THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 326-2016

2016 BRIDGE MAINTENANCE – ST. JAMES SOUTHBOUND BRIDGE REPAIRS

TABLE OF CONTENTS

PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 2016 BRIDGE MAINTENANCE – ST. JAMES SOUTHBOUND BRIDGE REPAIRS

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 4:00 p.m. Winnipeg time, July 6, 2016.

B2.2 Bids determined by the Manager of Materials to have been received later than the Submission Deadline will not be accepted and will be returned upon request.

B2.3 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

B3. SITE INVESTIGATION

B3.1 Further to C3.1, the Bidder may view the Site without making an appointment.

B4. ENQUIRIES

B4.1 All enquiries shall be directed to the Contract Administrator identified in D4.1.

B4.2 If the Bidder finds errors, discrepancies or omissions in the Bid Opportunity, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.

B4.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator to all Bidders by issuing an addendum.

B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator only to the Bidder who made the enquiry.

B4.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B4 unless that response or interpretation is provided by the Contract Administrator in writing.

B5. CONFIDENTIALITY

B5.1 Information provided to a Bidder by the City or acquired by a Bidder by way of further enquiries or through investigation is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator. The use and disclosure of the confidential information shall not apply to information which:

(a) was known to the Bidder before receipt hereof; or

(b) becomes publicly known other than through the Bidder; or

(c) is disclosed pursuant to the requirements of a governmental authority or judicial order.

B5.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Bid Opportunity to the media or any member of the public without the prior written authorization of the Contract Administrator.

B6. ADDENDA

B6.1 The Contract Administrator may, at any time prior to the Submission Deadline, issue addenda correcting errors, discrepancies or omissions in the Bid Opportunity, or clarifying the meaning or intent of any provision therein.

B6.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.

B6.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/

B6.2.2 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

B6.2.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 8 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B7. SUBSTITUTES

B7.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.

B7.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

B7.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.

B7.4 The Bidder shall ensure that any and all requests for approval of a substitute:

(a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;

(b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;

(c) identify any anticipated cost or time savings that may be associated with the substitute;

(d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;

(e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.

B7.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his/her sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.

B7.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, to the Bidder who requested approval of the substitute.

B7.6.1 The Contract Administrator will issue an Addendum, disclosing the approved materials, equipment, methods and products to all potential Bidders. The Bidder requesting and obtaining the approval of a substitute shall be responsible for disseminating information regarding the approval to any person or persons he/she wishes to inform.

B7.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

B7.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/her Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B16.

B7.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B8. BID COMPONENTS

B8.1 The Bid shall consist of the following components:

(a) Form A: Bid;

(b) Form B: Prices.

B8.2 Further to B8.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B7.

B8.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.

B8.4 The Bid Submission may be submitted by mail, courier or personal delivery, or by facsimile transmission.

B8.5 If the Bid Submission is submitted by mail, courier or personal delivery, it shall be enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address, and shall be submitted to:

The City of Winnipeg
Corporate Finance Department
Materials Management Division
185 King Street, Main Floor
Winnipeg, MB R3B 1J1

B8.5.1 Samples or other components of the Bid Submission which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder’s Bid Submission.

B8.6 Bidders are advised not to include any information/literature except as requested in accordance with B8.1.

B8.7 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B16.1(a).

B8.8 If the Bid Submission is submitted by facsimile transmission, it shall be submitted to 204 949-1178.

B8.8.1 The Bidder is advised that the City cannot take responsibility for the availability of the facsimile machine at any time.

B8.8.2 Bids submitted by internet electronic mail (e-mail) will not be accepted.

B9. BID

B9.1 The Bidder shall complete Form A: Bid, making all required entries.

B9.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:

(a) if the Bidder is a sole proprietor carrying on business in his/her own name, his/her name shall be inserted;

(b) if the Bidder is a partnership, the full name of the partnership shall be inserted;

(c) if the Bidder is a corporation, the full name of the corporation shall be inserted;

(d) if the Bidder is carrying on business under a name other than his/her own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.

B9.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B9.2.

B9.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.

B9.4 Paragraph 10 of Form A: Bid shall be signed in accordance with the following requirements:

(a) if the Bidder is a sole proprietor carrying on business in his/her own name, it shall be signed by the Bidder;

(b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;

(c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers;

(d) if the Bidder is carrying on business under a name other than his/her own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.

B9.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.

B9.4.2 All signatures shall be original.

B9.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

B10. PRICES

B10.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.

B10.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.

B10.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

B10.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B11. DISCLOSURE

B11.1 Various Persons provided information or services with respect to this Work. In the City's opinion, this relationship or association does not create a conflict of interest because of this full disclosure. Where applicable, additional material available as a result of contact with these Persons is listed below.

B11.2 The Persons are:

(a) N/A

B12. QUALIFICATION

B12.1 The Bidder shall:

(a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba; and

(b) be financially capable of carrying out the terms of the Contract; and

(c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.

B12.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

(a) be responsible and not be suspended, debarred or in default of any obligations to the City. A list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/debar.stm

B12.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

(a) have successfully carried out work similar in nature, scope and value to the Work; and

(b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and

(c) have a written workplace safety and health program if required pursuant to The Workplace Safety and Health Act (Manitoba);

B12.4 Further to B12.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractors has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

(a) a copy of their valid Manitoba COR certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Certificate of Recognition (COR) Program administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or

(b) a copy of their valid Manitoba SECOR™ certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Small Employer Certificate of Recognition Program (SECOR™) administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or

(c) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/.

B12.5 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B12.6 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B13. OPENING OF BIDS AND RELEASE OF INFORMATION

B13.1 Bids will not be opened publicly.

B13.2 Following the submission deadline, the names of the Bidders and their Total Bid Prices (unevaluated, and pending review and verification of conformance with requirements) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/bidopp.asp

B13.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/

B13.4 The Bidder is advised that any information contained in any Bid may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B14. IRREVOCABLE BID

B14.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 9 of Form A: Bid.

B14.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work for the time period specified in Paragraph 9 of Form A: Bid.

B15. WITHDRAWAL OF BIDS

B15.1 A Bidder may withdraw his/her Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B15.1.1 Notwithstanding C23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.

B15.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 10 of Form A: Bid, and only such person, has authority to give notice of withdrawal.

B15.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:

(a) retain the Bid until after the Submission Deadline has elapsed;

(b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 10 of Form A: Bid; and

(c) if the notice has been given by any one of the persons specified in B15.1.3(b), declare the Bid withdrawn.

B15.2 A Bidder who withdraws his/her Bid after the Submission Deadline but before his/her Bid has been released or has lapsed as provided for in B14.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law.

B16. EVALUATION OF BIDS

B16.1 Award of the Contract shall be based on the following bid evaluation criteria:

(a) compliance by the Bidder with the requirements of the Bid Opportunity or acceptable deviation there from (pass/fail);

(b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B12 (pass/fail);

(c) Total Bid Price;

(d) economic analysis of any approved alternative pursuant to B7.

B16.2 Further to B16.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements or minor informalities or irregularities, if the interests of the City so require.

B16.3 Further to B16.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his/her Bid or in other information required to be submitted, that he/she is responsible and qualified.

B16.4 Further to B16.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.

B16.4.1 Further to B16.1(a), in the event that a unit price is not provided on Form B: Prices, the City will determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

B17. AWARD OF CONTRACT

B17.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B17.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.

B17.2.1 Without limiting the generality of B17.2, the City will have no obligation to award a Contract where:

(a) the prices exceed the available City funds for the Work;

(b) the prices are materially in excess of the prices received for similar work in the past;

(c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;

(d) only one Bid is received; or

(e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.

B17.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B16.

B17.3.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his/her Bid upon written request to the Contract Administrator.

B17.4 Notwithstanding C4, the City may issue a Purchase Order to the successful Bidder in lieu of the execution of a Contract.

B17.5 The Contract, as defined in C1.1, in its entirety shall be deemed to be incorporated in and to form a part of the Purchase Order notwithstanding that it is not necessarily attached to or accompany said Purchase Order.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

C0.1 The *General Conditions for Construction* (Revision 2006 12 15) are applicable to the Work of the Contract.

C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm

C0.2 A reference in the Bid Opportunity to a section, clause or subclause with the prefix "**C**" designates a section, clause or subclause in the *General Conditions for Construction*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

D1.1 In addition to the *General Conditions for Construction*, these Supplemental Conditions are applicable to the Work of the Contract.

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of concrete repairs, expansion joint replacement and approach roadway works at the St. James Southbound Bridge over the Assiniboine River.

D2.2 The major components of the Work are as follows:

(a) curb lane and median lane concrete barrier repairs;

(b) sidewalk curb concrete repairs;

(c) overhead sign structure concrete pile repair;

(d) north and south expansion joint assembly replacement;

(e) partial depth approach slab concrete patches;

(f) north and south roadway expansion joint replacement; and,

(g) north and south approach roadway works including partial slab patches, curb renewal, catch basin frame replacement, catch basin frame adjustment, and asphalt overlay.

D3. DEFINITIONS

D3.1 When used in this Bid Opportunity:

(a) ”**Lane Closure Day**” means any Calendar Day in which the Contractor has a traffic lane closed for any portion of the Calendar Day.

(b) “**Work Zone**” means the areas of the project as shown in **Appendix A- Traffic Control Work Zones.**

D4. CONTRACT ADMINISTRATOR

D4.1 The Contract Administrator is Dillon Consulting Limited, represented by:

Robert Taylor, P. Eng.
Project Manager

Telephone No. 204 453-2301
Email: rtaylor@dillon.ca

D4.2 At the pre-construction meeting, Robert Taylor will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D4.3 Bids Submissions must be submitted to the address in B8.5.

D5. CONTRACTOR'S SUPERVISOR

D5.1 At the pre-construction meeting, the Contractor shall identify his/her designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D6. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

D6.1 The Contract, all deliverables produced or developed, and information provided to or acquired by the Contractor are the property of the City and shall not be appropriated for the Contractors own use, or for the use of any third party.

D6.2 The Contractor shall not make any public announcements or press releases regarding the Contract, without the prior written authorization of the Contract Administrator.

D6.3 The following shall be confidential and shall not be disclosed by the Contractor to the media or any member of the public without the prior written authorization of the Contract Administrator;

(a) information provided to the Contractor by the City or acquired by the Contractor during the course of the Work;

(b) the Contract, all deliverables produced or developed; and

(c) any statement of fact or opinion regarding any aspect of the Contract.

D6.4 A Contractor who violates any provision of D6 may be determined to be in breach of Contract.

D7. NOTICES

D7.1 Except as provided for in C23.2.2, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the Contractor shall be sent to the address or facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid.

D7.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D7.3, D7.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the facsimile number identified in D4.1.

D7.3 Notwithstanding C21., all notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following facsimile number:

The City of Winnipeg
Chief Financial Officer

Facsimile No.: 204 949-1174

D7.4 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following facsimile number:

The City of Winnipeg
Legal Services Department
Attn: Director of Legal Services

Facsimile No.: 204 947-9155

D7.5 Bids Submissions must be submitted to the address in B8.5.

SUBMISSIONS

D8. AUTHORITY TO CARRY ON BUSINESS

D8.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

D9. SAFE WORK PLAN

D9.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D9.2 The Safe Work Plan should be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/Safety/default.stm

D10. INSURANCE

D10.1 The Contractor shall provide and maintain the following insurance coverage:

(a) commercial general liability insurance, in the amount of at least two million dollars ($2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period;

(b) if applicable, Automobile Liability Insurance covering all motor vehicles, owned and operated and used or to be used by the Contractor directly or indirectly in the performance of the Work. The Limit of Liability shall not be less than two million dollars ($2,000,000.00) inclusive for loss or damage including personal injuries and death resulting from any one accident or occurrence; and

(c) all risks installation floater, carrying adequate limits to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of any installation.

D10.2 Deductibles shall be borne by the Contractor.

D10.3 The Contractor shall provide the Contract Administrator with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than seven (7) Calendar Days from notification of the award of Contract by Purchase Order.

D10.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D11. PERFORMANCE SECURITY

D11.1 If the Contract Price exceeds twenty-five thousand dollars ($25,000.00), the Contractor shall provide and maintain performance security until the expiration of the warranty period in the form of:

(a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; or

(b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or

(c) a certified cheque or draft payable to "The City of Winnipeg", drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.

D11.1.1 Where the performance security is in the form of a certified cheque or draft, it will be deposited by the City. The City will not pay any interest on certified cheques or drafts furnished as performance security.

D11.2 The Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of Purchase Order and prior to the commencement of any Work on the Site.

D12. SUBCONTRACTOR LIST

D12.1 The Contractor shall provide the Contract Administrator with a complete list of the Subcontractors whom the Contractor proposes to engage (Form J: Subcontractor List) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than seven (7) Calendar Days from notification of the award of Contract.

D13. DETAILED WORK SCHEDULE

D13.1 The Contractor shall provide the Contract Administrator with a detailed work schedule at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D13.2 The detailed work schedule shall consist of the following:

(a) a Gantt chart for the Work schedule acceptable to the Contract Administrator.

D13.3 Further to D13.2(a) Gantt chart Work schedule shall clearly identify the start and completion dates, as well as critical path items for all activities listed under D2.2.

D13.4 Further to D13.2(a), the Gantt chart shall show the time on a weekly basis, required to carry out the Work of each trade, or specification division. The time shall be on the horizontal axis, and the type of trade shall be on the vertical axis.

SCHEDULE OF WORK

D14. COMMENCEMENT

D14.1 The Contractor shall not commence any Work until he/she is in receipt of a Purchase Order from the Award Authority authorizing the commencement of the Work.

D14.2 The Contractor shall not commence any Work on the Site until:

(a) the Contract Administrator has confirmed receipt and approval of:
  (i) evidence of authority to carry on business specified in D8;
  (ii) evidence of the workers compensation coverage specified in C6.15;
  (iii) the Safe Work Plan specified in D9;
  (iv) evidence of the insurance specified in D10;
  (v) the performance security specified in D11;
  (vi) the Subcontractor list specified in D12; and
  (vii) the Detailed Work Schedule specified in D13.

(b) the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.

D14.3 The City intends to award this Contract by July 20, 2016.

D14.3.1 If the actual date of award is later than the intended date, the dates specified for Substantial Performance, and Total Performance will be adjusted by the difference between the aforementioned intended and actual dates.

D15. CRITICAL STAGES

D15.1 The Contractor shall achieve Critical Stages of the Work in accordance with the following requirements:

(a) Bridge Maintenance Works – St. James Southbound Bridge

(i) The Contractor shall complete all Bridge Maintenance works within fifty (50) consecutive Lane Closure Days.

(b) Bridge Maintenance Works – Work Zone 3A (Academy Road off-ramp Closure)

(i) The Contractor will be permitted one (1) full closure of the Academy Road off-ramp for Work Zone 3A from Friday at 18:00 to the following Monday at 06:00.

D16. SUBSTANTIAL PERFORMANCE

D16.1 The Contractor shall achieve Substantial Performance by October 15, 2016.

D16.2 When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D16.3 The date on which the Work has been certified by the Contract Administrator as being substantially performed to the requirements of the Contract through the issue of a certificate of Substantial Performance is the date on which Substantial Performance has been achieved.

D17. TOTAL PERFORMANCE

D17.1 The Contractor shall achieve Total Performance by October 31, 2016.

D17.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D17.3 The date on which the Work has been certified by the Contract Administrator as being totally performed to the requirements of the Contract through the issue of a certificate of Total Performance is the date on which Total Performance has been achieved.

D18. LIQUIDATED DAMAGES

D18.1 If the Contractor fails to achieve Critical Stages in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Lane Closure Day for each and every Lane Closure Day following the days fixed herein for same during which such failure continues:

(a) Critical Stage as listed in D15.1(a) – one thousand dollars ($1,000.00);

(b) Critical Stage as listed in D15.1(b) – five thousand dollars ($5,000.00).

D18.2 If the Contractor fails to achieve Substantial Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Calendar Day for each and every Calendar Day following the days fixed herein for same during which such failure continues:

(a) Substantial Performance – six hundred and fifty dollars ($650.00).

D18.3 The amounts specified for liquidated damages in D18.2 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve critical stages, Substantial Performance by the days fixed herein for same.

D18.4 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

CONTROL OF WORK

D19. JOB MEETINGS

D19.1 Regular weekly job meetings will be held at the Site. These meetings shall be attended by a minimum of one (1) representative of the Contract Administrator, one (1) representative of the City and one (1) representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City and the Contractor respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.

D19.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

D20. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D20.1 Further to C6.24, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

D21. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

D21.1 Further to B12.4, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety and Health Act (Manitoba). At any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require updated proof of compliance, as set out in B12.4.

MEASUREMENT AND PAYMENT

D22. PAYMENT

D22.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D23. WARRANTY

D23.1 Notwithstanding C13.2, the warranty period shall begin on the date of Total Performance and shall expire two (2) years thereafter unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.

D23.1.1 For the purpose of Performance Security, the warranty period shall be two (2) years.

D23.2 Notwithstanding C13.2 or D23.1, the Contract Administrator may permit the warranty period for a portion or portions of the Work to begin prior to the date of Total Performance if:

(a) a portion of the Work cannot be completed because of unseasonable weather or other conditions reasonably beyond the control of the Contractor but that portion does not prevent the balance of the Work from being put to its intended use.

D23.2.1 In such case, the date specified by the Contract Administrator for the warranty period to begin shall be substituted for the date specified in C13.2 for the warranty period to begin.

FORM H1: PERFORMANCE BOND
(See D11)

KNOW ALL MEN BY THESE PRESENTS THAT

_____
(hereinafter called the "Principal"), and

_____ ,
(hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter called the "Obligee"), in the sum of

_____

_____ dollars ($_____.____)

of lawful money of Canada to be paid to the Obligee, or its successors or assigns, for the payment of which sum the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS the Principal has entered into a written contract with the Obligee for

BID OPPORTUNITY NO. 326-2016

2016 BRIDGE MAINTENANCE – ST. JAMES SOUTHBOUND BRIDGE REPAIRS

which is by reference made part hereof and is hereinafter referred to as the “Contract”.

NOW THEREFORE the condition of the above obligation is such that if the Principal shall:

(a) carry out and perform the Contract and every part thereof in the manner and within the times set forth in the Contract and in accordance with the terms and conditions specified in the Contract;
(b) perform the Work in a good, proper, workmanlike manner;
(c) make all the payments whether to the Obligee or to others as therein provided;
(d) in every other respect comply with the conditions and perform the covenants contained in the Contract; and
(e) indemnify and save harmless the Obligee against and from all loss, costs, damages, claims, and demands of every description as set forth in the Contract, and from all penalties, assessments, claims, actions for loss, damages or compensation whether arising under "The Workers Compensation Act", or any other Act or otherwise arising out of or in any way connected with the performance or non-performance of the Contract or any part thereof during the term of the Contract and the warranty period provided for therein;

THEN THIS OBLIGATION SHALL BE VOID, but otherwise shall remain in full force and effect. The Surety shall not, however, be liable for a greater sum than the sum specified above.

AND IT IS HEREBY DECLARED AND AGREED that the Surety shall be liable as Principal, and that nothing of any kind or matter whatsoever that will not discharge the Principal shall operate as a discharge or release of liability of the Surety, any law or usage relating to the liability of Sureties to the contrary notwithstanding.

IN WITNESS WHEREOF the Principal and Surety have signed and sealed this bond the

_____ day of _____ , 20____ .

SIGNED AND SEALED
in the presence of:

_____
(Witness as to Principal if no seal)

_____
(Name of Principal)

Per: _____ (Seal)

Per: _____

_____
(Name of Surety)

By: _____ (Seal)
(Attorney-in-Fact)

FORM H2: IRREVOCABLE STANDBY LETTER OF CREDIT
(PERFORMANCE SECURITY)
(See D11)

_____
(Date)

The City of Winnipeg
Legal Services Department
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 326-2016

2016 BRIDGE MAINTENANCE – ST. JAMES SOUTHBOUND BRIDGE REPAIRS

Pursuant to the request of and for the account of our customer,

_____ ,
(Name of Contractor)

_____
(Address of Contractor)

WE HEREBY ESTABLISH in your favour our irrevocable Standby Letter of Credit for a sum not exceeding in the aggregate

_____

_____ Canadian dollars.

This Standby Letter of Credit may be drawn on by you at any time and from time to time upon written demand for payment made upon us by you. It is understood that we are obligated under this Standby Letter of Credit for the payment of monies only and we hereby agree that we shall honour your demand for payment without inquiring whether you have a right as between yourself and our customer to make such demand and without recognizing any claim of our customer or objection by the customer to payment by us.

The amount of this Standby Letter of Credit may be reduced from time to time only by amounts drawn upon it by you or by formal notice in writing given to us by you if you desire such reduction or are willing that it be made.

Partial drawings are permitted.

We engage with you that all demands for payment made within the terms and currency of this Standby Letter of Credit will be duly honoured if presented to us at:

_____
(Address)

and we confirm and hereby undertake to ensure that all demands for payment will be duly honoured by us.

All demands for payment shall specifically state that they are drawn under this Standby Letter of Credit.

Subject to the condition hereinafter set forth, this Standby Letter of Credit will expire on

_____ .
(Date)

It is a condition of this Standby Letter of Credit that it shall be deemed to be automatically extended from year to year without amendment from the present or any future expiry date, unless at least 30 days prior to the present or any future expiry date, we notify you in writing that we elect not to consider this Standby Letter of Credit to be renewable for any additional period.

This Standby Letter of Credit may not be revoked or amended without your prior written approval.

This credit is subject to the Uniform Customs and Practice for Documentary Credit (2007 Revision), International Chamber of Commerce Publication Number 600.

_____
(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

FORM J: SUBCONTRACTOR LIST
(See D12)

2016 BRIDGE MAINTENANCE – ST. JAMES SOUTHBOUND BRIDGE REPAIRS

Name	Address

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

E1.1 These Specifications shall apply to the Work.

E1.2 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.

E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/Spec/Default.stm

E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.

E1.2.3 Further to C2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.

E1.3 The following are applicable to the Work:

Drawing No.	Drawing Name/Title
B101-16-00	Cover Sheet
B101-16-01	St. James SB KEY PLAN & OHSS S-595 Concrete Repair Details
B101-16-02	St. James SB Sidewalk Curb Repair Details
B101-16-03	St. James SB Barrier Repair Details
B101-16-04	St. James SB Barrier Repair Layout 1
B101-16-05	St. James SB Barrier Repair Layout 2
B101-16-06	St. James SB Expansion Joint Layout - Existing
B101-16-07	St. James SB Expansion Joint Layout - Proposed
B101-16-08	St. James SB Expansion Joint Details
B101-16-09	St. James SB Roadworks North Approach
B101-16-10	St. James SB Roadworks South Approach
B101-16-11	St. James SB Roadworks Details

E2. SHOP DRAWINGS

E2.1 Description

E2.1.1 This Specification provides instructions for the preparation and submission of shop drawings.

(a) the term ‘shop drawings’ means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, including Site erection drawings which are to be provided by the Contractor to illustrate details of a portion of the Work; and

(b) submit specified shop drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be show on all submissions for Contract Administrator review.

E2.2 Shop Drawings

E2.2.1 Original drawings shall be prepared by Contractor, Subcontractor, supplier, distributor or manufacturer to illustrate appropriate portion of Work including fabrication, layout, setting or erection details as specified in appropriate sections.

E2.2.2 Shop drawings for the following components shall bear the seal of a Professional Engineer registered in the province of Manitoba:

(a) St. James Southbound Bridge Expansion Joints

E2.3 Contractor's Responsibilities

(a) Review shop drawings, product data and samples prior to submission and stamp and sign drawings indicating conformance to the Contract requirements.

(b) Verify:

(i) Field Measurements;

(ii) Field Construction Criteria; and,

(iii) Catalogue numbers and similar data.

(c) Coordinate each submission with requirements of Work and Contract Documents. Individual shop drawings will not be reviewed until all related drawings are available.

(d) Notify Contract Administrator, in writing at time of submission, of deviations from requirements of Contract Documents.

(e) Responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator's review of submission, unless Contract Administrator gives written acceptance of specified deviations.

(f) Responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.

(g) Make any corrections required by the Contract Administrator and resubmit the required number of corrected copies of shop drawings. Direct specific attention in writing or on resubmitted shop drawings to revisions other than the corrections requested by the Contract Administrator on previous submission.

(h) After Contract Administrator's review and return of copies, distribute copies to Subcontractors and others as appropriate.

(i) Maintain one (1) complete set of reviewed shop drawings, filed by Specification Section Number, at the Site of the Work for use and reference of the Contract Administrator and Subcontractors.

E2.4 Submission Requirements

(a) Schedule submissions at least fourteen (14) Calendar Days before dates reviewed submissions will be needed, and allow for a fourteen (14) Calendar Day period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.

(b) Submit one (1) electronic copy of shop drawings.

(c) Accompany submissions with transmittal letter containing:

(i) date;

(ii) project title and Bid Opportunity number;

(iii) contractor's name and address;

(iv) number of each shop drawing, product data, and sample submitted;

(v) specification section, title, number and clause;

(vi) drawing number and detail/section number; and

(vii) other pertinent data.

(d) Submissions shall include:

(i) date and revision dates;

(ii) project title and Bid Opportunity number;

(iii) name of:

- Contractor
- Subcontractor
- Supplier
- Manufacturer
- Detailer (if applicable)

(iv) identification of product or material;

(v) relation to adjacent structure or materials;

(vi) field dimensions, clearly identified as such;

(vii) specification section name, number and clause number or drawing number and detail/section number;

(viii) applicable standards, such as CSA or CGSB numbers; and

(ix) Contractor's stamp, initialled or signed, certifying review of submission, verification of field measurements and compliance with Contract Documents.

E2.5 Other Considerations

(a) Fabrication, erection, installation or commissioning may require modifications to equipment or systems to conform to the design intent. Revise pertinent shop drawings and resubmit.

(b) Material and equipment delivered to the Site of the Works will not be paid for at least until pertinent shop drawings have been submitted and reviewed.

(c) Incomplete shop drawing information will be considered as stipulated deductions for the purposes of progress payment certificates.

(d) No delay or cost claims will be allowed that arise because of delays in submissions, re-submissions and review of shop drawings.

E3. HAZARDOUS MATERIALS

E3.1 If asbestos or other hazardous materials are encountered during the Work of the Contract, the Contractor shall stop all work and notify the Contract Administrator immediately. Removal of hazardous materials shall be dealt with by the City and the Contractor shall await further instruction by the Contract Administrator.

E4. PROTECTION OF EXISTING TREES

E4.1 The Contractor shall take the following precautionary steps to prevent damage from construction activities to existing boulevard trees within the limits of the construction area:

(a) the Contractor shall not stockpile materials and soil or park vehicles and equipment on boulevards within 2 m of trees;

(b) trees identified to be at risk by the Contract Administrator are to be strapped with 25 x 100 x 2400 mm wood planks, or suitably protected as approved by the Contract Administrator;

(c) excavation shall be performed in a manner that minimizes damage to the existing root systems. Where possible, excavation shall be carried out such that the edge of the excavation shall be a minimum of one and a half (1.5) times the diameter (measured in inches), with the outcome read in feet, from the closest edge of the trunk. Where roots must be cut to facilitate excavation, they shall be pruned neatly at the face of excavation;

(d) operation of equipment within the dripline of the trees shall be kept to the minimum required to perform the Work required. Equipment shall not be parked, repaired, refuelled; construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines of trees. The dripline of a tree shall be considered to be the ground surface directly beneath the tips of its outermost branches. The Contractor shall ensure that the operations do not cause flooding or sediment deposition on areas where trees are located;

(e) work on-Site shall be carried out in such a manner so as to minimize damage to existing tree branches. Where damage to branches does occur, they shall be neatly pruned.

E4.2 All damage to existing trees caused by the Contractor's activities shall be repaired to the requirements and satisfaction of the Contract Administrator and the City Forester or his/her designate.

E4.3 Elm trees shall not be pruned at any time between April 1 and July 31.

E4.4 No separate measurement or payment will be made for performing all operations herein described and all other items incidental to the Work described.

E5. PROTECTION OF EXISTING UTILITIES

E5.1 In accordance with and further to CW1120, the Contractor shall protect and maintain all existing utilities that may be affected by the Work. The Contractor shall identify and locate utilities, and select appropriate excavation methods, which may include soft digging, as may be required by utility agencies or the Contract Administrator. The protection of existing utilities shall be considered incidental to the Work and no separate measurement or payment will be made.

E6. WATER OBTAINED FROM THE CITY

E6.1 Further to clause 3.7 of CW 1120, the Contractor shall pay for all costs, including sewer charges, associated with obtaining water from the City in accordance with the Waterworks and Sewer By-laws.

E7. VERIFICATION OF WEIGHTS

E7.1 All material which is paid for on a weight basis shall be weighed on a scale certified by Consumer & Corporate Affairs, Canada.

E7.2 All weight tickets shall have the gross weight and the time and date of weighing printed by an approved electro/mechanical printer coupled to the scale.

E7.3 The tare weight and net weight may either be hand written or machine printed. All weights, scales and procedures shall be subject to inspection and verification by the Contract Administrator. Such inspection and verification may include, but shall not be limited to:

(a) checking Contractor's scales for Consumer and Corporate Affairs certification seals;

(b) observing weighing procedures;

(c) random checking of either gross or tare weights by having such trucks or truck/trailer(s) combinations as the Contract Administrator shall select weighed at the nearest available certified scale; and

(d) checking tare weights shown on delivery tickets against a current tare.

E7.4 No charge shall be made to the City for any delays or loss of production caused by such inspection and verification.

E7.5 The Contractor shall ensure that each truck or truck/trailer(s) combination delivering material which is paid for on a weight basis carries a tare not more than one (1) month old.

E7.6 The tare shall be obtained by weighing the truck or truck/trailer(s) combination on a certified scale and shall show:

(a) upon which scale the truck or truck/trailer(s) combination was weighed;

(b) the mechanically printed tare weight;

(c) the license number(s) of the truck and trailer(s); and

(d) the time and date of weighing.

E7.7 No separate measurement or payment will be made for performing all operations herein described and all other items incidental to the Work described.

E8. TRAFFIC AND PEDESTRIAN CONTROL

E8.1 Description

(a) The Work covered under this item shall include all items relating to traffic and pedestrian control at the Site.

(b) The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E8.2 Construction Methods

E8.2.1 General

(a) Further to clauses 3.6 and 3.7 of CW 1130, in accordance with the Manual of Temporary Traffic Control on City Streets, the Contractor ("Agency" in the manual) shall make arrangements with Traffic Services of the City of Winnipeg to erect and maintain all traffic control at the Site.

(b) Traffic Services will erect and maintain all temporary regulatory signs and other applicable traffic control devices (including but not limited to warning signs, barrels, tall cones and chevrons) in accordance with the provision contained in the latest edition of the "Manual of Temporary Traffic Control on City Streets", issued by the City of Winnipeg.

(c) The Contractor will erect and maintain all temporary regulatory signs and other applicable pedestrian control devices (including but not limited to warning signs, barrels, tall cones and chevrons) in accordance with the provision contained in the latest edition of the "Manual of Temporary Traffic Control on City Streets", issued by the City of Winnipeg.

(d) The Contractor shall submit a Regional Street Lane Closure Request Form, a Designated Construction Zone and/or Speed Limit Reduction Request Form, and call the Traffic Services at (204) 986-5178 at least fourteen (14) Calendar Days prior to beginning Work on-Site per the Manual of Temporary Traffic Control on City Streets.

(e) The Contractor shall call Traffic Services at (204) 986-5178 at least forty-eight (48) hours prior to moving to another Work Zone.

(f) The Contractor shall provide and maintain flagmen in accordance with the above-mentioned manual.

(g) The Contractor shall take all other safety measures necessary to cope with any peculiar or unusual circumstances that have not been set out in the above-mentioned manual and shall, at all times, ensure that maximum protection is afforded to the road-user and that his/her operations in no way interfere with the safe operation of traffic.

(h) Improper signing will be sufficient reason for the Contract Administrator or Inspector to immediately shut down the entire job.

(i) Barricades supplied and installed by the Contractor shall be marked with the name and the telephone number(s) at which the Contractor can be reached twenty-four (24) hours per day, seven (7) days per week.

(j) During the hours when the Contractor is not working, equipment and stockpiled materials shall be left in such a location so as not to interfere with or present a hazard to motorists or pedestrians.

E8.2.2 St. James Southbound Bridge

(a) Access from the Portage Avenue eastbound on-ramp shall be maintained at all times.

(b) Access to the Academy Road off-ramp shall be maintained at all times except as specified in D15.1(b). The Contractor shall submit a Regional Street Lane Closure Request Form and call Traffic Services at (204) 986-5178 at least fourteen (14) Calendar Days prior to closure of the Academy Road off-ramp.

(c) Work Zone locations, proposed sequencing, and associated works have been shown in **Appendix A – Traffic Control Work Zones**.

(d) Pedestrian Controls

(i) During construction operations that require the closure of the sidewalk, the Contractor shall erect signage at the south and north ends of the bridge notifying pedestrians of the closure, and directing them to the St. James Northbound Bridge sidewalk via the existing Portage Avenue overpass sidewalk on the north side or the Academy Road sidewalk on the south side.

(e) Work Zone 1

(i) Work Zone 1A shall occur during Work Zone 1.

(ii) Work Zone 1B shall occur during Work Zone 1.

(iii) A minimum of two (2) 3.5 m lanes shall be maintained on the north approach and over the bridge, one (1) 3.5 m lane on the Route 90 south approach, and one (1) 3.5 m lane on the Academy Road off-ramp for the duration of Work Zone 1.

(f) Work Zone 2

(i) Work Zone 2 shall occur after Work Zone 1.

(ii) A minimum of two (2) 3.5 m lanes shall be maintained on the north approach and over the bridge, one (1) 3.5 m lane on the Route 90 south approach, and one (1) 3.5 m lane on the Academy Road off-ramp.

(g) Work Zone 3

(i) Work Zone 3 shall occur after Work Zone 2.

(ii) Work Zone 3A shall occur during Work Zone 3.

(iii) When work is being performed in Work Zone 3 but not in Work Zone 3A, a minimum of two (2) 3.5 m lanes shall be maintained on the north approach, over the bridge and on the Route 90 south approach and one (1) 3.5 m lane on the Academy Road off-ramp.

(iv) Full closure of the Academy Road off-ramp is permitted as specified in D15.1(b). A minimum of two (2) 3.5 m lane widths shall be maintained on the north approach, over the bridge and on the Route 90 south approach for the duration of Work Zone 3A.

(h) Planing Headers and Asphalt Overlay Works

(i) The Contractor shall submit a sequencing plan to the Contract Administrator as least seven (7) Calendar Days prior to planing headers and asphalt overlay works.

(ii) The Contractor will be permitted two (2) consecutive Lane Closure Days for planing headers and asphalt overlay works.

(iii) Access to the Academy Road off-ramp shall be maintained for the duration of planing headers and asphalt overlay works.

(iv) A minimum of two (2) 3.5 m lanes shall be maintained on the north approach and over the bridge along with one (1) 3.5 m lane on the Route 90 south approach for the duration of planing headers and asphalt overlay works.

E8.3 Measurement and Payment

(a) Traffic control will not be measured. This item of Work will be paid for at the Contract Lump Sum Price for “Traffic Control”, repaired in accordance with this Specification and accepted by the Contract Administrator.

E9. CONCRETE TRAFFIC BARRIER REPAIRS

E9.1 Description

(a) This Specification shall cover all operations relating to the repair of designated concrete traffic barriers on the St. James Southbound Bridge as herein specified.

(b) The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E9.2 Materials

E9.2.1 General

(a) The Contractor shall be responsible for the supply, safe storage, and handling of all materials set forth in this Specification.

E9.2.2 Testing and Approval

(a) All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes.

(b) All materials shall be approved by the Contract Administrator at least seven (7) Calendar Days before any construction is undertaken. If, in the opinion of the Contract Administrator, such materials in whole or in part, do not conform to the Specifications detailed herein or are found to be defective in manufacture or have become damaged in transit, storage, or handling operations, then such materials shall be rejected by the Contract Administrator and replaced by the Contractor at his/her own expense.

E9.2.3 Epoxy Adhesive

(a) Epoxy adhesive for bonding steel reinforcing or dowels to concrete shall be Hilti Hit-RE 500 or equal as accepted by the Contract Administrator, in accordance with B7.

E9.2.4 Concrete Repair Mortar

(a) The concrete repair mortar for barrier repairs shall be a product suitable for application by hand trowelling or form and pour or pump. The mortar product shall be SikaTop 122 Plus for application by hand trowelling or Sikacrete-08 SCC for form and pour or pump or equivalent as approved in accordance with B7. Preparation, mixing, application, and curing in accordance with manufacturer's specifications.

E9.2.5 Concrete Strength and Workability

(a) Structural Concrete

(i) Proportioning of fine aggregate, coarse aggregate, cement, water, and air-entraining agent shall be such as to yield concrete having the required strength and workability, as follows:

Type C1 Concrete
- Minimum Compressive Strength @ 28 days = 35 MPa
- Maximum water-to cementing materials ratio = 0.40
- Aggregate: 20mm nominal
- Air Content: 5.0% to 8.0%
- Chloride Ion Penetrability at 56 days: < 1500 coulombs
- Slump = 75 mm ± 25 mm

E9.2.6 Concrete Aggregate

(a) The Contractor shall furnish in writing to the Contract Administrator, the location of the sources where aggregate will be obtained, in order that same may be inspected and tentatively approved by the Contract Administrator. Changes in the source of aggregate supply during the course of the Contract will not be permitted without notification in writing to and the expressed approval of the Contract Administrator.

(i) Fine Aggregate

- Fine aggregate shall consist of sand having clean, hard, strong, durable, uncoated grains; free from injurious amounts of dust, soft or flaking particles, shale, alkali, organic matter, load, or other deleterious substance.
- Fine aggregate shall be well-graded throughout and shall conform to the following grading requirements:

Sieve Size	Percent of Total Dry Weight Passing Each Seive
10 mm	100%
5 mm	95 - 100%
2.5 mm	80 - 100%
1.25 mm	50 - 90%
630 µm	25 - 65%
315 µm	10 - 35%
160 µm	2 - 10%
80 µm	0 - 3%

(ii) Coarse Aggregate (20 mm Nominal) Coarse aggregate shall be clean and free from alkali, organic, or other deleterious matter, shall have an absorption not exceeding three percent (3%), and shall conform to the following gradation requirements:

Sieve Size	Percent of Total Dry Weight Passing Each Sieve
28 mm	100%
20 mm	85 - 100%
14 mm	60 - 90%
10 mm	25 - 60%
5 mm	0 - 10%
2.5 mm	0 - 5%

E9.2.7 Cementitious Materials

(a) Cementitious materials shall conform to the requirements of CSA-A3001 and shall be free from lumps.

(b) Should the Contractor choose to include a silica fume admixture in the concrete mix design, the substitution of silica fume shall not exceed eight percent (8%) by mass of cement.

(c) Should the Contractor choose to include fly ash in the concrete mix design, the fly ash shall be Class CI or F and the substitution shall not exceed thirty percent (30%) by mass of cement.

(d) Cementitious materials shall be stored in a suitable weather-tight building that shall protect these materials from dampness and other destructive agents. Cementitious materials that have been stored for a length of time resulting in the hardening, or the formation of lumps, shall not be used in the Work.

E9.2.8 Water

(a) Water to be used for all operations in the Specification, including mixing and curing of concrete or grout, surface texturing operations, and saturating the substrate shall conform to the requirements of CSA A23.1 and shall be free of oil, alkali, acidic, organic materials, or deleterious substances. The Contractor shall not use water from shallow, stagnant, or marshy sources.

E9.2.9 Admixtures

(a) Air-entraining admixtures shall conform to the requirements of ASTM C260.

(b) Chemical admixtures shall conform to the requirements of ASTM C494 or C1017 for flowing concrete.

(c) All admixtures shall be compatible with all other constituents. The addition of calcium chloride, accelerators and air-reducing agents, will not be permitted, unless otherwise approved by the Contract Administrator.

E9.2.10 Bonding Agents

(a) Latex Bonding Agent

(i) Latex bonding agent shall be Acryl-Stix, SikaCem 810, or equal as accepted by the Contract Administrator, in accordance with B7. Polyvinyl acetate-based latexes will not be permitted. Planicrete AC by MAPEI is approved for use as a latex bonding agent on concrete greater than twenty-eight (28) days in age.

(b) Epoxy Bonding Agent

(i) Epoxy bonding agent shall be SikaTop Armatec 110 EpoCem or equal as approved by the Contract Administrator.

E9.2.11 Bonding Grout

(a) For latex bonding grouts, the grout for bonding the new barrier concrete to the existing barrier concrete shall be mixed in an agitating hopper slurry pump and shall consist of the following constituents, by weight:

(i) One (1) part water;

(ii) One (1) part latex bonding agent; and,

(iii) One and a half (1½) parts Type GUSF Portland cement.

(b) The consistency of the bonding grout shall be such that it can be brushed on the existing concrete surface in a thin, even coating that will not run or puddle in low spots.

E9.2.12 Field Applied Epoxy Coating

(a) Field applied epoxy coating shall be approved touch-up epoxy coating material as specified by the manufacturer for touching up the shop coating and for field coating existing reinforcing bars.

(b) Approved touch-up epoxy coating materials are as follows:

(i) 3M Scotchcoat 302, 309, 312, or 313.

(ii) Sterling 10686.

or equal as approved by the Contract Administrator.

E9.2.13 Curing Compound

(a) Curing compounds shall be liquid membrane-forming and conform to the requirements of ASTM Standard C309-98a.

(b) Curing compounds shall be resin-based and white-pigmented.

(c) WR Meadows 1215 WHITE Pigmented Curing Compound is an approved product, or equal as accepted by the Contract Administrator, in accordance with B7.

E9.2.14 Curing Blankets

(a) Curing blankets for wet curing shall be one hundred percent (100%) polyester, 3 mm thick, white in colour. An approved product is “Mirafi Geotextile P150”. Alternately, a 10 oz burlap, 5 mil polyethylene, curing blanket white in colour shall be used; “Curelap” manufactured by Midwest Canvas, together with a second layer of burlap, or equal as accepted by the Contract Administrator, in accordance with B7.

E9.2.15 Patching Mortar

(a) Patching mortar shall be made of the same material and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not more than one (1) part cement to two (2) parts sand by damp loose volume. White Portland Cement shall be substituted for a part of the grey Portland Cement on exposed concrete in order to produce a colour matching the colour of the surrounding concrete, as determined by a trial patch. The quantity of mixing water shall be no more than necessary for handling or placing.

E9.2.16 Reinforcing Steel

(a) All reinforcing steel shall conform to the requirements of CSA G30.18, Grade 400W.

E9.2.17 Bar Accessories

(a) Bar accessories shall be of a type approved by the Contract Administrator. They shall be made from a non-rusting material, and shall not stain, blemish, or spall the concreted surface for the life of the concrete.

(b) Bar chairs, bolsters, and bar supports shall be cementitious material as acceptable to the Contract Administrator. Plastic, PVC or galvanized bar chairs may be permitted if accepted in writing by the Contract Administrator prior to installation.

E9.2.18 Formwork

(a) Formwork materials shall conform to CSA Standard A23.1, and American Concrete Publication SP4, “Formwork for Concrete.”

(b) Form sheeting plywood to be covered with form liner or to be directly in contact with soil shall be exterior Douglas Fir, concrete form grade, conforming to CSA Standard O121, a minimum of 20 mm thick.

(c) Where form liner is not being used, form sheeting shall be Douglas Fir, overlay form liner type conforming to CSA Standard O121. Approved Manufacturers are “Evans” and “C-Z.”

(d) Boards used for formwork shall be fully seasoned and free from defects such as knots, warps, cracks, etc., which may mark the concrete surface.

(e) No formwork accessories will be allowed to be left in place within 50 mm of the surface following form removal. Items to be left in place must be made from a non-rusting material or stainless steel; and they shall not stain, blemish, or spall the concrete surface for the life of the concrete.

(f) Forms for exposed surfaces that do not require a form liner may be either new plywood or steel as authorized by the Contract Administrator.

(g) Studding shall be spruce or pine and shall have such dimensions and spacing that they shall withstand without distortion all the forces to which the forms shall be subjected.

(h) Walers shall be spruce or pine, with minimum dimensions of 100 mm x 150 mm. Studding shall be spruce or pine, with minimum dimensions of 50 x 150.

(i) Stay-in-place formwork or falsework is not acceptable and shall not be used by the Contractor unless specifically shown on the Drawings.

E9.2.19 Form Coating

(a) Form coating shall be "Sternson C.R.A." by Sternson, "SCP Strip Ease" by Specialty Construction Products, or equal as accepted by the Contract Administrator, in accordance with B7.

E9.2.20 Permeable Formwork Liner

(a) Formwork liner shall be Texel Drainaform, Hydroform, or equal as accepted by the Contract Administrator, in accordance with B7. This formwork liner shall be used on all exposed substructure and superstructure formed surfaces, except soffit surfaces, or where a normal form finish is specified.

E9.2.21 EMSEAL Precompressed Foam Joint Filler

(a) Barrier joint seals shall be EMSEAL BEJS-ON-A-REEL or equivalent as approved by the Contract Administrator.

(b) The seal width shall be as indicated on the Drawings.

(c) Sealant system shall be comprised of two (2) components:

(i) cellular polyurethane foam impregnated with hydrophobic one hundred percent (100%) acrylic, water-based emulsion, factory coated with highway-grade, fuel resistant silicone; and

(ii) field applied silicone adhesive along with field-injected silicone sealant bands.

(d) Impregnation agent to have proven non-migratory characteristics. Silicone coating to be highway-grade, low-modulus, fuel resistant silicone applied to the impregnated foam sealant at a width greater than maximum allowable joint extension and which when cured and compressed will form a convex curve. Depth of seal as recommended by manufacturer. BEJS foam seal to be installed into manufacturer's standard field-applied silicone mounting beads. The BEJS SYSTEM is to be installed recessed from the surface such that when the field-applied injection band of silicone is installed between the substrates and the foam-and-silicone-convex, the system will be (13 mm) down from the surface, or flush with the barrier joint chamfer.

(e) Material shall be capable, as a dual seal, of movements of plus fifty percent (+50%) to minus fifty percent (-50%) (one hundred percent (100%) total) of nominal material size. Changes in plane shall be accomplished as per manufacturer's recommendations.

(f) All substitute candidates to be certified in writing to be free in composition of any waxes or asphalts, wax compounds, or asphalt compounds. All substitute candidates shall be certified in writing to be:

(i) Capable of withstanding 65°C for three (3) hours while compressed down to the minimum of movement capability dimension of the basis of design product (minus fifty percent (-50%) of normal material size) without evidence of any bleeding of impregnation medium from the material; and,

(ii) That the same material after the heat stability test will self-expand to the maximum of movement capability dimension of the basis-of-design product (plus percent percent (+50%) of nominal material size) within twenty-four (24) hours at room temperature 20°C.

E9.2.22 Rail Post Anchor Bolts

(a) Rail post anchor bolts shall be 200 mm x 16 mm diameter stainless steel; each complete with one (1) stainless steel hex nut, one (1) stainless steel lock washer, one (1) stainless steel flat washer, and one (1) 50 mm diameter galvanized flat washer with 18 mm diameter hole. The anchor bolts shall be threaded for 65 mm and shall be pre-bent as shown on the Drawings (where applicable). The stainless steel hex head and socket head cap screws shall conform to ASTM A276 type 430 and the dimensional requirements of ANSI B18.3.

E9.3 Equipment

E9.3.1 All equipment shall be of a type accepted by the Contract Administrator and shall be kept in good working order.

E9.4 Construction Methods

E9.4.1 Type 1A – Concrete Barrier Repairs

(a) Remove all of the affected deteriorated concrete volume by saw cutting and removing the affected portion of the barrier to the dimensions shown on the Drawings.

(b) Install reinforcing steel bars into predrilled holes and place reinforcing steel bars as follows:

(i) drill holes into adjacent concrete of the diameters and depths shown on the Drawings. Drill bits shall have a diameter no larger than 2 mm larger than the bar diameter;

(ii) holes shall be located to the correct depth and alignment as indicated on the Drawings;

(iii) drilling equipment shall be operated so as to ensure that no damage to the concrete results from such drilling operation. Coring of holes is not permitted. In the event that existing reinforcing steel bars are hit during the drilling operations, that hole shall be abandoned and a new hole shall be drilled nearby to the correct depth. All abandoned holes shall be filled with non-shrink grout or approved adhesive agent;

(iv) touch up all cut or damaged surfaces of existing exposed reinforcing steel with field-applied epoxy coating;

(v) holes for reinforcing steel bars shall be blown clean with compressed air. Approved adhesive agent shall be placed in the back of the drilling hole. The reinforcing bars shall be worked back into the holes for complete coverage around the portion of the bar that extends into the hole, such that adhesive agent is squeezed from the hole;

(vi) install reinforcing steel bars as shown on the Drawings; and

(vii) once all reinforcing steel is in position, it shall be inspected and approved by the Contract Administrator before any new concrete is placed. Otherwise, the concrete may be rejected by the Contract Administrator and shall be removed by the Contractor at his/her own expense.

(c) Supply new traffic barrier rail post anchor bolts as shown on the Drawings.

(d) Clean all existing concrete surfaces that will be in contact with the repair concrete to remove all deleterious substances.

(e) Apply bonding grout or epoxy bonding agent to all existing concrete surfaces that will be in contact with the repair mortar.

(f) Place concrete into forms.

(g) Cure in accordance with E9.4.6.

E9.4.2 Type 1B – Concrete Barrier Repairs

(a) Remove all of the affected deteriorated concrete volume by saw cutting and removing the affected portion of the barrier to the dimensions shown on the Drawings.

(b) Install reinforcing steel dowels into predrilled holes and place reinforcing steel bars as follows:

(i) drill holes into adjacent concrete of the diameters and depths shown on the Drawings. Drill bits shall have a diameter no larger than 2 mm larger than the bar diameter;

(ii) holes shall be located to the correct depth and alignment as indicated on the Drawings;

(iii) drilling equipment shall be operated so as to ensure that no damage to the concrete results from such drilling operation. Coring of holes is not permitted. In the event that existing reinforcing steel bars are hit during the drilling operations, that hole shall be abandoned and a new hole shall be drilled nearby to the correct depth. All abandoned holes shall be filled with non-shrink grout or approved adhesive agent;

(iv) touch up all cut or damaged surfaces of existing exposed reinforcing steel with field-applied epoxy coating;

(v) holes for reinforcing steel dowels shall be blown clean with compressed air. Approved adhesive agent shall be placed in the back of the drilling hole. The reinforcing dowels shall be worked back into the holes for complete coverage around the portion of the bar that extends into the hole, such that adhesive agent is squeezed from the hole;

(vi) install reinforcing steel bars as shown on the Drawings; and

(vii) once all reinforcing steel is in position, it shall be inspected and approved by the Contract Administrator before any new concrete is placed. Otherwise, the concrete may be rejected by the Contract Administrator and shall be removed by the Contractor at his/her own expense.

(c) Supply new traffic barrier rail post anchor bolts as shown on the Drawings.

(d) Clean all existing concrete surfaces that will be in contact with the repair concrete to remove all deleterious substances.

(e) Apply bonding grout or epoxy bonding agent to all existing concrete surfaces that will be in contact with the repair concrete.

(f) Place concrete into forms.

(g) Cure in accordance with E9.4.6.

E9.4.3 Type 2 – Concrete Barrier Repairs

(a) Sawcut perimeter of area to be repaired to a minimum depth of 20 mm. Mechanically remove unsound concrete to the limits indicated on the Drawings or to the depth of unsound concrete, whichever is greater. Remove at least 30 mm of existing concrete facing, even if not delaminated, and continue removal as required to expose sound concrete.

(b) Where reinforcing steel with active corrosion is encountered, comply with the following:

(i) if half or greater of the diameter of the reinforcing steel is exposed, chip out behind the reinforcing to a 20 mm minimum depth;

(ii) wire brush reinforcing steel and concrete to remove rust and contaminants. Field epoxy-coat all exposed reinforcing; and

(iii) splice new reinforcing steel to existing steel where corrosion has depleted the cross-section area by twenty-five percent (25%), as directed by the Contract Administrator.

(c) Clean all existing concrete surfaces that will be in contact with the repair concrete to remove all deleterious substances.

(d) The Contractor is responsible to create a bond between the new mortar/concrete and the existing substrates. The Contract Administrator will check all repaired areas for bond using a hammer “sounding” method after form removal.

(e) Apply bonding grout or epoxy grout to all existing concrete surfaces that will be in contact with the repair concrete.

(f) Place mortar by trowelling, pumping, or into forms ensuring that all entrapped air is removed. The use of concrete for Type 2 – Concrete Barrier Repairs will only be permitted when the concrete for the repair area has been removed to 20 mm behind the existing reinforcing steel.

(g) Cure in accordance with E9.4.6.

E9.4.4 Concrete Barrier Joint Repairs

(a) Remove existing joint seals where replacement is indicated on the Drawings.

(b) Clean all concrete surfaces as required by the seal manufacturer's instructions.

(c) Install the seal in accordance with the manufacturer's recommendations.

E9.4.5 Debris Containment

(a) The Contractor shall ensure that all debris including, but not limited to: concrete debris, concrete cutting fluids, formwork debris, and repair materials do not enter the waterway in any way including by the bridge deck drainage system.

E9.4.6 General Curing

(a) Hot weather curing shall be in accordance with CSA A23.1, refer to E9.4.10 for additional hot weather curing requirements.

(b) Cold weather curing shall be in accordance with CSA A23.1, refer to E9.4.9 for additional cold weather curing requirements.

(c) The use of curing compound will not be allowed on concrete areas that are to receive additional concrete or waterproofing.

(d) Unformed concrete surfaces shall be covered and kept moist by means of wet polyester blankets for three (3) consecutive days immediately following finishing operations or otherwise approved by the Contract Administrator and shall be maintained at above 10ºC for at least seven (7) consecutive days. Construction joints shall only be covered and kept saturated by means of wet polyester curing blankets for the curing period.

(e) Unformed mortar surfaces shall be covered and kept moist by means of wet polyester blankets for three (3) consecutive days immediately following finishing operations or otherwise approved by the Contract Administrator and shall be maintained at above 10ºC for at least seven (7) consecutive days. Construction joints shall only be covered and kept saturated by means of wet polyester curing blankets for the curing period.

(f) Unformed concrete surfaces shall have curing compound applied immediately after the wet curing period.

(g) Unformed mortar surfaces do not require application of curing compound after the wet curing period.

(h) Concrete shall be protected from the harmful effects of sunshine, drying winds, surface dripping, or running water, vibration, and mechanical shock. Concrete shall be protected from freezing until at least twenty-four (24) hours after the end of the curing period.

(i) Changes in temperature of the concrete shall be uniform and gradual and shall not exceed 3°C in any one hour period or 20ºC in any twenty-four (24) hour period.

(j) Care shall be exercised to ensure that the polyester curing blanket is well drained and that it is placed as soon as the surface will support it without deformation. The Contractor shall ensure that water from the polyester curing blankets does not run into areas where concrete placement and finishing operations are underway. If this occurs, concrete placement shall stop until the problem is corrected satisfactory to the Contract Administrator.

E9.4.7 Form Removal

(a) All forms for concrete repairs shall remain in place for a minimum of three (3) days. The Contract Administrator must be notified at least twenty-four (24) hours prior to any form removal. The Contractor must receive approval from the Contract Administrator prior to beginning Work.

(b) All forms for mortar repairs shall remain in place for a minimum of three (3) days. The Contract Administrator must be notified at least twenty-four (24) hours prior to any form removal. The Contractor must receive approval from the Contract Administrator prior to beginning Work.

(c) The minimum strength of concrete and mortar in place for safe removal of soffit forms for horizontal or inclined members, as well as vertical forms shall be 20 MPa, with the added provisions that the member shall be of sufficient strength to carry safely its own weight, together with superimposed construction loads.

(d) Field-cured test specimens, representative of the in-place concrete being stripped, may be tested to verify the concrete strength.

E9.4.8 Patching of Formed Surfaces

(a) Immediately after forms have been removed, but before any repairing or surface finishing is started, the concrete surface shall be inspected by the Contract Administrator. Any repair or surface finishing started before this inspection may be rejected and required to be removed.

(b) All formed concrete surfaces shall have bolts, ties, struts, and all other timber or metal parts not specifically required for construction purposes cut back 50 mm from the surface before patching.

(c) Minor surface defects caused by honeycomb, air pockets greater than 5 mm in diameter, and voids left by strutting, and tie holes shall be repaired by removing the defective concrete to sound concrete, dampening the area to be patched and then applying patching mortar. A slurry grout consisting of water and cement shall be thoroughly brushed onto the area to be patched. When the slurry grout begins to lose the water sheen, the patching mortar shall be applied. It shall be struck-off slightly higher than the adjacent surface and left for one (1) hour before final finishing to prevent initial shrinkage of the patching mortar and it shall be touched up until it is satisfactory to the Contract Administrator. The patch shall be cured as specified in this Specification, and the final colour shall match the surrounding concrete.

(d) All objectionable fins, projections, offsets, streaks, or other surface imperfections shall be removed by approved means to the Contract Administrator's satisfaction. Cement washes of any kind shall not be used.

(e) Concrete shall be cast against forms that will produce plane surfaces with no bulges, indentations, or protuberances other than those shown on the Drawings. The arrangement of panel joints shall be kept to a minimum. Panels containing worn edges, patches, or other defects that will impair the texture of concrete surfaces shall not be used. All fins on the concrete surfaces shall be removed.

E9.4.9 Cold Weather Concreting

(a) The requirements of this section shall be applied to all concreting operations during cold weather; i.e., if the mean daily temperature falls below 5ºC during placing or curing.

(b) The Contract Administrator will advise the Contractor, in writing, as to the degree of heating of water and aggregates.

(c) Supplementary equipment, as required below, shall be at the job Site if concrete is likely to be placed in cold weather.

(d) Formwork and reinforcing steel shall be heated to at least 5ºC before concrete is placed.

(e) The temperature of the concrete shall be maintained at not less than 10ºC for seven (7) days or 15ºC for five (5) days or 20ºC for three (3) days after placing. The concrete shall be kept above freezing temperature for at least a period of seven (7) days. In no case shall the heating be removed until the concrete has reached a minimum compressive strength, which will be specified by the Contract Administrator for Work under construction, and as determined from compressive strength tests for specimens secured under the same conditions as the concrete works in question.

(f) Aggregates shall be heated to a temperature of not less than 20ºC and not more than 65°C. Water shall be heated to a temperature between 55ºC and 65ºC. The temperature of the concrete at the time of placement shall be within the range specified in CSA A23.1 for the thickness of the section being placed.

(g) When the mean daily temperature may fall below 5ºC, a complete hoarding of the Work, together with supplementary heat, shall be provided.

(h) When the ambient temperature is below -15ºC, the hoarding shall be constructed so as to allow the concrete to be placed without the hoarding having to be opened. If the mixing is done outside of the hoarding, the concrete shall be placed by means of hoppers installed through the hoarding. The hoppers are to be plugged when not in use.

(i) When the ambient temperature is equal to or above -15ºC, the Contractor will be permitted to open small portions of the hoarding for a limited time to facilitate the placing of the concrete.

(j) Before depositing any of the concrete, the Contractor shall show that enough heating equipment is available to keep the air temperature surrounding the forms within the specified range. This shall be accomplished by bringing the temperature inside of the hoarding to the specified 20ºC, at least twelve (12) hours prior to the start of the concrete placing.

(k) The Contractor shall supply all required heating apparatus and the necessary fuel. When dry heat is used, a means of maintaining atmospheric moisture shall be provided. The relative humidity within the heated enclosure shall be maintained at a minimum of forty percent (40%) during concrete placing and finishing operations. Surface moisture evaporation rates shall not exceed the limits specified in CSA A23.1. Following finishing operations, exposed concrete surfaces shall be protected from excessive drying by applying curing compound, covering the surfaces with polyethylene, or providing water curing.

(l) Sufficient standby heating equipment must be available to allow for any sudden drop in outside temperatures and any breakdowns which may occur in the equipment.

(m) Combustion-type heaters may be used if their exhaust gases are vented outside the enclosures and not allowed to come into contact with concrete surfaces. Fire extinguishers must be readily at hand wherever combustion-type heaters are used.

(n) The Contractor shall keep a curing record of each concrete pour. The curing record shall include: date and location of the pour, mean daily temperature, hoarding relative humidity, temperatures above and below the concrete surface at several points, and notes regarding the type of heating, enclosure, unusual weather conditions, etc. This record shall be available for inspection by the Contract Administrator at the end of the concrete operations.

E9.4.10 Hot Weather Concreting

(a) General

(i) The requirements of this section shall be applied during hot weather; i.e., air temperatures above 25ºC during placing.

(ii) Concrete shall be placed at as low a temperature as possible, preferably below 15ºC, but not above 30ºC. Aggregate stockpiles may be cooled by water sprays and sunshades.

(iii) Ice may be substituted for a portion of the mixing water; providing it has melted by the time mixing is completed.

(iv) Form and conveying equipment shall be kept as cool as possible before concreting, by shading them from the sun, painting their surfaces white, and/or the use of water sprays.

(v) Sunshades and wind breaks shall be used as required during placing and finishing.

(vi) Work shall be planned so that concrete can be placed as quickly as possible to avoid “cold joints.”

(vii) The Contract Administrator's approval is necessary before the Contractor may use admixtures, such as retardants, to delay setting or water-reducing agents to maintain workability and strength, and these must then appear in the Mix Design Statement submitted to the Contract Administrator.

(viii) Curing shall follow immediately after the finishing operations.

(b) Hot-Weather Curing

(i) When the air temperature is at or above 25ºC, curing shall be accomplished by water spray or by using saturated absorptive fabric, in order to achieve cooling by evaporation. Mass concrete shall be water cured for the basic curing period when the air temperature is at or above 20ºC, in order to minimize the temperature rise of the concrete.

(c) Job Preparation

(i) When the air temperature is at or above 25ºC, or when there is a probability of it rising to 25ºC during the placing period, facilities shall be provided for protection of the concrete in place from the effects of hot and/or drying weather conditions. Under severe drying conditions, as defined in CSA A23.1 the formwork, reinforcement, and concreting equipment shall be protected from the direct rays of the sun or cooled by fogging and evaporation.

(d) Concrete Temperature

(i) The temperature of the concrete as placed shall be as low as practicable and in no case greater than that shown below for the indicated size of the concrete section.

Thickness of Section (m)	**Temperatures, ºC**	
	Minimum	Maximum
Less than 0.3	10	35
0.3 to 1.0	10	30
1.0 to 2.0	5	25

E9.4.11 Cleanup

(a) The Contractor shall cleanup equipment and construction debris on at least a daily basis to the satisfaction of the Contract Administrator.

E9.5 Measurement and Payment

E9.5.1 Type 1A Concrete Barrier Repairs

(a) Type 1A Curb Lane Concrete Barrier Repairs will be measured on a unit basis and paid for at the Contract Unit Price per linear metre for “Curb Lane Concrete Barrier Repairs - Type 1A”, repaired in accordance with this Specification and accepted by the Contract Administrator.

(b) Type 1A Median Lane Concrete Barrier Repairs will be measured on a unit basis and paid for at the Contract Unit Price per linear metre for “Median Lane Concrete Barrier Repairs - Type 1A”, repaired in accordance with this Specification and accepted by the Contract Administrator.

E9.5.2 Type 1B Concrete Barrier Repairs

(a) Type 1B Curb Lane Concrete Barrier Repairs will be measured on a unit basis and paid for at the Contract Unit Price per linear metre for “Curb Lane Concrete Barrier Repairs - Type 1B”, repaired in accordance with this Specification and accepted by the Contract Administrator.

(b) Type 1B Median Lane Concrete Barrier Repairs will be measured on a unit basis and paid for at the Contract Unit Price per linear metre for "Median Lane Concrete Barrier Repairs - Type 1B", repaired in accordance with this Specification and accepted by the Contract Administrator.

E9.5.3 Type 2 Concrete Barrier Repairs

(a) Type 2 Curb Lane Concrete Barrier Repairs will be measured on a unit basis and paid for at the Contract Unit Price per square metre for "Curb Lane Concrete Barrier Repairs - Type 2", repaired in accordance with this Specification and accepted by the Contract Administrator.

(b) Type 2 Median Lane Concrete Barrier Repairs will be measured on a unit basis and paid for at the Contract Unit Price per square metre for "Median Lane Concrete Barrier Repairs - Type 2", repaired in accordance with this Specification and accepted by the Contract Administrator.

E9.5.4 Concrete Barrier Joint Repairs

(a) Curb Lane Concrete Barrier Joint Repairs will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Curb Lane Concrete Barrier Joint Repairs", repaired in accordance with this Specification and accepted by the Contract Administrator.

(b) Median Lane Concrete Barrier Joint Repairs will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Median Lane Concrete Barrier Joint Repairs", repaired in accordance with this Specification and accepted by the Contract Administrator.

E10. APPROACH SLAB CONCRETE REPAIRS

E10.1 Description

(a) This Specification shall cover all operations relating to the repair of designated approach slab areas on the St. James Southbound Bridge as herein specified.

(b) The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E10.2 Materials

E10.2.1 General

(a) The Contractor shall be responsible for the supply, safe storage, and handling of all materials set forth in this Specification.

E10.2.2 Testing and Approval

(a) All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes.

(b) All materials shall be approved by the Contract Administrator at least seven (7) Calendar Days before any construction is undertaken. If, in the opinion of the Contract Administrator, such materials in whole or in part, do not conform to the Specifications detailed herein or are found to be defective in manufacture or have become damaged in transit, storage, or handling operations, then such materials shall be rejected by the Contract Administrator and replaced by the Contractor at his/her own expense.

E10.2.3 Field Applied Epoxy Coating

(a) Field applied epoxy coating shall be approved touch-up epoxy coating material as specified by the manufacturer for touching up the shop coating and for field coating existing reinforcing bars.

(b) Approved touch-up epoxy coating materials are as follows:

(i) 3M Scotchcoat 302, 309, 312, or 313;

(ii) Sterling 10686.

or equal as approved by the Contract Administrator.

E10.2.4 Concrete Repair Mortar

(a) The concrete repair mortar for deck repairs shall be a product suitable for application by hand trowelling. The mortar product shall be SikaTop 122 Plus or equivalent as approved in accordance with B7. Preparation, mixing, application, and curing in accordance with manufacturer's specifications.

E10.2.5 Epoxy Bonding Agents

(a) Epoxy bonding agent shall be Sikadur 32 Hi-Mod, SikaTop Armatec 110 EpoCem or equal as approved by the Contract Administrator.

E10.2.6 Curing Compound

(a) Curing compounds shall be liquid membrane-forming and conform to the requirements of ASTM Standard C309-98a.

(b) Curing compounds shall be resin-based and white-pigmented.

(c) WR Meadows 1215 WHITE Pigmented Curing Compound is an approved product, or equal as accepted by the Contract Administrator, in accordance with B7.

E10.2.7 Reinforcing Steel

(a) All reinforcing steel shall conform to the requirements of CSA G30.18, Grade 400W.

E10.3 Equipment

E10.3.1 All equipment shall be of a type accepted by the Contract Administrator and shall be kept in good working order.

E10.4 Construction Methods

E10.4.1 Concrete Removals

(a) Sawcut perimeter of area to be repaired to a minimum depth of 20 mm. Mechanically remove unsound concrete to the limits indicated on the Drawings or to the depth of unsound concrete, whichever is greater. Remove at least 20 mm of existing concrete surface, even if not delaminated, and continue removal as required to expose sound concrete.

(b) Where reinforcing steel with active corrosion is encountered, comply with the following:

(i) if half or greater of the diameter of the reinforcing steel is exposed, chip out below the reinforcing to a 20 mm minimum depth;

(ii) wire brush reinforcing steel and concrete to remove rust and contaminants. Field epoxy-coat all exposed reinforcing; and

(iii) splice new reinforcing steel to existing steel where corrosion has depleted the cross-section area by twenty-five percent (25%), as directed by the Contract Administrator.

E10.4.2 Placing Mortar

(a) Clean all existing concrete surfaces that will be in contact with the repair mortar to remove all deleterious substances.

(b) The Contractor is responsible to create a bond between the new mortar and the existing substrates. The Contract Administrator will check all repaired areas for bond using a hammer “sounding” method after form removal.

(c) Apply bonding agent to all existing concrete surfaces that will be in contact with the repair mortar.

(d) Place mortar by trowelling, pumping, or into forms ensuring that all entrapped air is removed.

(e) Cure in accordance with E9.4.6.

E10.4.3 Cleanup

(a) The Contractor shall cleanup equipment and construction debris on at least a daily basis to the satisfaction of the Contract Administrator.

E10.5 Measurement and Payment

E10.5.1 Approach Slab Concrete Repairs

(a) Approach Slab Concrete Repairs will be measured on a unit basis and paid for at the Contract Unit Price per square metre for “Approach Slab Concrete Repairs”, repaired in accordance with this Specification and accepted by the Contract Administrator.

E11. SIDEWALK CURB REPAIRS

E11.1 Description

E11.1.1 This Specification shall cover the sidewalk curb repairs as specified herein.

E11.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all other things necessary for and incidental to the satisfactory performance and completion of all Work hereinafter specified.

E11.2 Materials

E11.2.1 General

(a) All materials supplied under this Specification shall be of a type acceptable to by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.

(b) The Contractor shall be responsible for the supply, safe storage, and handling of all materials set forth in this Specification.

E11.2.2 Concrete Repair Mortar

(a) The concrete repair mortar for barrier repairs shall be a product suitable for application by hand trowelling or form and pour or pump. The mortar product shall be SikaTop 122 Plus for application by hand trowelling or Sikacrete-08 SCC for form and pour or pump or equivalent as approved in accordance with B7. Preparation, mixing, application, and curing in accordance with manufacturer's specifications.

E11.2.3 Epoxy Bonding Agents

(a) Epoxy bonding agent shall be Sikadur 32 Hi-Mod, SikaTop Armatec 110 EpoCem or equal as approved by the Contract Administrator.

E11.2.4 Mechanical Anchors

(a) Mechanical anchors shall be stainless steel screw anchors as dimensioned on the Drawings.

E11.2.5 Curing Compound

(a) Curing compounds shall be liquid membrane-forming and conform to the requirements of ASTM Standard C309-98a.

(b) Curing compounds shall be resin-based and white-pigmented.

(c) WR Meadows 1215 WHITE Pigmented Curing Compound is an approved product, or equal as accepted by the Contract Administrator, in accordance with B7.

E11.2.6 Touch-up Galvanizing

(a) Field Applied Galvanizing

(i) All field applied galvanized coatings shall be applied in accordance with ASTM A780M.

(ii) Further to ASTM A780M, paints used for field applied galvanizing shall contain zinc dust above ninety-two percent (92%) in the dried film.

(iii) At least seven (7) days prior to any field applied galvanizing, the Contract shall submit the galvanizing product and application details to the Contract Administrator for review.

(iv) Spray applied field galvanizing will not be permitted. Where restrictions occur that brush applied field galvanizing is not possible, spray applied field galvanizing may be permitted if accepted in writing by the Contract Administrator prior to application.

(v) All field applied galvanized coatings shall be applied in accordance with the manufacturer's recommendations and as directed by the Contract Administrator.

E11.3 Equipment

E11.3.1 All equipment shall be of a type accepted by the Contract Administrator and shall be kept in good working order.

E11.4 Construction Methods

E11.4.1 Concrete Removals

(a) Mechanically remove unsound concrete to the limits indicated on the Drawings or to the depth of unsound concrete, whichever is greater.

(b) Mechanically remove unsound polymer slurry to the limits as indicated on the Drawings, or to the extents of grout keyway, whichever is greater.

(c) Where reinforcing steel with active corrosion is encountered, comply with the following:

(i) wire brush reinforcing steel and concrete to remove rust and contaminants. Field epoxy-coat all exposed reinforcing.

(d) North Abutment Sidewalk Curb Concrete Repairs:

(i) Following concrete removals at the north abutment concrete curb repairs, apply touch up galvanizing on the sidewalk expansion joint extrusion exposed during concrete removals.

E11.4.2 Placing Mortar

(a) Clean all existing concrete surfaces that will be in contact with the repair mortar to remove all deleterious substances.

(b) The Contractor is responsible to create a bond between the new mortar and the existing substrates. The Contract Administrator will check all repaired areas for bond using a hammer "sounding" method after form removal.

(c) Install mechanical screw anchors as shown on the Drawings.

(d) Apply bonding agent to all existing concrete surfaces that will be in contact with the repair mortar.

(e) Place mortar by trowelling, pumping, or into forms ensuring that all entrapped air is removed.

(f) Cure in accordance with E9.4.6.

E11.4.3 Debris Containment

(a) The Contractor shall ensure that all debris including, but not limited to: concrete debris, concrete cutting fluids, formwork debris, and repair materials do not enter the waterway in any way including by the bridge deck drainage system.

E11.4.4 Cleanup

(a) The Contractor shall cleanup equipment and construction debris on at least a daily basis to the satisfaction of the Contract Administrator.

E11.5 Measurement and Payment

E11.5.1 Sidewalk Curb Repairs

(a) North Abutment Sidewalk Curb Repairs will be measured on a unit basis and paid for at the Contract Unit Price per linear metre for “North Abutment Sidewalk Curb Repairs”, repaired in accordance with this Specification and accepted by the Contract Administrator.

(b) South Abutment Sidewalk Curb Repairs will be measured on a unit basis and paid for at the Contract Unit Price per linear metre for “South Abutment Sidewalk Curb Repairs”, repaired in accordance with this Specification and accepted by the Contract Administrator.

(c) Bridge Sidewalk Curb Repairs will be measured on a unit basis and paid for at the Contract Unit Price per linear metre for “Bridge Sidewalk Curb Repairs”, repaired in accordance with this Specification and accepted by the Contract Administrator.

E12. OHSS S-595 WEST PILE CONCRETE REPAIR

E12.1 Description

E12.1.1 This Specification shall cover the OHSS S-595 west pile concrete repair as specified herein.

E12.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all other things necessary for and incidental to the satisfactory performance and completion of all Work hereinafter specified.

E12.2 Materials

E12.2.1 General

(a) All materials supplied under this Specification shall be of a type acceptable to by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.

(b) The Contractor shall be responsible for the supply, safe storage, and handling of all materials set forth in this Specification.

E12.2.2 Concrete Repair Material

(a) Concrete repair material shall be in accordance with E9.

E12.2.3 Epoxy Bonding Agents

(a) Epoxy bonding agent shall be Sikadur 32 Hi-Mod, SikaTop Armatec 110 EpoCem or equal as approved by the Contract Administrator.

E12.2.4 Mechanical Anchors

(a) Mechanical anchors shall be stainless steel screw anchors as dimensioned on the Drawings.

E12.2.5 Curing Compound

(a) Curing compounds shall be liquid membrane-forming and conform to the requirements of ASTM Standard C309-98a.

(b) Curing compounds shall be resin-based and white-pigmented.

(c) WR Meadows 1215 WHITE Pigmented Curing Compound is an approved product, or equal as accepted by the Contract Administrator, in accordance with B7.

E12.3 Equipment

E12.3.1 All equipment shall be of a type accepted by the Contract Administrator and shall be kept in good working order.

E12.4 Construction Methods

E12.4.1 Concrete Removals

(a) Mechanically remove unsound concrete to the limits indicated on the Drawings or to the depth of unsound concrete, whichever is greater.

(b) Where reinforcing steel with active corrosion is encountered, comply with the following:

(i) wire brush reinforcing steel and concrete to remove rust and contaminants. Field epoxy-coat all exposed reinforcing.

E12.4.2 Placing Concrete

(a) Clean all existing concrete surfaces that will be in contact with the repair mortar to remove all deleterious substances.

(b) The Contractor is responsible to create a bond between the new concrete and the existing substrates. The Contract Administrator will check all repaired areas for bond using a hammer “sounding” method after form removal.

(c) Install mechanical screw anchors as shown on the Drawings.

(d) Apply bonding agent to all existing concrete surfaces that will be in contact with the repair mortar.

(e) Place concrete into forms ensuring that all entrapped air is removed.

(f) Cure in accordance with E9.4.6.

E12.4.3 Cleanup

(a) The Contractor shall cleanup equipment and construction debris on at least a daily basis to the satisfaction of the Contract Administrator.

E12.5 Measurement and Payment

E12.5.1 OHSS S-595 West Pile Concrete Repair

(a) The OHSS S-595 West Pile Concrete Repair will not be measured. This item of work will be paid for at the Contract Lump Sum Price for “OHSS S-595 West Pile Concrete Repair”, repaired in accordance with this Specification and accepted by the Contract Administrator.

E13. EXPANSION JOINTS

E13.1 Description

E13.1.1 This Specification shall cover the removal of existing expansion joint assemblies including associated concrete barrier sections and the supply and installation of new expansion joint assemblies including associated concrete barrier sections, as specified herein.

E13.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all other things necessary for and incidental to the satisfactory performance and completion of all Work hereinafter specified.

E13.2 Materials

E13.2.1 General

(a) The Contractor shall be responsible for the supply, safe storage, and handling of all materials set forth in this Specification.

(b) All materials supplied under this Specification shall be of a type acceptable to by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.

E13.2.2 Expansion Joints

(a) The expansion joints shall be an equivalent to WaboCrete SE-400 StripSeal, as specified in the Drawings, and supplied by Watson Bowman Acme Corp., or equal as accepted by the Contract Administrator.

(b) The seals at each expansion joint shall be supplied as specified in E13.2.11.

E13.2.3 Concrete Traffic Barrier EMSEAL BEJS Precompressed Foam Joint Filler

(a) Concrete traffic barrier expansion joint seal shall be EMSEAL BEJS or equivalent as approved by the Contract Administrator to ASTM C711 and ASTM G155-00A.

(b) The seal width, shape, permitted field splice, and locations shall be as indicated on the Drawings.

(c) Sealant system shall be comprised of three (3) components:

(i) cellular polyurethane foam impregnated with hydrophobic one hundred percent (100%) acrylic, water-based emulsion, factory coated with highway-grade, fuel resistant silicone;

(ii) field-applied epoxy adhesive primer; and,

(iii) field-injected silicone sealant bands.

(d) Impregnation agent to have proven non-migratory characteristics. Silicone coating to be highway-grade, low-modulus, fuel resistant silicone applied to the impregnated foam sealant at a width greater than maximum allowable joint extension and which when cured and compressed will form a double bellows. Depth of seal as recommended by manufacturer. BEJS foam seal to be installed into manufacturer's standard field-applied epoxy adhesive. The BEJS SYSTEM is to be installed recessed from the surface of the top and traffic face of the barrier such that when the field-applied injection band of silicone is installed between the substrates and the foam-and-silicone-bellows, the system will be 20 mm down/back from the substrate surface.

(e) Material shall be capable, as a dual seal, of movements of plus fifty percent (+50%) to minus fifty percent (-50%) (one hundred percent (100%) total) of nominal material size. Changes in plane and direction shall be executed using a preformed EMSEAL BEJS shape as shown on the Drawings. Transitions shall be warranted to be watertight at inside and outside corners through the full movement capabilities of the product.

(f) All substitute candidates to be certified in writing to be free in composition of any waxes or asphalts, wax compounds, or asphalt compounds. All substitute candidates shall be certified in writing to be:

(i) Capable of withstanding 65°C for three (3) hours while compressed down to the minimum of movement capability dimension of the basis of design product (minus fifty percent (-50%) of normal material size) without evidence of any bleeding of impregnation medium from the material; and,

(ii) That the same material after the heat stability test will self-expand to the maximum of movement capability dimension of the basis-of-design product (plus fifty percent (+50%) of nominal material size) within twenty-four (24) hours at room temperature 20°C.

E13.2.4 Concrete

(a) Concrete for the WaboCrete StripSeal expansion joint assembly header shall be the WaboCrete II Poured-In-Place Elastomeric Concrete or approved equal as approved by the Contract Administrator.

(b) Concrete for the associated barrier repairs at the expansion joints shall be in accordance with E9.

E13.2.5 Steel

(a) Steel supplied for the fabrication of the bridge deck expansion joints shall conform to CSA G40.21, Grade 300W, or equal as accepted by the Contract Administrator in accordance with B7 of the Specifications. They shall be galvanized after shop fabrication in accordance with ASTM A123 to a minimum net retention of 610 gm/m^2.

E13.2.6 Reinforcing Steel

(a) All reinforcing steel shall conform to the requirements of CSA G30.18, Grade 400W.

E13.2.7 Steel Extrusions

(a) Steel for the extrusions shall conform to CSA G40.21, Grade 230G minimum.

E13.2.8 Miscellaneous Steel Items

(a) Rods, cover plates, brackets and washer plates, slider plates, and all other associated steel items shown on the Drawings shall be fabricated from steel conforming to CSA G40.21, Grade 300W and shall be galvanized in accordance with ASTM A123 to a minimum net retention of 600 gm/m^2.

E13.2.9 Touch-up Gavanizing

(a) Field Applied Galvanizing

(i) All field applied galvanized coatings shall be applied in accordance with ASTM A780M.

(ii) Further to ASTM A780M, paints used for field applied galvanizing shall contain zinc dust above ninety-two (92%) in the dried film.

(iii) At least seven (7) days prior to any field applied galvanizing, the Contract shall submit the galvanizing product and application details to the Contract Administrator for review.

(iv) Spray applied field galvanizing will not be permitted. Where restrictions occur that brush applied field galvanizing is not possible, spray applied field galvanizing may be permitted if accepted in writing by the Contract Administrator prior to application.

(v) All field applied galvanized coatings shall be applied in accordance with the manufacturer's recommendations and as directed by the Contract Administrator.

(b) Galvalloy

(i) Galvalloy shall be as supplied by Metalloy Products Company, P.O. Box #3093, Terminal Annex, Los Angeles, California. Locally, this is available from Welders Supplies Ltd., 25 McPhillips Street.

E13.2.10 Welding

(a) Welding shall be of a low oxygen classification. Manual electrodes shall be E7016 or E7018. All welding shall be in accordance with CSA Standard W59.

E13.2.11 Preformed Joint Seals

(a) Preformed joint seal shall be manufactured from a neoprene rubber.

(b) The preformed neoprene rubber joint seal shall meet the requirements of ASTM D395 and Ontario Provincial Standard Specification (OPSS) 1210 "Material Specification for Preformed Neoprene Joint Seals," latest edition, and as amended herein; and of **Table** 1 of this Specification. All tests will be made on specimens prepared from the extruded seals.

(c) The seals at each joint shall be supplied in one continuous piece, separate from the steel extrusions or joint. No shop or field splicing will be allowed in the seals.

E13.3 Equipment

E13.3.1 All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.

E13.4 Fabrication

E13.4.1 Shop drawings consisting of one (1) electronic copy showing the fabrication details and proposed field splice details of the steel components of the bridge deck expansion joints and design calculations shall be provided to the Contract Administrator for acceptance at least seven (7) Calendar Days prior to scheduled commencement of fabrication. The shop drawings shall be signed, sealed and dated by a professional engineer that is registered or licensed to practice in the province of Manitoba. No fabrication shall commence until acceptance of the shop drawings from the Contract Administrator has been obtained. The complete expansion joint shop fabrication and installation shall be done by or under the direct supervision of a trained factory representative, who shall be responsible for the joint installation procedure.

E13.4.2 Care shall be taken to ensure that all members are straight and flat and free from twists, bends, and distortions due to welding. The units shall be shop assembled and checked for matching of sliding surfaces, correct cross-fall and skew, as well as accurate positioning and alignment of supporting brackets. The Contractor shall exercise care in the handling of all units to prevent twists, bends, and warping.

E13.4.3 Matching expansion joints shall be assembled and bolted together for shipping.

E13.4.4 Expansion joint assemblies shall be shop checked for fit and match marked.

E13.4.5 All metal surfaces to be galvanized shall be cleaned thoroughly of rust, rust scale, mill scale, dirt, paint, and other foreign material by commercial sand, grit or shop blasting, and pickling prior to galvanizing. Heavy deposits or oil and grease shall be removed with solvents prior to blasting and pickling.

E13.4.6 In no case shall weldments be substituted for extrusion shapes.

E13.5 Construction Methods

E13.5.1 Concrete Removals for Expansion Joints

(a) The Contractor shall take all necessary precautions to ensure that no sound concrete located beyond the required dimensions of removal is damaged or removed. Any damage caused to sound concrete or reinforcing steel beyond the required limit of removal or excessive removal of concrete beyond the required dimensions of removal by the Contractor during any demolition procedure, will be repaired by the Contractor at the Contractor’s expense to the satisfaction of the Contract Administrator.

E13.5.2 Removal of Existing Expansion Joints

(a) The Contractor shall remove and dispose of the existing expansion joint assemblies to the extents shown on the Drawings.

(b) Care shall be taken to ensure that remaining sidewalk expansion joint sections are not damaged during the removal of existing expansion joints or the installation of the new expansion joints. Any damaged caused to the existing sidewalk expansion joint sections by the Contractor during the removal or installation process, will be repaired by the Contractor at the Contractor's expense to the satisfaction of the Contract Administrator.

E13.5.3 Installation

(a) The Contractor shall install expansion joints as shown on the Drawings and shall be responsible for the correct matching and seating of parts. Two (2) field splices in the length of the expansion joint assembly are permitted for each assembly unit as follows:

(i) north expansion joint assembly; and

(ii) south expansion joint assembly.

(b) All welding shall conform to the latest CSA Standard W59, electric arc method.

E13.5.4 Galvanizing Touch-up Prior to Placement of Concrete

(a) Any extrusion areas of damaged galvanizing and field welds are to receive Galvalloy touch-up galvanizing.

(i) Surfaces to receive Galvalloy field-applied galvanizing shall be cleaned using a wire brush, a light grinding action, or mild blasting to remove loose scale, rust, paint, grease, dirt, or other contaminants. Preheat the surface to 315°C and wire brush the surface during preheating. Rub the cleaned preheated area with the repair stick to deposit an evenly distributed layer of zinc alloy. Spread the alloy with a wire brush, spatula, or similar tool. Field-applied galvanizing shall be blended into existing galvanizing of surrounding surfaces and shall be buffed and polished if required to match the surrounding surfaces. Care shall be taken to not overheat surfaces beyond 400°C and to not apply direct flame to the alloy rods.

(ii) The process is to be repeated as required to achieve a thickness comparable to original galvanizing.

(b) All other areas of damaged galvanizing and field welds are to receive field applied galvanizing.

E13.5.5 Placement of Concrete at Expansion Joints

(a) The assemblies shall be set in position such that they will remain true to line and elevation during and after concreting.

(b) Care shall be taken during compaction of the concrete to ensure that there are no voids in the concrete under and around the structural steel components.

(c) Before concreting, the expansion joint opening shall be set to match the gap dimension as indicated in the expansion joint setting chart in the Drawings.

(d) Immediately prior to placement of concrete, all existing concrete surfaces that will be in contact with the expansion joint concrete shall be coated with primer in accordance with the manufacturer's recommendations.

(e) Concrete shall be mixed and installed as per manufacturer's recommendations.

(f) Epoxy grout shall be used to fill any bolt holes left after the removal of manufacturer's clamping channels.

E13.5.6 Concrete Barriers

(a) Repair concrete barrier sections associated with expansion joint replacement as specified in E9.4.2.

E13.5.7 Installation of Expansion Joint Seal

(a) The seal at each expansion joint unit shall be installed as one continuous piece after completion of all concreting operations, to the satisfaction of the Contract Administrator, and shall not be installed prior to casting of the expansion joints into the concrete.

E13.5.8 Installation of Concrete Barrier EMSEAL BEJS

(a) Install the seal in accordance with the manufacturer's recommendations.

E13.5.9 Watertight Verification of Joint Seal

(a) The expansion joint seal shall be inspected by the Contract Administrator for any deficiencies. Any deficiencies shall be corrected, using mechanical or other adjustment of the bridge deck expansion joints to the satisfaction of the Contract Administrator. In no case shall caulk or other temporary devices or materials be used to seal leaks in the expansion joints. The Contract Administrator's decision in this regard shall be final.

E13.6 Quality Control

E13.6.1 General

(a) All workmanship and all materials furnished and supplied under this Specification are subject to the close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the Work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or acceptance that may have been previously given. The Contract Administrator reserves the right to reject any materials or works which are not in accordance with the requirements of this Specification.

E13.6.2 Joint Seal Markings

(a) All joint seals shall be identified as to the manufacturer by means of a continuous permanent mould mark. The mould marks shall be registered with the Contract Administrator and shall be used on all seals produced by the respective manufacturer. The seal shall also be permanently marked, on the side of the seal, with the date of production and the batch/lot, at intervals of not more than 1.2 m.

(b) The Contractor shall supply to the Contract Administrator a summary of the seals identifying the date of manufacture, the batch/lot, and the proposed installation location.

E13.6.3 Joint Seal Samples and Testing Procedures

(a) The Contractor shall supply seal sample material at no charge to The City for quality control testing purposes. The samples will each be 1.5 m long. Each sample will represent not more than three expansion joint seals of the same size, lot, and make and shall be continuous with same until sampled by the Contract Administrator. As soon as the seals to be used in the joint assemblies have been manufactured, they shall be available to the Contract Administrator for sampling.

(b) Testing procedures will be in accordance with the latest revisions of the methods indicated on **Table 1**, Physical Requirements.

(c) All materials failing to meet the Specification requirements will be rejected.

(d) Lots rejected may be culled by the supplier and, upon satisfactory evidence of compliance with the Specifications, will be accepted.

Table 1

Property	Physical Requirements	Test Procedure*
1. Tensile Strength	Minimum 13.5 MPa	ASTM D412 OPSS 1210.07.03.01.02
2. Elongation at Break	Minimum 250%	ASTM D412 OPSS 1210.07.03.01.02
3. Hardness, Type A Durometer	55: +5 Points -5 Points	ASTM D2240 Modified OPSS 120.07.03.01.03
4. Oven aging Test 70 Hours at 100 C Reduction in Tensile Strength Reduction in Elongation Increase in Hardness	 Maximum 20% Maximum 20% Maximum 10 Points	ASTM D573
5. Permanent Set at Break	Maximum 10%	ASTM D412
6. Low Temperature Stiffening Hardness, Type A Durometer	Maximum 15 Points	ASTM D2240 OPSS 1210.07.03.01.03
7. Oil Swell, ASTM Oil No. 3 70 H at 40 C (wipe with toluene to remove surface contamination)	45%	ASTM D471
8. **Safe Compressibility Test (Z min.) Bridge Seal - < 63.5 mm > 63.5 mm	 Minimum 50% Minimum 55%	OPSS 1210.07.03.01.04
9. **Pressure Generation at 15% Deflection	Minimum 20 kPa	OPSS 1210.07.03.01.04
10. **Recovery 22 h at -28 C 70 h at -10 C 70 h at +100 C	 Minimum 80% No Cracking Minimum 88% Splitting or Minimum 85% Sticking	OPSS 1210.07.03.01.05

* ASTM - American Society for Testing and Materials
OPSS - Ontario Provincial Standard Specification

** This physical requirement not applicable to lock-in type joint seals

E13.7 Measurement and Payment

E13.7.1 The replacement of expansion joints will not be measured. This item of Work will be paid for at the Contract Lump Sum Price for “Replacement of Expansion Joints” repaired in accordance with this Specification and accepted by the Contract Administrator.

E14. ROADWAY EXPANSION JOINT REPLACEMENT

E14.1 Description

E14.1.1 This Specification shall cover all operations related to the supply and installation of replacement roadway expansion joints.

E14.2 Materials

E14.2.1 EMSEAL Precompressed Foam Joint Filler

(a) Expansion joint seal shall be EMSEAL BEJS or equivalent as approved by the Contract Administrator to ASTM C711 and ASTM G155-00A.

(b) The seal width shall be as indicated on the Drawings.

(c) Sealant system shall be comprised of three (3) components:

(i) cellular polyurethane foam impregnated with hydrophobic one hundred percent (100%) acrylic, water-based emulsion, factory coated with highway-grade, fuel resistant silicone;

(ii) field-applied epoxy adhesive primer; and,

(iii) field-injected silicone sealant bands.

(d) Impregnation agent to have proven non-migratory characteristics. Silicone coating to be highway-grade, low-modulus, fuel resistant silicone applied to the impregnated foam sealant at a width greater than maximum allowable joint extension and which when cured and compressed will form a bellows. Depth of seal as recommended by manufacturer. BEJS foam seal to be installed into manufacturer's standard field-applied epoxy adhesive. The BEJS SYSTEM is to be installed recessed from the surface such that when the field-applied injection band of silicone is installed between the substrates and the foam-and-silicone-bellows, the system will be 5 mm down from the substrate surface.

(e) Material shall be capable, as a dual seal, of movements of plus fifty percent (+50%) to minus fifty percent (-50%) (one hundred percent (100%) total) of nominal material size. Changes in plane and direction shall be executed using factory fabricated "Universal 90" transition assemblies. Transitions shall be warranted to be watertight at inside and outside corners through the full movement capabilities of the product.

(f) All substitute candidates to be certified in writing to be free in composition of any waxes or asphalts, wax compounds, or asphalt compounds. All substitute candidates shall be certified in writing to be:

(i) capable of withstanding 65°C for three (3) hours while compressed down to the minimum of movement capability dimension of the basis of design product (minus fifty percent (-50%) of normal material size) without evidence of any bleeding of impregnation medium from the material; and,

(ii) that the same material after the heat stability test will self-expand to the maximum of movement capability dimension of the basis-of-design product (plus fifty percent (+50%) of nominal material size) within twenty-four (24) hours at room temperature 20°C.

E14.3 Construction Methods

E14.3.1 Removals and Cleaning

(a) Remove the existing joint seals where replacement is indicated on the Drawings.

(b) Sawcut the roadway slabs and concrete barriers and remove concrete as shown on the Drawings.

(c) Clean all concrete surfaces as required by the seal manufacturer's installation instructions

E14.3.2 Seal Installation

(a) Install the seal in accordance with the manufacturer's recommendations.

(b) For roadway surfaces to be subsequently overlaid with asphalt, the seal shall be recessed 5 mm from the top of the concrete pavement.

E14.4 Measurement and Payment

E14.4.1 Replacement of roadway expansion joints will be measured on a unit basis and paid for at the Contract Unit Price per linear metre for "Roadway Expansion Joint Replacement", repaired in accordance with this Specification and accepted by the Contract Administrator.