing membrane product.
- .14 Apply waterproofing membrane to selected areas of paver sections that will involve patching which will be the width equal to space between and length varying between 600 mm and 1000 mm. The quantity of these areas is as follows:
 - .1 10 - 600 mm long strips.
 - .2 3 - 1000 mm long strips.

3.3 Scuppers

- .1 Form scuppers at locations shown and as detailed on the drawings.
- .2 Install waterproofing walkway system through scuppers as per manufacturer's recommendations and, to ensure positive drainage.

3.4 Racer Rail Fasteners

- .1 All fasteners on original racer rail are to be left undisturbed. Fasteners on modified racer rail can be removed. New stainless steel fasteners to be provided and installed. New Fasteners to match existing in diameter and depth. Where fasteners are deteriorated such that their size cannot be recognized, use fasteners that will have minimum 50 mm penetration into stone and be 6 mm in diameter set in epoxy.

3.5 HSS Sleeper Fasteners

- .1 Carefully remove existing fasteners while not damaging any in the process. Any damaged fasteners will be replaced new, in kind, at the Contractor's expense.

3.6 Roof Penetrations

- .1 In addition to all visible and observable roof penetrations and electrical and other conduits, Contractor is to allow for additional 30 roof penetrations beneath the concrete pavers.

3.7 Carriage Support on Two (2) Deteriorated Cannon Carriages

- .1 Block and support to allow safe executions for work at two deteriorated cannon carriage areas. If blocking is well executed, PCA will consider purchasing the blocking at the price to be negotiated at the sole discretion of the Departmental Representative.
- .2 Do not waterproof the racer rail beneath two deteriorated cannon carriages within 250 mm ± of carriage wheels.

***** END OF SECTION *****

Tremco, Inc. Commercial Sealants & Waterproofing

Section 07 18 00 TRAFFIC COATINGS Vehicular Traffic Coatings Guide Specification

Specifier: This guide specification section **specifies Tremco Vulkem® EWS Traffic Coating System with PUMA Technology.**

Tremco PUMA Primer is a methyl methacrylate (MMA) primer that is applied to the shot blast concrete to prepare it for the application of Tremco PUMA BC base coat.

Tremco PUMA BC Base Coat is a modified polyurethane methacrylate (PUMA) base coat that bonds firmly to Tremco PUMA Primer. It retains its integrity even if substrate movement causes hair line cracks of up 1/16". Tremco PUMA BC will prevent water migration between it and its substrate.

Tremco PUMA BC LM Detailing Coating is a modified polyurethane methacrylate (PUMA) detail coat that bonds firmly to Tremco PUMA Primer. It retains its integrity even if substrate movement causes hair line cracks of up 1/16". It has a higher modulus than Tremco PUMA BC and is used for detailing cracks and control joints prior to the Tremco PUMA BC base coat application.

Tremco PUMA BC T Base Coat is a thixotropic modified polyurethane methacrylate (PUMA) base coat that bonds firmly to Tremco PUMA Primer. It retains its integrity even if substrate movement causes hair line cracks of up 1/16". Tremco PUMA BC T will prevent water migration between it and its substrate. Tremco PUMA BC T is used on ramps, vertical rises, detailing and field applied cant beads.

Tremco PUMA BC R Base Coat is a rollable version of Tremco PUMA BC that bonds firmly to Tremco PUMA Primer. It retains its integrity even if substrate movement causes hair line cracks of up 1/16". Tremco PUMA BC R is used for ramps and upturns.

Tremco PUMA WC Wear Coat is a modified polyurethane methacrylate (PUMA) wear coat. Tremco PUMA WC is applied after Tremco PUMA BC has cured. The wear coat is loaded with aggregate to give the system excellent impact, abrasion and chemical resistance.

Tremco PUMA TC Top Coat is a methyl methacrylate (MMA) top coat that is applied after Tremco PUMA WC has cured. Interlaminary adhesion to Tremco PUMA WC is exceedingly strong. The top coat affords excellent abrasion resistance, UV stability and chemical resistance to complete the Vulkem EWS

Basic Uses

Heavy-Duty vehicular traffic deck coating applications include waterproofing concrete slabs and protecting occupied areas underneath from water damage. The system also protects concrete from damaging effects of water deicing salts, chemicals, gasoline, oils and anti-freeze.

This section is easily edited using several common commercial specification software tools.

We recommend you consult with your Tremco construction technical representative, who can be contacted through: Tremco, Inc., Commercial Sealants and Waterproofing Division, Beachwood OH; (866) 321-6357; email: techresources@tremcoinc.com; www.tremcosealants.com.

Tremco products appear in the following CSI MasterFormat guide specifications available from Tremco:

- Section 07 01 91 Joint Sealant Rehabilitation and Replacement
- Section 07 14 13.01 Hot Fluid-Applied Waterproofing, Deck (TREMproof 6100)
- Section 07 14 13.02 Hot Fluid-Applied Waterproofing, Vegetated Roof (TREMproof 6100)
- Section 07 14 16.01 Cold Fluid-Applied Waterproofing, Vertical and Deck (TREMproof 250GC)
- Section 07 14 16.02 Cold Fluid-Applied Waterproofing, Vertical (TREMproof 250GC)
- Section 07 14 16.03 Cold Fluid-Applied Waterproofing, Deck (TREMproof 250GC)
- Section 07 14 16.04 Cold Fluid-Applied Waterproofing, Vegetative Roof (TREMproof 250GC)
- Section 07 17 16.01 Bentonite Waterproofing (Paraseal)
- Section 07 17 16.02 Bentonite Waterproofing (Paraseal GM/LG 60 mil)
- Section 07 18 00.01 Traffic Coatings, Vehicular
- Section 07 18 00.02 Traffic Coatings, Pedestrian
- Section 07 18 00.03 Traffic Coatings, Mechanical Rooms
- Section 07 27 13 Modified Bituminous Sheet Air Barriers, Vapor-Retarding (ExoAir 110)
- Section 07 27 23 Board Product Air Barriers, Vapor Permeable (SECUROCK ExoAir 230)
- Section 07 27 26.01 Fluid-Applied Membrane Air Barriers, Vapor-Retarding (ExoAir 120)
- Section 07 27 26.02 Fluid-Applied Membrane Air Barriers, Vapor Permeable (ExoAir 220)
- Section 07 27 26.03 Fluid-Applied Membrane Air Barriers, Vapor Permeable (ExoAir 230)
- Section 07 92 00 Joint Sealants
- Section 08 85 00 Glazing Sealants
- Section 32 13 73 Concrete Paving Joint Sealants

This document includes Specifier notes in hidden text. To view hidden text, www.bim.net/displaying-hidden-text-in-microsoft-word-step-by-step-instructions-for-windows-and-mac/

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SECTION 07 18 00 – TRAFFIC COATINGS, VEHICULAR TRAFFIC

PART 1 - GENERAL

1.1 SECTION INCLUDES

1. Polyurethane methacrylate traffic coatings for vehicular traffic applications

1.2 RELATED REQUIREMENTS

1. Section 03 31 00 "Cast-in-Place Concrete" for moisture curing of concrete traffic coating substrate.
2. Section 07 92 00 "Joint Sealants" for joint sealants and accessories and joint preparation.

1.3 REFERENCES

- A. References, General: Versions of the following standards current as of the date of issue of the project apply to the Work of this Section.
- B. ASTM International (ASTM): www.astm.org:
 1. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants
 2. ASTM C 1127 - Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with an Integral Wearing Surface
 3. ASTM C 1193 - Standard Guide for Use of Joint Sealants
 4. ASTM D 4258 - Standard Practice for Surface Cleaning Concrete for Coating
 5. ASTM D 4259 - Standard Practice for Abrading Concrete
- C. International Concrete Repair Institute (ICRI): www.icri.org:
 1. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Conference: Conduct conference at Project Site.
 1. Review requirements for traffic coating products and installation, including surface preparation, substrate conditions, project and manufacturer's details, installation procedures, mockups, testing and inspection requirements, protection and repairs, and coordination and sequencing of traffic coating work with work of other Sections.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of traffic coating product specified, indicating compliance with requirements.
- B. Shop Drawings: Show locations for traffic coating system components. Show details for each type of substrate, movement joints, corners, and edge conditions, including penetrations, transitions, and terminations.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data:
 1. Certification of manufacturer's approval of Installer.
- B. Product Test Reports: Test data for traffic coating products and traffic coating system, by qualified testing agency, indicating proposed traffic coating meets performance requirements, when requested by Departmental Representative.

- C. Warranty: Sample of unexecuted manufacturer and installer special warranties.
- D. Field quality control reports.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A manufacturer-approved firm with minimum [five] years' experience in installation of specified or similar products in successful use on similar projects, employing workers trained by manufacturer, including a full-time on-site supervisor with a minimum of [three] years' experience installing similar work, and able to communicate verbally with Contractor, Departmental Representative, and employees.
- B. Mockups: Provide traffic coating mockup application within mockups required in other sections, or if not specified, in an area of not less than 150 sq. ft. of surface where directed by Departmental Representative for each type of substrate condition. Include examples of surface preparation, crack and joint treatment, traffic coating application, slip-resistant aggregate application, and flashing, transition, and termination conditions, to set quality standards for execution.
 - 1. Include intersections of deck traffic coating with adjacent vertical coating and moisture control system applications.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Accept materials on site in manufacturer's unopened original packaging.
- B. Store products in weather protected environment, clear of ground and moisture, within temperature ranges recommended by traffic coating manufacturer.
- C. Construction Waste: Store and dispose of packaging materials and construction waste in accordance with requirements of Division 01 Section "Construction Waste Management".

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Environmental Limitations: Apply traffic coating within the range of ambient and substrate temperatures recommended by traffic coating manufacturer.
 - 1. Protect substrates from environmental conditions that affect system performance.
 - 2. Do not apply traffic coating to a damp or wet substrate or during snow, rain, fog, or mist.

1.10 SCHEDULING

- A. Schedule work so traffic coating applications may be inspected prior to concealment.

1.11 WARRANTY

- A. Applicator: Company specializing in performing the work of this section qualified by system manufacturer for warranted membrane installation. Applicator shall submit the following certification for review:
 - 1. Applicator shall submit documentation from the membrane manufacturer to verify contractor's status as a qualified approved applicator for warranted installations.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which traffic coating manufacturer agrees to furnish traffic coating material to repair or replace those materials installed according to manufacturer's written instructions that exhibit material defects or otherwise fail to perform as specified under normal use within warranty period specified.
 - 1. Access for Repair: Owner shall provide unimpeded access to the Project and the traffic coating system for purposes of testing, leak investigation, and repair,

2. Cost Limitation: Manufacturer's obligation for repair or replacement shall be limited to the original installed cost of the work.
 3. Warranty Period: Ten years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of traffic coating materials from the following:
1. Movement of the structure caused by structural settlement or stresses on the traffic coating exceeding manufacturer's written specifications for elongation.
 2. Mechanical damage caused by outside agents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Products: Provide traffic coating products manufactured by **Tremco, Inc., Commercial Sealants and Waterproofing Division, An RPM Company**, Beachwood OH; (866) 321-6357; email: techresources@tremcoinc.com; www.tremcosealants.com, Source Limitations: Provide traffic coating system materials and accessory products from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Traffic coating system shall be capable of performing as a continuous watertight installation and as a moisture drainage plane transitioned to adjacent flashings and discharging water to the structure exterior. Traffic coating shall accommodate normal substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without resultant moisture deterioration.
- B. Compatibility: Provide traffic coating system materials that are compatible with one another and with adjacent materials under conditions of service and application required, as demonstrated by traffic coating manufacturer based on testing and field experience.

2.3 TRAFFIC COATING FOR VEHICULAR TRAFFIC, EXTREME WEAR SYSTEM (EWS)

- A. Traffic Coating: Manufacturer's polyurethane methyl methacrylate system for extreme exterior exposure conditions, traffic-bearing, seamless, high-solids-content, cold liquid-applied, elastomeric, waterproofing membrane system with integral wearing surface for vehicular traffic.
1. Basis of Design Products: Tremco, Inc., Vulkem EWS System
- B. Primer: Two-component, chemically curing methyl methacrylate
1. Tremco PUMA Primer
- C. Base Coats: Modified polyurethane methacrylate
1. Tremco PUMA BC Base Coat
- D. Wear Coat: Modified polyurethane methacrylate
1. Tremco PUMA WC Wear Coat mixed with Tremco PUMA Filler Powder
- E. Top Coat: Methyl Methacrylate
1. Tremco PUMA TC Top Coat.
 2. Color: As selected by Departmental Representative from manufacturer's full range.
- F. Topcoat Aggregate: Manufacturer's standard aggregate for each use indicated of particle sizes, shape, and minimum hardness recommended in writing by traffic-coating manufacturer.

1. 16-20 Mesh silica sand for the wear coat
2. 25-50 Mesh silica sand for the primer
3. Bauxite; heavy duty aggregate comprised of aluminum oxide

2.4 ACCESSORY MATERIALS

- A. General: Accessory materials as described in manufacturer's written installation instructions, recommended to produce complete traffic coating system meeting performance requirements, and compatible with traffic coating material and adjacent materials.
- B. Initiator; Benzoyl Peroxide
 1. Tremco PUMA Initiator
- C. Cleaner; One component polyurethane methyl methacrylate
 1. Tremco PUMA Cleaner
- D. Cold Weather Catalyst;
 1. Tremco PUMA Cold Weather Catalyst
- E. Crack and Joint Detailing Coating
 1. Tremco PUMA BC LM and/or Tremco PUMA WC with silica
- F. Vertical and Ramp Application Coating
 1. Tremco PUMA BC R
- G. Cant Beads and Detailing of Penetrations
 1. Tremco PUMA BC T

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Surface Condition: Before applying traffic coating materials, examine substrate and conditions to ensure substrates are fully cured, smooth, and free from high spots, depressions, loose and foreign particles and other deterrents to adhesion, and conditions comply with manufacturer's written recommendations.
 1. Verify concrete surfaces are visibly dry, have cured for time period recommended by traffic coating manufacturer, and are free from release agents, curing agents, laitance, and other contaminants.
 2. Test surfaces following cleaning and abrasion specified below.
 - a. Test for capillary moisture by method recommended in writing by traffic-coating manufacturer.
 - b. Test for traffic coating adhesion per manufacturer's recommended method.
 - c. Notify Departmental Representative in writing of unsatisfactory conditions.
- B. Proceed with installation once unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean, prepare, and treat substrates in accordance with ASTM C 1127 and traffic coating manufacturer's written instructions.
 1. Remove contaminants, curing compounds, and film-forming coatings from substrates.
 2. Remove projections and excess materials and fill voids with manufacturer's recommended substrate patching material.

3. Mechanically abrade concrete surfaces by method of shot blasting to a uniform profile in accordance with ASTM D 4259 and meeting ICRI Surface Profile CSP 3. Do not acid etch.
 4. Clean prepared surfaces in accordance with ASTM D 4258.
- B. Protect adjacent finished surfaces by masking. Mask termination point on vertical surfaces. Protect weep holes and drains.

3.3 TERMINATIONS AND PENETRATIONS

- A. Prepare vertical and horizontal surfaces at horizontal to vertical transitions, terminations, joints, and penetrations through traffic coatings in accordance with ASTM C 1127 and manufacturer's written instructions, using accessory materials specified.
- B. At terminations of traffic coating exposed to traffic, rout 1/4 by 1/4 inch keyway in concrete.
- C. Detail Preparation: Prepare non-moving shrinkage cracks, large cracks, construction joints, expansion joints, projections and protrusions, penetrations, drains, and changes in plane in accordance with manufacturer's written instructions and details, .
1. Prepare joints and cracks in substrate in accordance with ASTM C 1127 and ASTM D 4258 and manufacturer's written instructions.
- D. Joint Coating Installation: Comply manufacturer's written instructions. Allow joint coatings to cure adequately before coating with traffic coating.
1. Provide coating cants at penetrations and at horizontal-to-vertical intersections. Tool coating material to form 45 degree angle transition. Penetrations must be grouted solid at all instances.
 2. Rout and fill cracks with coating and tool flush with surface.
 3. Feather edges of joint coating applications.
 4. Allow coating to cure.
 5. Fill expansion joints with backer rod and joint sealant contact Tremco for sealant recommendation. Do not apply traffic coating over expansion joints.

3.4 VEHICULAR TRAFFIC-COATING APPLICATION

- A. Primer: Prime surfaces to receive traffic coating system. Allow to cure before proceeding.
- B. Start traffic-coating application in presence of manufacturer's technical representative.
- C. Apply traffic coating according to manufacturer's written instructions.
1. Verify that wet film thickness of each coat complies with requirements every 100 sq. ft. Specifier: Edit number of coats below based upon manufacturer's recommendation for type of traffic. Intermediate coat is typically recommended for heavy traffic areas.
- D. Apply number of coats of specified compositions for vehicular traffic coating at locations indicated on Drawings, per manufactures written installation instructions
- E. Apply traffic coatings to prepared wall terminations and vertical surfaces to height indicated; omit aggregate on vertical surfaces.
- F. Cure traffic coatings. Prevent contamination and damage during application and curing stages.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, traffic coating application, protection, and drainage components, and to furnish reports to Departmental Representative.
- B. Coordination of Testing: Cooperate with testing agency. Allow access to work areas and staging. Notify testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.
 - 1. Do not cover Work until testing and inspection is completed and accepted.
- C. Reporting: Forward written inspection reports to the Departmental Representative within 3 working days of the inspection and test being performed.
- D. Correction: Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.

3.6 CLEANING AND PROTECTING

- A. Clean spills, stains, and overspray resulting application utilizing cleaning agents recommended by manufacturers of affected construction. Remove masking materials.
- B. Protect traffic coating from damage from subsequent work. Protect traffic coating materials from exposure to UV light for period in excess of that acceptable to traffic coating manufacturer; replace overexposed materials and retest.

END OF SECTION

APPLICATION INSTRUCTIONS

1. Purpose

- 1.1 The purpose of this document is to establish uniform procedures for applying the Vulkem® Extreme Wearing System (EWS). This document describes application procedures for extreme-duty requirements. The techniques involved may require modifications to adjust to job-site conditions. If you have any questions regarding your application, contact your local Tremco Field Sales Representative for specific design requirements. This document will provide instructions and troubleshooting for the application of the Vulkem EWS to qualify for the manufacturer's warranty.

2. Substrate Preparation

- 2.1 Investigation of the substrate should be performed to determine the type of surface preparation that will need to take place to achieve the appropriate surface profile required for the coating application. Depending on the condition of the concrete, one or more types of surface preparations may be required. **Shotblast is required prior to any Vulkem EWS installation.** Refer to ICRI's Technical Guideline No. 03732-Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays for best practices on selecting the appropriate method of concrete preparation. Vulkem EWS application requires a CSP 3-4.
- 2.2 For preparation of metal substrates, please follow The Society for Protective Coatings recommendations that follow in section 3.12.

3. Conditions for Concrete Surfaces

- 3.1 Concrete shall be water-cured and attain a 4000 PSI minimum compressive strength. Moisture content in the concrete must be lower than 6% as measured using a Tramex CME 4 Moisture Meter. Excess moisture in the concrete can prevent the coating materials from performing as intended. Depending on the concrete construction and job site location, additional concrete testing may be required. Please contact your local Tremco Sales or Technical Representative.
- 3.2 To detect the presence of excess moisture, several tests may be employed:
- ASTM D4263- Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
 - ASTM F2170-02 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs
 - Calcium Chloride Test
- 3.3 All concrete surfaces must be shotblast prior to any coating application. For proper methods, refer to ICRI's Technical Guideline No. 03732. For supplier information contact Tremco's Technical Service.
- 3.4 Concrete surface shall be properly cleaned so that the surface to receive the coating, sealant, or liquid applied flashing is free of all laitance, mold, paint, sealers, coatings, curing agents, loose particles, and other contamination or foreign matter which may interfere with the adhesion. Consult a Tremco Technical Service Representative for recommendations prior to installing materials.
- 3.5 Shrinkage cracks in the concrete surface which are 1/16" (1.5 mm) wide or greater shall be treated according to the instructions in Section 6, Detail Work.

- 3.6 Structural cracks, regardless of width, shall be treated according to the instructions in Section 6, Detail Work.
- 3.7 Spalled areas shall be cleaned and free of loose contaminants prior to repair. Due to the fact that jobsite conditions vary, it is recommended that you contact Tremco's Technical Service or your local Tremco Sales Representative for the best method of repair.
- 3.8 In the event of exposed reinforcing steel, it is recommended that the structural engineer of record be contacted for investigation of the condition and for the best method of repair.
- 3.9 Surfaces shall be made free of defects that may telegraph and show through the finished coating. Surfaces which are rough (fins, ridges, exposed aggregate, honeycombs, deep broom finish, etc.) shall be leveled and made smooth by applying a coat of sand-filled Tremco PUMA WC.
- 3.10 All drains shall be cleaned and operative. Drains shall be recessed lower than the deck surface. Surface shall be sloped to drain and provide positive drainage. Drains should be detailed as instructed below:
- Cut a 1/4" wide x 1/4" deep (6 mm x 12 mm) keyway into the concrete surface at any point where the coating will have an exposed terminating edge- that is, any point where the coating will end in an open area subject to traffic, for example, at the end of a ramp, around drains and alongside expansion joints.
- 3.11 If the project is a restoration deck, old sealant and backing material shall be removed. The joint interface will require a thorough wire brushing, grinding, sandblasting, and primer.
- 3.12 Conditions for Metal Surfaces: Follow standard SSPC-SP 10/NACE No. 2 Near White Blast Cleaning. A near-white metal blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products, and foreign matter.

4. Jobsite Materials

- 4.1 Recommended materials and their use are as follows:

Tremco PUMA Primer: A two-part, chemical-curing MMA primer for porous and non-porous surfaces.

Tremco PUMA BC: A two-part, chemical-curing PUMA modified coating used as an elastomeric, waterproofing membrane for Vulkem EWS.

Tremco PUMA BC LM: A lower modulus version of Tremco PUMA BC, used as the waterproofing membrane for Vulkem EWS for service temperatures below 32° F (0° C).

Tremco PUMA BC T: A thixotropic version of Tremco PUMA BC, used for ramps, vertical rises, detailing and field applied cant beads.

Tremco PUMA BC R: A rollable version of Tremco PUMA BC, used for ramps and upturns.

Tremco PUMA WC: A two-part, chemical curing PUMA modified wearing course that can also be used with sand to level out uneven areas in the concrete.

Tremco PUMA TC: A two-part, chemical-curing MMA coating used to lock in aggregate and provide additional chemical and UV resistance to Vulkem EWS.

Tremco PUMA Cleaner: A one-part PUMA cleaner for all tools such as mixing paddles, squeegees, spiked rollers and spatulas. Always use this cleaner for Vulkem EWS materials. Never use any kind of solvent to clean any of your tools as this will cause contamination and inhibit cure.

Tremco PUMA Initiator: A benzoyl peroxide-based initiator used to react to all components of Vulkem EWS.

Tremco PUMA Filler Powder: A calcium carbonate filler used to thicken PUMA resins.

Tremco PUMA Cold Weather Catalyst: Used at temperatures of 20 °F (-6 °C) and below. Please contact Tremco Technical Service for further details.

Aggregate: 0.3 to 0.7 mm-sized silica sand for the primer application. 0.7 to 1.2 mm-sized silica sand or color quartz for the wear application, which imparts a textured surface and contributes to wear resistance. For supplier information, contact Tremco Technical Service.

5. Priming Concrete Surface

- 5.1 Mix Tremco PUMA Primer for 1 to 2 min prior to the addition of Tremco PUMA Initiator.
- 5.2 Mix Tremco PUMA Primer thoroughly together with Tremco PUMA Initiator in accordance with Table 3 for 2 to 3 min. Amount of Tremco PUMA Initiator is dependent on the temperature. Please see Table 3 on Page 4 for addition amounts.
- 5.3 Apply Tremco PUMA Primer at a minimum of 90 ft²/gal to yield 17 wet mils to the entire area to be coated. The recommended method of application is with a roller. Application below 17 wet mils will result in the primer not curing.
- 5.4 Once primer is rolled out evenly, lightly broadcast 0.3 to 0.7 mm-sized silica sand into the primer at a rate of 0.7 lb/10 ft².
- 5.5 Allow Tremco PUMA Primer a minimum of 15 min to cure.

6. Detail Work

For cracks and defects in concrete, proceed to section 6.1. **For moving joints, that are not expansion joints, proceed to 6.10.** Contact local sales representative for expansion joint detailing.

- 6.1 Mix Tremco PUMA WC for 1 to 2 min prior to the addition of the silica sand.
- 6.2 Begin with 10 lb of sand for every gallon of Tremco PUMA WC. Additional sand can be added if a thicker consistency is desired.
- 6.3 Once Tremco PUMA WC and the sand are blended together, combine this mixture with the Tremco PUMA Initiator in accordance with Table 3 and mix thoroughly for 2 to 3 min. Amount of Tremco PUMA Initiator is dependent on ambient temperature. Please note the Vulkem Initiator addition is based in the ratio of Initiator to Tremco PUMA WC amount, not Initiator to Tremco PUMA WC with sand amount. Please see Table 3 on Page 4 for addition amounts.
- 6.4 Pour Tremco PUMA WC with sand mixture into cracks and strike flush with a steel trowel or similar tool.
- 6.5 For uneven spots and other defects in the surface, such as pitting or cratering, a thicker mix of Tremco PUMA WC and sand may be required. Trowel the material to create an even surface with the concrete.

- 6.6 Allow Tremco PUMA WC with sand mixture to cure a minimum of 15 min before proceeding to base coat application.

Horizontal to Vertical Transition

- 6.7 Mix the Tremco PUMA BC T for 2 to 3 min prior to the addition of the Tremco PUMA Initiator. Ensure that Tremco PUMA BC T is thoroughly mixed together with the Tremco PUMA Initiator in accordance with Table 3 for 2 to 3 min.
- 6.8 Apply a cant of Tremco PUMA BC T or other approved Tremco Sealant 1" (2.5 cm) wide at the juncture of all horizontal and vertical surfaces (such as curbs, wall sections, columns or penetrations through the deck). Tool Tremco PUMA BC T or approved Tremco sealant bead to form a 45° cant. Use sufficient pressure to force out any trapped air and to assure complete wetting of the surface. Remove excess material from the deck or wall surface.
- 6.9 Apply a strip of tape (masking tape or duct tape) to the vertical sections, 2 to 3" above the Tremco PUMA BC T cant to provide a neat termination of Tremco PUMA BC R.
- 6.10 Apply Tremco PUMA Primer over the Tremco PUMA BC T before coating over the cant.
- 6.11 For penetrations, apply Tremco PUMA Primer over the cant, up the penetration to 1" below the top of the projected overburden. Allow primer to cure.
- 6.12 Following the primer application, mix Tremco PUMA BC R. Mix in Tremco PUMA Initiator in accordance with Table 3.
- 6.13 Apply the Tremco PUMA BC R mixture over the primed penetration, over the cant, and extended minimum of 12 inches onto the horizontal plane.
- 6.14 Apply Tremco PUMA Primer over the Tremco PUMA BC R before coating over.

Moving Joints

- 6.15 Mix Tremco PUMA BC LM for 1 to 2 min prior to the addition of Tremco PUMA Initiator.
- 6.16 Ensure Tremco PUMA BC LM is thoroughly mixed together with the Tremco PUMA Initiator in accordance with Table 3 for 2 to 3 min. Amount of Tremco PUMA Initiator is dependent on the ambient temperature. Please see Table 3 on Page 4 for addition amounts.
- 6.17 Apply Tremco PUMA BC LM 6" (150 mm) wide, centered over all untreated cracks at an 80-mil thickness (2.0 mm).
- 6.18 Allow Tremco PUMA BC LM a minimum of 1 hr to cure.
- 6.19 Prior to continuing with the base coat application, the cured Tremco PUMA BC LM must be primed with Tremco PUMA Primer.

7. Base Coat Application

Note: In environmental conditions where large temperature swings exist, such as Northern US and Canada, Tremco PUMA BC LM can be used in lieu of Tremco BC.

- 7.1 Mix Tremco PUMA BC or BC LM for 1 to 2 min prior to the addition of Tremco PUMA Initiator. Note: for ramps up to a 40% slope, mix Tremco PUMA BC R for 2 to 3 min before adding Tremco PUMA Initiator.
- 7.2 Tremco PUMA BC, Tremco PUMA BC LM, or Tremco PUMA BC R is thoroughly mixed together with the Tremco PUMA Initiator in accordance with Table 3 for 2 to 3 min. Amount of Tremco PUMA

Initiator is dependent on the ambient temperature. Please see Table 3 on Page 4 for addition amounts.

- 7.3 Apply Tremco PUMA BC, Tremco PUMA BC LM, or Tremco PUMA BC R at 20 ft²/gal to yield 80 wet mils (2.0 mm) thick to the entire area. The recommended method is a metal notched rake.
- 7.4 Spike roll Tremco PUMA BC, Tremco PUMA BC LM, or Tremco PUMA BC R immediately to release all air bubbles from the coating.
- 7.5 Allow Tremco PUMA BC, Tremco PUMA BC LM, or Tremco PUMA BC R a minimum of 45 min to cure.

8. Wear Coat Application

There are two acceptable methods for applying the Tremco PUMA WC:

Option 1

- 8.1 Mix Tremco PUMA WC for 1 to 2 min prior to the addition of Tremco PUMA Filler Powder.
- 8.2 12.5 lb of Tremco PUMA Filler Powder is used for every gallon of Tremco PUMA WC. Once Tremco PUMA Filler Powder is added, mix for 2 to 4 min.
- 8.3 Once Tremco PUMA WC and Tremco PUMA Filler Powder are blended, this mixture is thoroughly mixed together with the Tremco PUMA Initiator in accordance with Table 3 for an additional 2 to 3 min. Please note: the Tremco PUMA Initiator addition is based on the ratio of Initiator to Tremco PUMA WC amount, not Initiator to Tremco PUMA WC with Tremco PUMA Filler Powder amount. Please see Table 3 on Page 4 for addition amounts.
- 8.4 Apply Tremco PUMA WC with Tremco PUMA Filler Powder mixture at 25 ft²/gal to yield 65 wet mils (1.65 mm) thick to the entire area. The recommended method is a metal notch rake.
- 8.5 Spike roll Tremco PUMA WC immediately to release all air bubbles from the coating.
- 8.6 Immediately following the application of the Tremco PUMA WC, broadcast to refusal (flood coat) the material with 20 to 30-mesh (0.6 to 0.9 mm) diameter silica sand or color quartz.
- 8.7 Allow Tremco PUMA WC a minimum of 45 min to cure. Before proceeding with the Tremco PUMA TC, sweep or blow off any excess sand or color quartz.

Option 2

- 8.8 Mix the Tremco PUMA WC for 1 to 2 minutes prior to the addition of the Tremco PUMA Initiator. Mix the Tremco PUMA WC and initiator in accordance with Table 3 for 2 to 3 min.
- 8.9 Apply the Tremco PUMA WC at 80 ft²/gal to yield 20 wet mils (0.51 mm) thick to the entire area. The recommended method of application is with a roller.
- 8.10 Immediately following the application of the Tremco PUMA WC, broadcast 0.3 lb/ft² of 20 to 30 mesh (0.6 to 0.9 mm) diameter silica sand or color quartz.
- 8.11 Allow the Tremco PUMA WC a minimum of 45 minutes to cure. Prior to proceeding with the next application of the Tremco PUMA WC, sweep and/or blow off any excess sand or color quartz.
- 8.12 Mix the Tremco PUMA WC for 1 to 2 minutes prior to the addition of the Tremco PUMA Initiator. Mix the Tremco PUMA WC and initiator in accordance with Table 2 for 2 to 3 min.

- 8.13 Apply the Tremco PUMA WC at 57 ft²/gal to yield 28 wet mils (0.71 mm) thick to the entire area. The recommended method of application is with a roller.
- 8.14 Immediately following the application of the Tremco PUMA WC, broadcast to refusal the material with 20 to 30 mesh (0.6 to 0.9 mm) diameter silica sand or color quartz.
- 8.15 Allow the Tremco PUMA WC a minimum of 45 minutes to cure. Prior to proceeding with the Tremco PUMA TC, sweep and/or blow off any excess sand or color quartz.

Note: For ramps the best recommendation is option 2, see Chart 2.

9. Top Coat Application

Note: Recommended coverage rates are approximate. Sand loading methods and concrete surface profiles may increase the amount of material required to obtain uniform coverage.

- 9.1 Mix Tremco PUMA TC for 1 to 2 min prior to the addition of Tremco PUMA Initiator.
- 9.2 Tremco PUMA TC is thoroughly mixed together with the Tremco PUMA Initiator in accordance with Table 3 for 2 to 3 min. Amount of Tremco PUMA Initiator is dependent on the ambient temperature. Please see Table 3 on Page 4 for addition amounts.
- 9.3 Apply Tremco PUMA TC at 53 to 90 ft²/gal to yield 17 to 30 wet mils (0.43 to 0.76 mm) thick to the entire area. The recommended method of application is with a soft squeegee and roller.
- 9.4 Allow Tremco PUMA TC a minimum of 1 hr to cure before opening to vehicular traffic.

10. Clean Up

- 10.1 Clean all adjacent areas to remove any stains or spills with Tremco PUMA Cleaner.
- 10.2 Clean tools or equipment with Tremco PUMA Cleaner.
- 10.3 Clean hands by soaking in hot, soapy water then brush with a stiff bristle brush.

11. Material Usage Guidelines

The Following is a guide to determine material usage:

Tremco PUMA Primer: When applied at 90 ft²/gal (2.21 M²/L) will yield a mil thickness of 17 wet mils.

Tremco PUMA BC, BC LM, or BC R: When applied at 20 ft²/gal (0.49 M²/L) will yield a mil thickness of 80 wet mils.

Tremco PUMA WC with Tremco PUMA Filler Powder: Option 1-When applied at 25 ft²/gal (0.61 M²/L) will yield a mil thickness of 65 wet mils.

Option 2-When applied at 80 ft²/gal (1.96 M²/L) will yield a mil thickness of 20 wet mils. When applied at 57 ft²/gal (1.4 M²/L) will yield a mil thickness of 28 wet mils.

Tremco PUMA TC: When applied at 64 to 90 ft²/gal (1.57 to 2.21 M²/L) depending on silica method will yield a mil thickness of 17 to 30 wet mils.

Aggregate: Apply silica sand at a rate of 0.7 lb/10 ft² immediately after the Tremco PUMA Primer application.

Aggregate: Apply silica sand at a rate of 1 lb/ft² immediately after the Tremco PUMA WC application.

Vulkem® EWS with PUMA Technology (Vehicular)

Waterproof Traffic Coating System-Vehicular System Ready for Use 1 Hour After Application

12. Troubleshooting

- 12.1 This section describes common industry application issues when certain environmental conditions exist. Below are some commonly seen issues and remedies. If any of these should occur, it is always recommended you contact your local Tremco Sales Representative or Tremco's Technical Service.
- 12.2 When a deck contains too much moisture, the excess moisture may change into a vapor which then condenses at the concrete-membrane

interface before the coating has cured, which will cause blisters or bubbles, which, in turn, will interfere with proper adhesion. If this should occur the blisters/bubbles can be cut out, allowing the moisture to escape. After moisture has escaped and the surface is dry, the area can be repaired.

- 12.3 If the coating is applied in very hot ambient temperatures, the air in the small spaces between the concrete particles increases in volume and forms blisters. Contact Tremco's Technical Service should this occur.

Quick Reference Application Chart

Layer	Product	Wet Mils	Cure Time	Square Feet Per Gallon
Primer	Tremco PUMA Primer	17 mils	15 min	90 square feet per gallon
Base Coat	Tremco PUMA BC	80 mils	45 min	20 square feet per gallon
Wear Coat	Tremco PUMA WC w/Tremco PUMA Filler Powder	65 mils	45 min	25 square feet per gallon
Top Coat	Tremco PUMA TC	17 to 30 mils	1 hr for vehicular traffic	53 to 90 square feet per gallon

Quick Reference Application Chart (Ramps)

Layer	Product	Wet Mils	Cure Time	Square Feet Per Gallon
Primer	Tremco PUMA Primer	17 mils	15 min	90 square feet per gallon
Base Coat	Tremco PUMA BC R	80 mils	45 min	20 square feet per gallon
Wear Coat #1	Tremco PUMA WC	20 mils	45 min	80 square feet per gallon
Wear Coat #2	Tremco PUMA WC	28 mils	45 min	57 square feet per gallon
Top Coat	Tremco PUMA TC	17 to 25 mils	1 hr for vehicular traffic	64 to 90 square feet per gallon

Temperature Chart

Temperature °F	Temperature °C	Grams or ounces/gallon
68 to 95	20 to 35	75 g or 2.75 oz of initiator/gal resin
50 to 68	10 to 20	150 g or 5.5 oz of initiator/gal resin
32 to 50	0 to 10	300 g or 11 oz of initiator/gal resin
14 to 32	-10 to 10	450 g or 16.5 oz of initiator/gal resin

Please contact Tremco Technical Service for further details.

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Please refer to our website at www.tremcosealants.com for the most up-to-date Product Data Sheets.



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1 General

1.1 REFERENCE STANDARD[S]

1.2 COMPATIBILITY

- .1 All waterproofing materials will be provided by the same manufacturer.

1.3 TECHNICAL DOCUMENTS

- .1 Submit two (2) copies of the most current technical data sheets. These documents must describe the physical properties of materials [and explanations about product installation, including restrictions, limitations and other manufacturer recommendations].

1.4 QUALITY ASSURANCE AND ENVIRONMENTAL MANAGEMENT

- .1 The manufacturer of liquid membranes will provide proof of ISO 9001 and ISO 14001 Certifications.

1.5 CONTRACTOR QUALIFICATIONS

- .1 Roofing contractors and sub-contractors must, when tendering and during works, possess a roofing contractor operating license.
- .2 The roofing contractor shall be specialized in carrying out the work specified in this section and certified by the manufacturer of the membrane system. The contractor shall submit to the architect a written certificate issued by the manufacturer for this purpose before roofing works begin.

1.6 MATERIALS STORAGE AND DELIVERY

- .1 All materials will be delivered and stored in their original packaging, in conformance with the requirements described in the manufacturer's technical documentation.
- .2 At all times, materials will be adequately protected and stored in a dry and properly ventilated area, away from any welding flame or spark, and sheltered from the elements and any harmful substances.
- .3 Avoid gathering construction materials on the roof, which may affect the structural integrity by imposing loads exceeding what is admissible.

1.7 FIRE PROTECTION

- .1 Prior to the start of work, conduct a site inspection to ensure its safety in order to minimize fire risks and hazards.
- .2 Respect safety measures recommended by the related local authorities.

1.8 WARRANTIES

- .1 The membrane manufacturer will issue a written and signed document in the owner's name, certifying that the roofing membranes are free of manufacturing defects for a period of ten (10) years, starting from the date of completion of membrane installation. This warranty will cover the removal and replacement of defective roof membrane products, including workmanship. The warranty must remain full and complete for the duration of the period specified. The warranty certificate must reflect these requirements.

- .2 The contractor will provide a written and signed document to the owner's name certifying that the work executed will remain in place and free of waterproofing defect for a period as specified in the General Conditions of the Contract.

2 Products

2.1 PRIMER

- .1 Description: Translucent cloudy two-component polymethyl methacrylate-based (PMMA) primer.
- .2 Specified product: ALSAN RS 276 by SOPREMA

2.2 FIELD SURFACE MEMBRANES

- .1 Description: Two-component polymethyl methacrylate-based (PMMA) liquid membrane combined with fleece fabric to form a reinforced field membrane.
- .2 Specified product: ALSAN RS 230 FIELD by SOPREMA

2.3 FLASHING AND PARAPET MEMBRANES

- .1 Description: Two-component polymethyl methacrylate-based (PMMA) liquid membrane combined with fleece fabric to form a reinforced membrane for flashings and parapets.
- .2 Specified product: ALSAN RS 230 FLASH by SOPREMA

2.4 SELF LEVELING MORTAR

- .1 Description: Two-component polymethyl methacrylate-based (PMMA) and cement powder-based liquid resin used for leveling or smoothing substrate surfaces and as a protective layer for trafficable surfaces.
- .2 Specified product: ALSAN RS 233 by SOPREMA

2.5 TEXTURED FINISH

- .1 Description: Two-component polymethyl methacrylate-based (PMMA) clear liquid resin infused with aggregates (pre-mixed additive) to which a coloured paste is added. This resin is used as a finish or protective non-slip coating.
- .2 Specified product: ALSAN RS 289 Textured Base by SOPREMA

2.6 FINISH COLOUR ADDITIVE

- .1 Description: Coloured additive to be added to a polymethyl methacrylate-based (PMMA) clear resin.
- .2 Specified product: ALSAN RS Colour Additive by SOPREMA

2.7 WATERPROOFING DETAILER

- .1 Description: Two-component polymethyl methacrylate-based (PMMA) liquid resin with microfibers used as the waterproofing paste, where it is difficult to install a reinforced liquid membrane system.
- .2 Specified product: ALSAN RS Detailer by SOPREMA

2.8 FILLING PASTE

- .1 Description: Two-component polymethyl methacrylate-based (PMMA) liquid resin used as a sealant to fill cracks, voids and depressions before installation of liquid membranes.
- .2 Specified product: ALSAN RS PASTE by SOPREMA

2.9 CATALYST

- .1 Description: Dibenzoyl peroxide-based reactive agent used to induce curing of resin products during membrane application.
- .2 Specified product: ALSAN RS CATALYST POWDER by SOPREMA

2.10 FABRIC REINFORCEMENT

- .1 Description: Non-woven, needle-punched polyester fabric used as fabric reinforcement in liquid-applied membrane systems.
- .2 Specified product: ALSAN RS FLEECE by SOPREMA

3 Execution of Work

3.1 SURFACE EXAMINATION AND PREPARATION

- .1 Surface examination and preparation must be completed in conformance with instructions in the membrane manufacturer's technical documentation.
- .2 Before roofing work begins, the owner's representative and roofing foreman will inspect and approve deck conditions (including slopes and wood grounds) as well as flashings at parapets, roof drains, plumbing vents, ventilation outlets and other construction joints. If necessary, a non-conformity notice will be issued to the contractor so that required corrections can be carried out. The start of roofing work will be considered as acceptance of conditions for work completion.
- .3 Do not begin any portion of work before surfaces are clean, smooth, dry, and free of ice and debris. Use of calcium or salt is forbidden for ice or snow removal.
- .4 Be sure plumbing, carpentry and all other works have been duly completed.

3.2 METHOD OF EXECUTION

- .1 Roofing work must be completed in a continuous fashion as surfaces are readied and as weather conditions allow it.
- .2 Follow the membrane manufacturer's instructions for application restrictions depending on weather conditions.
- .3 No materials will be installed during rain or snowfall.

3.3 SITE PROTECTION

- .1 Protect the exposed surfaces of finished work to avoid damage during roof installation and material transportation. [Install walkways made of rigid boards over installed roofing materials to enable passage of people and transport of products.] Assume full responsibility for any damage.
- .2 Observe local regulations regarding the disposal of unused product.
- .3 Consult the manufacturer's data sheets for restrictions applicable to the construction site.

3.4 PREPARATION WORK – CONCRETE DECK

- .1 Concrete must be fully cured (28 days) with a minimum hardness of 24 MPa (3,500 psi).
- .2 The concrete substrate must have a maximum moisture content of 6% (ASTM F 2659), or 1.5 kg/100 m²/24h (ASTM F 1869), or an internal relative humidity content of 75% (ASTM F 2170).
- .3 The structure surfaces to be covered with the membrane must have a concrete surface profile (CSP) of 2 to 4 (CSP in accordance with the *International Concrete Repair Institute*).

3.5 PREPARATION WORK – WOOD/PLYWOOD

- .1 Cover the plywood joints with a waterproofing membrane strip of 100 mm (4 in).
- .2 Cover any cracks or holes with a waterproofing membrane strip.

3.6 INSTALLATION OF FILLING PASTE

- .1 Description: Apply resin where required using rollers, brushes or notched squeegees provided for this purpose. Follow manufacturer's instructions for the surface preparation and the use of primer.

3.7 APPLICATION OF LIQUID MEMBRANE PRIMER

- .1 Using a slow-speed mechanical agitator, thoroughly mix the entire container of resin for two minutes before the addition of catalyst.
- .2 Pour the resin into a second container if you make a batch mix.
- .3 Add pre-measured catalyst to the resin component according to the amounts indicated in manufacturer's Catalyst Mixing Chart.
- .4 Add catalyst only to the amount of material that can be used within 10 to 15 minutes.
- .5 Stir again for two minutes before applying.
- .6 Apply the resin to the substrate using rollers, brushes or notched squeegees provided for this purpose.
- .7 The primer should be spread evenly so that the substrate is completely saturated with a single application.
- .8 See the manufacturer's data sheet for minimum quantities required.

3.8 INSTALLATION OF MEMBRANE AND REINFORCEMENT ON FLASHINGS AND PARAPETS

- .1 Wherever possible, install flashing membranes BEFORE installing field-surface membranes to minimize traffic on the surfaces already installed.
- .2 All flashing membranes must be installed together with the surface membranes as the work progresses.
- .3 If water leakage should occur under a new waterproofing membrane caused by the incomplete installation of a flashing, the affected area should be removed and replaced at the contractor's expense.
- .4 All flashing membranes must be at least 200 mm (8 in).
- .5 Using a low-speed mechanical agitator, thoroughly mix the entire container of resin for two minutes before the addition of catalyst.
- .6 Pour the resin into a second container if you make a batch mix.

- .7 Add pre-measured catalyst to the resin component according to the amounts indicated in manufacturer's Catalyst Mixing Chart.
- .8 Add catalyst only to the amount of material that can be used within 10 to 15 minutes.
- .9 Stir again for two minutes before applying.
- .10 Apply the first layer of resin to the substrate using rollers, brushes or notched squeegees provided for this purpose. The first layer thickness must be 1.3 to 1.5 mm when wet.
- .11 Lay out the polyester reinforcement on the resin to prevent the formation of wrinkles, swellings or fishmouths.
- .12 Use rollers, brushes or notched squeegees in order to fully saturate resin reinforcement and remove wrinkles and air bubbles under the reinforcement. The appearance of the reinforcement should be slightly opaque without any white trace. It is important to correct these defaults before the resin cures.
- .13 Apply the second resin layer on top of the reinforcement using rollers, brushes or notched squeegees provided for this purpose. The second layer thickness must be 0.6 to 0.7 mm when wet.
- .14 Excess resin which is not absorbed should be used to saturate adjacent reinforcement.
- .15 The final resin coating should be smooth and even.
- .16 Each reinforcement shall overlap the previous one by a minimum of 50 mm (2 in).

3.9 INSTALLATION OF MEMBRANE AND REINFORCEMENT ON FIELD SURFACE

- .1 Using a slow-speed mechanical agitator, thoroughly mix the entire container of resin for two minutes before the addition of catalyst.
- .2 Pour the resin into a second container if you make a batch mix.
- .3 Add pre-measured catalyst to the resin component according to the amounts indicated in manufacturer's Catalyst Mixing Chart.
- .4 Add catalyst only to the amount of material that can be used within 10 to 15 minutes.
- .5 Stir again for two minutes before applying.
- .6 Apply the first resin layer to the substrate using rollers, brushes or notched squeegees provided for this purpose. The thickness of the first layer must be 1.3 to 1.5 mm when wet.
- .7 Lay out the polyester reinforcement on the resin to prevent the formation of wrinkles, swellings or fishmouths.
- .8 Use rollers, brushes or notched squeegees in order to fully saturate resin reinforcement and remove wrinkles and air bubbles under the reinforcement. The appearance of the reinforcement should be slightly opaque without any white trace. It is important to correct these defaults before the resin cures.
- .9 Apply the second resin layer on top of the reinforcement using rollers, brushes or notched squeegees provided for this purpose. The second layer thickness must be 0.6 to 0.7 mm when wet.
- .10 Excess resin which is not absorbed should be used to saturate adjacent reinforcement.
- .11 The final resin coating should be smooth and even.
- .12 Each reinforcement shall overlap the previous one by 50 mm (2 in) laterally, and by 100 mm (4 in) at the ends.

3.10 INSTALLATION OF SELF-LEVELING MORTAR

- .1 Using a slow-speed mechanical agitator, thoroughly mix the entire container of resin for two minutes.
- .2 Before the addition of the catalyst, add the cement powder while continuing to mix for at least two minutes.
- .3 Pour the resin into a second container if you make a batch mix.
- .4 Add pre-measured catalyst to the resin component according to the amounts indicated in manufacturer's Catalyst Mixing Chart.
- .5 Add catalyst only to the amount of material that can be used within 10 to 15 minutes.
- .6 Stir again for two minutes before applying.
- .7 Apply the finish resin coating on the existing membrane using rollers, brushes or notched squeegees provided for this purpose. The thickness must be 2.2 to 2.4 mm when wet.
- .8 The final resin coating should be smooth and even.

3.11 INSTALLATION OF WATERPROOFING DETAILER

- .1 Description: Apply the waterproofing detailer where required using a brush or a notched squeegee in areas where it is difficult to install the reinforced liquid membrane system.

3.12 INSTALLATION OF TEXTURED FINISH

- .1 Add finishing colour additive to the clear resin.
- .1 Pour the resin into a second container if you make a batch mix.
- .2 Add pre-measured catalyst to the resin component according to the amounts indicated in manufacturer's Catalyst Mixing Chart.
- .3 Add catalyst only to the amount of material that can be used within 10 to 15 minutes.
- .4 Stir again for two minutes before applying.
- .5 Apply the finish resin coating on the existing membrane using rollers, brushes or notched squeegees provided for this purpose. The thickness must be 0.6 to 0.8 mm when wet.
- .6 The final resin coating should be smooth and even.

3.13 INSTALLATION OF THE COLOURED FINISH

- .1 Add finishing colour additive to the clear resin.
- .2 Using a slow-speed mechanical agitator, thoroughly mix the entire container of coloured resin for two minutes before the addition of catalyst.
- .3 Pour the resin into a second container if you make a batch mix.
- .4 Add pre-measured catalyst to the resin component according to the amounts indicated in manufacturer's Catalyst Mixing Chart.
- .5 Add catalyst only to the amount of material that can be used within 10 to 15 minutes.
- .6 Stir again for two minutes before applying.
- .7 Apply the finish resin coating on the existing membrane using rollers, brushes or notched squeegees provided for this purpose.
- .8 The final resin coating should be smooth and even.

3.14 WATERPROOFING FOR VARIOUS DETAILS

- .1 Install waterproofing membranes at various roofing details in conformance with typical details indicated in technical documentation of the manufacturer.

Note: Based on the evolution of knowledge and techniques, SOPREMA INC. may modify the composition and/or conditions of use of its products without prior notice. Consequently orders will be filled according to the latest specifications.

- END OF SECTION -

NATURAL QUARTZ AGGREGATES

DESCRIPTION

The **NATURAL QUARTZ AGGREGATES** are used as slip-resistant surface coating when applying liquid **ALSAN RS** membranes.

COLOUR: Natural quartz.

APPLICATION

The **NATURAL QUARTZ AGGREGATES** must be spread randomly during an **ALSAN RS** liquid resin wet application.

Once the **ALSAN RS** resin is cured, excess **NATURAL QUARTZ AGGREGATES** can be removed using a vacuum cleaner, a broom or an oil-free air compressor.

Saturate with a finish coat of **ALSAN RS 287 COLOR FINISH BASE**.

FOR COMPLETE INFORMATION ON PRODUCT INSTALLATION, PLEASE CONSULT YOUR SOPREMA REPRESENTATIVE.

PACKAGING

The **NATURAL QUARTZ AGGREGATES** are packed in a 23 kg (50 lb) bag, except for size no.2, which is offered in 45 kg (100 lb) bags.

The **NATURAL QUARTZ AGGREGATES** sizes:

0: 0.4 - 0.8 mm (20 - 40 mesh)

1: 0.7 - 1.2 mm (16 - 30 mesh)

2: 1.0 - 1.6 mm (10 - 16 mesh)

DENSITY

2.7- 2.8 kg/m³ (95-100 lb/ft³)

MINERAL HARDNESS

Mohs scale: 6 - 8

STORAGE & HANDLING

Storage: Always store in a clean and dry location. Product packaging should not be damaged prior to use.



PART 1 - GENERAL

1.1 Reference Standards

- .1 ASTM International
 - .1 ASTM C 919-08, Standard Practice for Use of Sealants in Acoustical Applications.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
- .3 General Services Administration (GSA) - Federal Specifications (FS)
 - .1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.2 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 - Shop Drawings, Product Data, Samples and Mock-ups.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Manufacturer's product to describe:
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
 - .3 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 30 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.
- .3 Samples:
 - .1 Submit 2 samples of each type of material and colour.
 - .2 Cured samples of exposed sealants for each colour where required to match adjacent material.

- .4 Manufacturer's Instructions:
 - .1 Submit instructions to include installation instructions for each product used.
- .5 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Construction/Demolition Waste Management and Disposal plan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.

1.3 Closeout Submittals

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

1.4 Delivery, Storage and Handling

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect joint sealants from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

1.5 Site Conditions

- .1 Ambient Conditions:
 - .1 Proceed with installation of joint sealants only when:
 - .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.
 - .2 Joint substrates are dry.
 - .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .2 Joint-Width Conditions:
 - .1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.

- .3 Joint-Substrate Conditions:
 - .1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

1.6 Environmental Requirements

- .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 (MSDS) acceptable to Health Canada.
- .2 Departmental Representative will arrange for ventilation system to be operated on maximum outdoor air and exhaust during installation of caulking and sealants. Ventilate area of work as directed by Departmental Representative by use of approved portable supply and exhaust fans.

PART 2 - PRODUCTS

2.1 Sealant Materials

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

2.2 Sealant Material Designations

- .1 Acrylics one part: to CGSB 19-GP-5M.
- .2 Acrylic latex one part: to CAN/CGSB-19.17.
- .3 Preformed compressible and non-compressible back-up materials:
 - .1 Polyethylene, urethane, neoprene or vinyl foam:
 - .1 Extruded closed cell foam backer rod.
 - .2 Size: oversize 30%.
 - .2 Neoprene or butyl rubber:
 - .1 Round solid rod, Shore A hardness 70.
 - .3 High density foam:
 - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam,

- 32 kg/m³ density, or neoprene foam backer, size as recommended by manufacturer.
- .4 Bond breaker tape:
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 Sealant Selection

- .1 Interface between paver stones and HSS sleepers as needed in order to stabilize and level out top surface of pavers:
 - .1 Sealant Type: Acrylic Base

2.4 Joint Cleaner

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.
- .2 Primer: in accordance with sealant manufacturer's written recommendations.

PART 3 - EXECUTION

3.1 Examination

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

3.2 Surface Preparation

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

3.3 Priming

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

3.4 Backup Material

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

3.5 Mixing

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

3.6 Application

- .1 Sealant:
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing:
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.

3.7 Cleaning

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Clean adjacent surfaces immediately.
 - .3 Remove excess and droppings, using recommended cleaners as work progresses.
 - .4 Remove masking tape after initial set of sealant.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.8 Protection

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by joint sealants installation.

***** END OF SECTION *****