



THE CITY OF WINNIPEG

TENDER

TENDER NO. 685-2019

2019 BRIDGE MAINTENANCE NORWOOD AND MAIN STREET BRIDGES

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 2019 Bridge Maintenance Norwood and Main Street Bridges

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, September 10, 2019.

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. ENQUIRIES

B3.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.

B3.2 If the Bidder finds errors, discrepancies or omissions in the Tender, 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.

B3.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Tender will be provided by the Contract Administrator to all Bidders by issuing an addendum.

B3.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Tender will be provided by the Contract Administrator only to the Bidder who made the enquiry.

B3.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B3 unless that response or interpretation is provided by the Contract Administrator in writing.

B4. CONFIDENTIALITY

B4.1 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.

B4.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Tender to the media or any member of the public without the prior written authorization of the Contract Administrator.

B5. ADDENDA

B5.1 The Contract Administrator may, at any time prior to the Submission deadline, issue addenda correcting errors, discrepancies or omissions in the Tender, or clarifying the meaning or intent of any provision therein.

B5.2 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.

B5.3 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/bidopp.asp>

B5.4 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.

B5.5 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B5.6 Notwithstanding B3, enquiries related to an Addendum may be directed to the Contract Administrator indicated in D3.

B6. SUBSTITUTES

B6.1 The Work is based on the Plant, Materials and methods specified in the Tender.

B6.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

B6.3 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.

B6.4 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.

- B6.5 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.
- B6.6 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.
- B6.6.1 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.
- B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B6.8 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 B17.
- B6.9 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.

B7. BID COMPONENTS

- B7.1 The Bid shall consist of the following components:
- (a) Form A: Bid;
 - (b) Form B: Prices, hard copy;
 - (c) Form G1: Bid Bond and Agreement to Bond.
- B7.2 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.
- B7.3 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.
- B7.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Tender number and the Bidder's name and address.
- B7.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Tender number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid.
- B7.4.2 A hard copy of Form B: Prices must be submitted with the Bid. If there is any discrepancy between the Adobe PDF version of Form B: Prices and the Microsoft Excel version of Form B: Prices, the PDF version shall take precedence.
- B7.5 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.
- B7.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Tender document, including the General Conditions, will be evaluated in accordance with B17.1(a).
- B7.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B7.8 Bids shall be submitted to:
The City of Winnipeg

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

B8. BID

B8.1 The Bidder shall complete Form A: Bid, making all required entries.

B8.2 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.

B8.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.

B8.3 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.

B8.4 Paragraph 13 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 and the corporate seal, if the corporation has one, shall be affixed;
- (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.

B8.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.

B8.5 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.

B9. PRICES

B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.

B9.1.1 Prices stated on Form B: Prices shall not include any costs which may be incurred by the Contractor with respect to any applicable funding agreement obligations as outlined in D23. Any such costs shall be determined in accordance with D23.

- B9.2 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.
- B9.3 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.
- B9.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B10. DISCLOSURE

- B10.1 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.
- B10.2 The Persons are:
(a) N/A

B11. CONFLICT OF INTEREST AND GOOD FAITH

- B11.1 Bidders, by responding to this Tender, declare that no Conflict of Interest currently exists, or is reasonably expected to exist in the future.
- B11.2 Conflict of Interest means any situation or circumstance where a Bidder or employee of the Bidder proposed for the Work has:
(a) other commitments;
(b) relationships;
(c) financial interests; or
(d) involvement in ongoing litigation;
that could or would be seen to:
(i) exercise an improper influence over the objective, unbiased and impartial exercise of the independent judgment of the City with respect to the evaluation of Bids or award of the Contract; or
(ii) compromise, impair or be incompatible with the effective performance of a Bidder's obligations under the Contract;
(e) has contractual or other obligations to the City that could or would be seen to have been compromised or impaired as a result of its participation in the Tender process or the Work; or
(f) has knowledge of confidential information (other than confidential information disclosed by the City in the normal course of the Tender process) of strategic and/or material relevance to the Tender process or to the Work that is not available to other bidders and that could or would be seen to give that Bidder an unfair competitive advantage.
- B11.3 In connection with its Bid, each entity identified in B11.2 shall:
(a) avoid any perceived, potential or actual Conflict of Interest in relation to the procurement process and the Work;
(b) upon discovering any perceived, potential or actual Conflict of Interest at any time during the Tender process, promptly disclose a detailed description of the Conflict of Interest to the City in a written statement to the Contract Administrator; and
(c) provide the City with the proposed means to avoid or mitigate, to the greatest extent practicable, any perceived, potential or actual Conflict of Interest and shall submit any

additional information to the City that the City considers necessary to properly assess the perceived, potential or actual Conflict of Interest.

- B11.4 Without limiting B11.3, the City may, in its sole discretion, waive any and all perceived, potential or actual Conflicts of Interest. The City's waiver may be based upon such terms and conditions as the City, in its sole discretion, requires to satisfy itself that the Conflict of Interest has been appropriately avoided or mitigated, including requiring the Bidder to put into place such policies, procedures, measures and other safeguards as may be required by and be acceptable to the City, in its sole discretion, to avoid or mitigate the impact of such Conflict of Interest.
- B11.5 Without limiting B11.3, and in addition to all contractual or other rights or rights at law or in equity or legislation that may be available to the City, the City may, in its sole discretion:
- (a) disqualify a Bidder that fails to disclose a perceived, potential or actual Conflict of Interest of the Bidder or any of its employees proposed for the Work;
 - (b) require the removal or replacement of any employees proposed for the Work that has a perceived, actual or potential Conflict of Interest that the City, in its sole discretion, determines cannot be avoided or mitigated;
 - (c) disqualify a Bidder or employees proposed for the Work that fails to comply with any requirements prescribed by the City pursuant to B11.4 to avoid or mitigate a Conflict of Interest; and
 - (d) disqualify a Bidder if the Bidder, or one of its employees proposed for the Work, has a perceived, potential or actual Conflict of Interest that, in the City's sole discretion, cannot be avoided or mitigated, or otherwise resolved.
- B11.6 The final determination of whether a perceived, potential or actual Conflict of Interest exists shall be made by the City, in its sole discretion.

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/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

- (a) Written confirmation of a safety and health certification meeting SAFE Work Manitoba's SAFE Work Certified Standard (e.g., COR™ and SECOR™) in the form of:
 - (i) 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
 - (ii) 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
- (b) 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. BID SECURITY

B13.1 The Bidder shall provide bid security in the form of a bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in the form included in the Bid Submission (Form G1: Bid Bond and Agreement to Bond).

B13.1.1 If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.

B13.1.2 All signatures on bid securities shall be original.

B13.1.3 The Bidder shall sign the Bid Bond.

B13.1.4 The Surety shall sign and affix its corporate seal on the Bid Bond and the Agreement to Bond.

B13.2 The bid security of the successful Bidder and the next two lowest evaluated responsive and responsible Bidders will be released by the City when a Contract for the Work has been duly executed by the successful Bidder and the contract securities are furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

B13.3 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Tender.

B14. OPENING OF BIDS AND RELEASE OF INFORMATION

B14.1 Bids will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Division, or in such other office as may be designated by the Manager of Materials.

B14.1.1 Bidders or their representatives may attend.

- B14.1.2 Bids determined by the Manager of Materials, or his/her designate, to not include the bid security specified in B13 will not be read out.
- B14.2 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/>
- B14.3 After award of Contract, the name(s) of the successful Bidder(s), their address(es) 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/>
- B14.4 The Bidder is advised that any information contained in any Bid may be released if required by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law or by City policy or procedures (which may include access by members of City Council).
- B14.4.1 To the extent permitted, the City shall treat as confidential information, those aspects of a Bid Submission identified by the Bidder as such in accordance with and by reference to Part 2, Section 17 or Section 18 or Section 26 of The Freedom of Information and Protection of Privacy Act (Manitoba), as amended.

B15. IRREVOCABLE BID

- B15.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.
- B15.2 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 until a Contract for the Work has been duly executed and the contract securities have been furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid.

B16. WITHDRAWAL OF BIDS

- B16.1 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.
- B16.1.1 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.
- B16.1.2 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 13 of Form A: Bid, and only such person, has authority to give notice of withdrawal.
- B16.1.3 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 13 of Form A: Bid; and
 - (c) if the notice has been given by any one of the persons specified in B16.1.3(b), declare the Bid withdrawn.
- B16.2 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 B15.2 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, including the right to retain the Bidder's bid security.

B17. EVALUATION OF BIDS

B17.1 Award of the Contract shall be based on the following bid evaluation criteria:

- (a) compliance by the Bidder with the requirements of the Tender, or acceptable deviation therefrom (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 B6.

B17.2 Further to B17.1(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.

B17.3 Further to B17.1(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 qualified.

B17.4 Further to B17.1(c), where the Total Bid Price exceeds the funds stated in D2.3, the City may determine that no award will be made in accordance with B18.2.1 (a).

B17.5 Further to B17.1(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.

B17.5.1 Further to B17.1(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.

B18. AWARD OF CONTRACT

B18.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B18.2 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 qualified, and the Bids are determined to be responsive.

B18.2.1 Without limiting the generality of B18.2, 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.

- B18.3 If funding for the Work is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, Bidders are advised that the terms of D23 shall immediately take effect upon confirmation of such funding, regardless of when funding is confirmed.
- B18.4 Where an award of Contract is made by the City, the award shall be made to the qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B17.
- B18.4.1 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.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

C0.1 The *General Conditions for Construction* (Revision 2019-01-15) 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 Tender 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

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 Maintenance Works to Norwood and Main Street Bridges.

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

- (a) Mobilization and Demobilization
- (b) Traffic Control
- (c) Concrete Removal
- (d) Surface Preparation of Concrete Surfaces
- (e) Concrete Repairs
- (f) Surface Preparation and Metallizing of Structural Steel.
- (g) Discrete Galvanic Protection System.
- (h) Sidewalk Benches Refurbishing

D2.3 The funds available for this contract are \$300,000.00.

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is Morrison Hershfield Limited Represented by:

Bill Ebenspanger, P.Eng.
Senior Structural Engineer
Telephone No.: 204 977-8370
Email Address: bebenspanger@morrisonhershfield.com

D3.2 At the pre-construction meeting, Bill Ebenspanger will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D4. CONTRACTOR'S SUPERVISOR

D4.1 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.

D4.2 At least two (2) business days prior to the commencement of any Work on the site, the Contractor shall provide the Contract Administrator with a phone number where the supervisor identified in D4.1 or an alternate can be contacted twenty-four (24) hours a day to respond to an emergency.

D5. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

D5.1 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.

D5.2 The Contractor shall not make any public announcements or press releases regarding the Contract, without the prior written authorization of the Contract Administrator.

D5.3 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.

D5.4 A Contractor who violates any provision of D5 may be determined to be in breach of Contract.

D6. NOTICES

D6.1 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.

D6.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D6.3 D6.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator identified in D3.

D6.3 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:

The City of Winnipeg
Attn: Chief Financial Officer
Office of the Chief Administrative Officer
Susan A. Thompson Building
2nd Floor, 510 Main Street
Winnipeg MB R3B 1B9

- D6.4 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

- D6.5 **Bids Submissions must not be submitted to this facsimile number. Bids must be submitted in accordance with B7.**

D7. FURNISHING OF DOCUMENTS

- D7.1 Upon award of the Contract, the Contractor will be provided with three (3) complete sets of the Tender. If the Contractor requires additional sets of the Tender, they will be supplied to him/her at cost.

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 shall 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 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, broad form property damage cover 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 \$2,000,000 inclusive for loss or damage including personal injuries and death resulting from any one accident or occurrence;
 - (c) an 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 All policies shall be taken out with insurers licensed to do business in the Province of Manitoba.
- D10.4 The Contractor shall provide the City Solicitor 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 the date specified in the C4.1 for the return of the executed Contract.
- D10.5 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. CONTRACT SECURITY

- D11.1 The Contractor shall provide and maintain the performance bond and the labour and material payment bond 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; and
 - (b) a labour and material payment bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H2: Labour and Material Payment Bond), in an amount equal to fifty percent (50%) of the Contract Price.
- D11.2 The Contractor shall provide the City Solicitor with the required performance and labour and material payment bonds within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and 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.
- D11.3 The Contractor shall, as soon as practicable after entering into a contract with a Subcontractor:
- (a) give the Subcontractor written notice of the existence of the labour and material payment bond in D11.1(b); and
 - (b) post a notice of the bond and/or a copy of that bond in a conspicuous location at the Site of the Work.

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 or prior to a pre-construction meeting, or 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 the C4.1 for the return of the executed 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 the General Conditions 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 acceptable to the Contract Administrator.
- D13.3 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 letter of intent 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 twenty-four (24) hour emergency response phone number specified in D4.2.
 - (iv) the Safe Work Plan specified in D9;
 - (v) evidence of the insurance specified in D10;
 - (vi) the contract security specified in D11;
 - (vii) the subcontractor list specified in D12; and
 - (viii) 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 Contractor shall commence the Work on the Site within Seven (7) Working Days of receipts of the Letter of Intent.
- D14.4 The City intends to award this Contract by October 11, 2019.
- D14.5 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. SUBSTANTIAL PERFORMANCE

- D15.1 The Contractor shall achieve Substantial Performance by May 15, 2020.
- D15.2 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 re-inspected.
- D15.3 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.

D16. TOTAL PERFORMANCE

- D16.1 The Contractor shall achieve Total Performance by May 22, 2020.
- D16.2 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 re-inspected.
- D16.3 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.

D17. LIQUIDATED DAMAGES

- D17.1 If the Contractor fails to achieve Total Performance in accordance with the Contract by the day fixed herein for Total Performance, the Contractor shall pay the City Five Hundred dollars (\$500) per Calendar Day for each and every Calendar Day following the day fixed herein for Total Performance during which such failure continues.
- D17.2 The amount specified for liquidated damages in D17.1 is based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve Total Performance by the day fixed herein for same.
- D17.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

CONTROL OF WORK

D18. JOB MEETINGS

- D18.1 Regular weekly job meetings will be held at the Site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, one representative of the City and one 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.
- D18.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

D19. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

- D19.1 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).

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

- D20.1 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

D21. PAYMENT

- D21.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D22. WARRANTY

- D22.1 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.
- D22.2 Notwithstanding C13.2 or D22.1, 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.
- D22.2.1 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.

THIRD PARTY AGREEMENT

D23. FUNDING AND/OR CONTRIBUTIONS AGREEMENT OBLIGATIONS

- D23.1 In the event that funding for the Work of the Contract is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, the following terms and conditions shall apply, as required by the applicable funding agreements.
- D23.2 Further to D23, in the event that the obligations in D23 apply, actual costs legitimately incurred by the Contractor as a direct result of these obligations ("Funding Costs") shall be determined by the actual cost to the Contractor and not by the valuation method(s) outlined in C7.4. In all other respects Funding Costs will be processed in accordance with Changes in Work under C7.
- D23.3 For the purposes of D23:
- (a) "**Government of Canada**" includes the authorized officials, auditors, and representatives of the Government of Canada; and
 - (b) "**Government of Manitoba**" includes the authorized officials, auditors, and representatives of the Government of Manitoba.
- D23.4 Modified Insurance Requirements
- D23.4.1 If not already required under the insurance requirements identified in D10, the Contractor will be required to provide wrap-up liability insurance in an amount of no less than two million dollars (\$2,000,000) inclusive per occurrence. Such policy will be written in the joint names of the City, Contractor, Consultants and all sub-contractors and sub-consultants and include twelve (12) months completed operations. The Government of Manitoba and its Ministers, officers, employees, and agents shall be added as additional insureds.
- D23.4.2 If not already required under the insurance requirements identified in D10, the Contractor will be required to provide builders' risk insurance (including boiler and machinery insurance, as applicable) providing all risks coverage at full replacement cost, or such lower level of insurance that the City may identify on a case-by-case basis, such as an installation floater.
- D23.4.3 The Contractor shall obtain and maintain third party liability insurance with minimum coverage of two million dollars (\$2,000,000.00) per occurrence on all licensed vehicles operated at the Site. In the event that this requirement conflicts with another licensed vehicle insurance requirement in this Contract, then the requirement that provides the higher level of insurance shall apply.

D23.4.4 Further to D23, insurers shall provide satisfactory Certificates of Insurance to the Government of Manitoba prior to commencement of Work as written evidence of the insurance required. The Certificates of Insurance must provide for a minimum of thirty (30) days' prior written notice to the Government of Manitoba in case of insurance cancellation.

D23.4.5 All policies must be taken out with insurers licensed to carry on business in the Province of Manitoba.

D23.5 Indemnification By Contractor

D23.5.1 In addition to the indemnity obligations outlined in C17 of the General Conditions for Construction, the Contractor agrees to indemnify and save harmless the Government of Canada and the Government of Manitoba and each of their respective Ministers, officers, servants, employees, and agents from and against all claims and demands, losses, costs, damages, actions, suit or other proceedings brought or pursued in any manner in respect of any matter caused by the Contractor or arising from this Contract or the Work, or from the goods or services provided or required to be provided by the Contractor, except those resulting from the negligence of any of the Government of Canada's or the Government of Manitoba's Ministers, officers, servants, employees, or agents, as the case may be.

D23.6 Records Retention and Audits

D23.6.1 The Contractor shall maintain and preserve accurate and complete records in respect of this Contract and the Work, including all accounting records, financial documents, copies of contracts with other parties and other records relating to this Contract and the Work during the term of the Contract and for at least six (6) years after Total Performance. Those records bearing original signatures or professional seals or stamps must be preserved in paper form; other records may be retained in electronic form.

D23.6.2 In addition to the record keeping and inspection obligations outlined in C6 of the General Conditions for Construction, the Contractor shall keep available for inspection and audit at all reasonable times while this Contract is in effect and until at least six (6) years after Total Performance, all records, documents, and contracts referred to in D23.6.1 for inspection, copying and audit by the City of Winnipeg, the Government of Manitoba and/or the Government of Canada and their respective representatives and auditors, and to produce them on demand; to provide reasonable facilities for such inspections, copying and audits, to provide copies of and extracts from such records, documents, or contracts upon request by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada and their respective representatives and auditors, and to promptly provide such other information and explanations as may be reasonably requested by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada from time-to-time.

D23.7 Other Obligations

D23.7.1 The Contractor consents to the City providing a copy of the Contract to the Government of Manitoba and/or the Government of Canada upon request from either entity.

D23.7.2 If the Lobbyists Registration Act (Manitoba) applies to the Contractor, the Contractor represents and warrants that it has filed a return and is registered and in full compliance with the obligations of that Act, and covenants that it will continue to comply for the duration of this Contract.

D23.7.3 The Contractor shall comply with all applicable legislation and standards, whether federal, provincial, or municipal, including (without limitation) labour, environmental, and human rights laws, in the course of providing the Work.

D23.7.4 The Contractor shall properly account for the Work provided under this Contract and payment received in this respect, prepared in accordance with generally accepted accounting principles in effect in Canada, including those principles and standards approved or recommended from time-to-time by the Chartered Professional Accountants of Canada or the Public Sector Accounting Board, as applicable, applied on a consistent basis.

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

TENDER NO. 685-2019

2019 BRIDGE MAINTENANCE NORWOOD AND MAIN STREET BRIDGES

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: LABOUR AND MATERIAL PAYMENT BOND
(See D11)

KNOW ALL MEN BY THESE PRESENTS THAT

his/its heirs, executors, administrators, successors or assigns (hereinafter called the "Principal"), and

his/its heirs, executors, administrators, successors or assigns (hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter called the "Obligee"), for the use and benefit of claimants as herein below defined, in the amount of

_____ dollars (\$_____)

of lawful money of Canada, for the payment whereof we, the Principal and the Surety jointly and severally bind ourselves firmly by these presents.

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

TENDER NO. 685-2019

2019 BRIDGE MAINTENANCE NORWOOD AND MAIN STREET BRIDGES

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 promptly make payment to all claimants as hereinafter defined, for all labour, service and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void, otherwise it shall remain in full force and effect subject, however, to the following conditions:

- (a) A claimant is defined as one having a direct contract with the Principal for labour, service and material, or any of them, used or reasonably required for use in the performance of the contract, labour, service and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment (but excluding rent of equipment where the rent pursuant to an agreement is to be applied towards the purchase price thereof) directly applicable to the Contract;
- (b) The above-named Principal and Surety hereby jointly and severally agree with the Obligee that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work, labour or service was done or performed, or materials were furnished by such claimant, may sue on this bond, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon;
- (c) No suit or action shall be commenced hereunder by any claimant
 - (i) unless claimant shall have given written notice to the Principal and the Surety above-named, within one hundred and twenty (120) days after such claimant did or performed the last of the work, labour or service, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work, labour or service was done or performed. Such notice shall be served by mailing the same by registered mail to the Principal, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the Province of Manitoba;

- (ii) after the expiration of one (1) year following the date on which Principal ceased work on said Contract; including work performed under the guarantees provided in the Contract;
 - (iii) other than in a court of competent jurisdiction in the Province of Manitoba.
- (d) The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.
- (e) The Surety shall not be liable for a greater sum than the specified penalty of this bond.

The Principal and Surety hereby agree that The Guarantors' Liability Act (Manitoba) shall apply to this Bond.

IN TESTIMONY WHEREOF, the Principal has hereunto set its hand affixed its seal, and the Surety has caused these presents to be sealed and with its corporate seal duly attested by the authorized signature of its signing authority this

_____ 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)

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 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B6. In every instance where a brand name or design specification is used, the City will also consider approved equals and/or approved alternatives in accordance with B6.
- E1.4 The following are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
B103-19-01/B104-19-01	Cover Sheet, Location Plan & Drawing Index
B103-19-02/B104-19-02	General Notes
B103-19-03/B104-19-03	General Arrangements
B103-19-04	Norwood Bridge Northbound – Delamination Map
B103-19-05	Norwood Bridge Southbound – Delamination Map
B103-19-06	Norwood Bridge Northbound – Concrete Repair
B103-19-07	Norwood Bridge Southbound – Concrete Repair
B103-19-08	Norwood Bridge Southbound – Overhead Sign Structure Capping
B103-19-09	Norwood Bridges – Bench Refurbishing Details
B103-19-10	Norwood Bridge Northbound – Pier Metallizing
B103-19-11	Norwood Bridge Southbound – Pier Metallizing
B104-19-04	Main Street Bridges – Pier Metallizing

E2. MOBILIZATION AND DEMOBILIZATION

- E2.1 Description
- (a) This Specification shall cover all operations relating to the mobilization and demobilization of the Contractor to the Bridge Sites, as specified herein.
 - (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 Works as hereinafter specified.
- E2.2 Scope of Work
- (a) The Work under this Specification shall include but not be limited to:
 - (i) Mobilizing and demobilizing on-site Work facilities;
 - (ii) Supplying, setting up, laying out, and removing site office facilities as detailed in E3 “Site Office Facilities”;
 - (iii) Supplying and installing secure fencing around the laydown/staging area;

- (iv) Maintaining and removing any access roadways; and
- (v) Restoring all existing facilities.

E2.3 Materials

- (a) All materials supplied under this Specification shall be of a type approved 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 as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

E2.4 Equipment

- (a) All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.

E2.5 Construction Methods

E2.6 Layout of On-Site Work Facilities

- (a) The Contractor shall mobilize all on-site Work and other temporary facilities.
- (b) The Contractor shall coordinate with relevant parties to make arrangements for use of areas.
- (c) Upon completion of construction activities, the Contractor shall remove all on-site Work and other temporary facilities.

E2.7 Cellular Telephone Communication

- (a) The Contractor's site supervisor is required to carry, at all times, a cellular telephone, with voice mail.

E2.8 Secure Site Fencing

- (a) Fencing around the site lay-down, lavatory facilities, and Work site areas, shall be installed prior to commencement of site activities.
- (b) The fencing shall remain secure and in place for the full duration of the Work.
- (c) Access points to the fencing shall be secured by padlocks or other appropriate means outside of working hours. The fencing shall be removed upon demobilization of on-site Work facilities.

E2.9 Access Roadway

- (a) The Contractor shall maintain any access roadway they install.
- (b) The access road shall be maintained on a regular basis to provide continual unrestricted site access, to the satisfaction of the Contract Administrator.
- (c) City of Winnipeg streets and alleys adjacent to all access roads and staging areas must be kept clean at all times.
- (d) Upon completion of the Work, the area shall be restored to its original condition.

E2.10 Restoration of Existing Facilities

- (a) Upon completion of the Work and demobilization, the Contractor shall restore existing facilities.

E2.11 Quality Control

E2.11.1 Inspection

- (a) All workmanship and all materials furnished and supplied under this Specification are subject to 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 specified Work.

- (b) 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.

E2.11.2 Access

- (a) The Contractor shall allow the Contract Administrator free access to all parts of the Work at all times. The Contractor shall supply samples to the Contract Administrator or his inspector for testing purposes as required. There will be no charge to the City for samples taken.

E2.12 Measurement and Payment

E2.12.1 Mobilization and Demobilization

- (a) Mobilization and demobilization shall not be measured. This item of work shall be paid for at the Lump Sum Price for "Mobilization and Demobilization", which price shall be paid in full for supply all materials and performing all operations herein described and all other items incidental to the Work. Payment will be based on the following breakdown:

(i) Commencement of Construction	30%
(ii) During Construction	60%
(iii) Upon Completion of the Work	10%

E3. SITE OFFICE FACILITIES

E3.1 Description

- (a) This Specification shall cover all operations relating to the supply of site office facilities, as specified herein.
- (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 Works as hereinafter specified.

E3.2 Materials

- (a) All materials supplied under this Specification shall be of a type approved 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 as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

E3.3 Equipment

- (a) All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.

E3.4 Construction Methods

E3.4.1 Site Office Facilities

- (i) The Contractor shall supply the Contract Administrator's site office facilities meeting the following requirements:
- (ii) A site office shall be provided for the exclusive use of the Contract Administrator.

- (iii) The office shall be conveniently located within the site lay-down area near the Work site.
- (iv) The office shall be a newer building with a minimum floor area of 20 square metres, having a ceiling height of 2.4 m and adequate windows (complete with security bars) to provide for cross ventilation, with door entrance(s) with suitable lock(s).
- (v) The office shall be suitable for all weather use. It shall be equipped with suitable heating and air conditioning systems, so that the interior room temperature can be maintained between 20 to 22°C at any outside ambient temperature.
- (vi) The office shall be adequately lighted with fluorescent fixtures and have a minimum of 3 wall outlets.
- (vii) The office shall be furnished with one office desk with minimum plan dimensions 3' x 6' and two chairs, , one meeting table, two bookcases, and a minimum of eight (8) chairs.
- (viii) The office shall be equipped with reliable internet access, either provided by ethernet cable (hard line) or wireless internet service. Any wireless internet access shall be secured by an access password and by conventional WPA2 256-bit encryption to prevent unauthorized access. If wireless internet access is not provided, then a minimum of two ethernet connections shall be provided.
- (ix) The office shall be equipped with an individual size fridge having minimum nominal volume of 1.7 cubic feet, and a microwave.
- (x) The site office building shall be cleaned on a weekly basis. The Contract Administrator may request additional cleaning when he deems it necessary.
- (xi) All site office facilities and furnishings shall be approved by the Contract Administrator.
- (xii) The Contractor shall be responsible for all installation and removal costs, all operating costs, and the general maintenance of the site office facilities.
- (xiii) The site office facilities shall be provided from the date of the commencement of the Work to the date of Total Performance unless otherwise approved in writing by the Contract Administrator.

E3.4.2 Site Lavatory Facilities

- (i) a Minimum Of One Portable Flush Or Chemical-Type Toilet, Lavatory, And Mirror Shall Be Provided At The Work Site. The Portable Toilets Shall Be Accessible To The Contract Administrator At All Times.
- (ii) The portable toilets shall be cleaned on a weekly basis. The Contract Administrator may request additional cleaning when he deems it necessary;

E3.5 Measurement and Payment

E3.5.1 Site Office Facilities

- (b) The supply of site office facilities, including site lavatory facilities, shall not be measured. This item of Work shall be included in the Lump Sum Price for "Mobilization and Demobilization", which price shall be paid in full for supply all materials and performing all operations herein described and all other items incidental to the Work.

E4. TRAFFIC CONTROL

E4.1 Description

- E4.1.1 The Work covered under this item shall cover traffic control requirements related to the concrete repairs.
- E4.1.2 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

things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E4.2 Notification

- (a) The Contractor shall submit a *Designated Construction Zone and/or Speed Limit Reduction Request* for approval by the Traffic Management Branch ((204) 986-5640 or email PWDLaneClosures@winnipeg.ca) at least fourteen (14) Calendar Days prior to beginning concrete repairs.
- (b) The Contractor shall submit a *Regional Street Lane Closure Request* form at least fourteen (14) Calendar Days prior to beginning concrete repairs.
- (c) In accordance with the Manual, the Contractor shall make arrangements with the Traffic Services Branch to 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) at least fourteen (14) Calendar Days prior to beginning concrete repairs.
- (d) The Contractor shall call the Traffic Services Branch at (204) 986-5178 at least forty-eight (48) hours prior to reopening the closed traffic lane.

E4.3 General

E4.3.1 Further to Clauses 3.6 and 3.7 of CW 1130, in accordance with the latest edition of the Manual of Temporary Traffic Control on City Streets (the Manual), the following shall be applicable to the Work:

- (a) The Contractor ("Construction Agency" in the Manual) shall:
 - (i) Ensure intersecting street and private approach access is maintained at all times. Should the Contractor be unable to maintain pedestrian or vehicular access to a residence or business, he shall review the planned disruption with the business or residence and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of twenty-four (24) hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access.
 - (ii) Place, maintain and remove the appropriate temporary traffic control devices as specified by the Manual, the Traffic Management Branch, and/or the Permit issued by the City.
 - (iii) Mark barricades supplied by the Contractor 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.
 - (iv) Provide safety for the worker.
 - (v) Provide safety and convenience for motorists, cyclists, and pedestrians.
 - (vi) Ensure all temporary traffic control devices are removed or hidden from view when no longer appropriate.
 - (vii) Contact the Traffic Management Branch to report any changes to the location, limits, or duration of any lane closures.
 - (viii) Notify lane closure reopening to the Traffic Management Branch.
- (b) 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 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, cyclists, or pedestrians.
- (c) Improper signing will be sufficient reason for the Contract Administrator or Inspector to order the Works to cease on Site.
- (d) 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, cyclists, or pedestrians.

- (e) Emergency vehicle access must be maintained at all times.
- (f) The Contractor is not allowed to close any traffic lane between the hours of 7:00 am to 9:00 am and 3:00 pm to 5:30 pm.

E4.4 Measurement and Payment

Traffic Control

- (a) No separate measurement or payment shall be made for this Work. This Item of Work shall be included in the "Concrete Repairs" Contract Unit Price as per Specification E6, Clause E6.6.2, which price shall be paid in full for supply of all materials and performing all operations herein described and all other items incidental to the Work.

E5. CONCRETE REMOVALS

E5.1 Description

- (a) This Specification shall cover all operations relating to the removal and disposal of concrete as specified herein and as shown on the Drawings. This Specification shall cover concrete removal Works, including all necessary staging, demolition, removal, salvaging, transporting, unloading, stockpiling, dismantlement, and disposal of applicable materials.
- (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 Works as hereinafter specified.

E5.2 Scope of Work

- (a) The Work under this Specification shall include the removal and disposal of existing concrete to the limits as shown on the Drawings or as otherwise directed by the Contract Administrator.
- (b) Provision of access platforms and work platforms.
- (c) Removing concrete with appropriate equipment satisfactory to the Contract Administrator.
- (d) Providing saw cuts where necessary to limit the extent of demolition.
- (e) Repairing any over demolition and reinforcing damage to the satisfaction of the Contract Administrator.
- (f) All concrete removal materials shall revert to the Contractor for off-site disposal.

E5.3 Submittals

- (a) The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the commencement of any scheduled Work on the Site, a proposed schedule, including methods and sequence of operations.

E5.4 Materials

E5.4.1 General

- (a) All materials supplied under this Specification shall be of a type approved 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 as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

E5.5 Equipment

E5.5.1 General

- (a) All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.

E5.5.2 Demolition Access

- (a) The Contractor shall provide all necessary access/work platforms to facilitate removals and associated inspections of all Works by the Contract Administrator.
- (b) Any proposal to drill into the existing bridge structure to secure any platforms must be submitted in writing to the Contract Administrator for review and acceptance prior to proceeding with any Work.

E5.6 Construction Methods

E5.6.1 General

- (a) Concrete shall be removed to the limits shown on the Drawings. Any unsound concrete detected beyond the removal extents depicted in the Drawings shall be reported to the Contract Administrator immediately. Removals beyond the limits shown on the Drawings shall only proceed as directed by and in the presence of the Contract Administrator. The Contractor shall field verify removal limits with sounding prior to demolition.
- (b) The Contractor shall prevent movement, settlement, or damage of existing structures to remain, services, paving, trees, landscaping and adjacent grades. If the safety of the structure and/or existing structures or services appears to be endangered during structural removal operations, the Contractor shall cease operations and notify the Contract Administrator immediately.
- (c) The Contractor shall be fully responsible for ensuring the public safety in all areas, and will be held responsible for any loss or damage caused due to neglect by the Contractor or his employees.
- (d) Under no circumstances shall the Contractor close any portion of existing roadways or walkways to traffic without prior written approval of the Contract Administrator. If any existing roadway is to be closed to traffic in no case shall the Contractor commence any construction operations until such time as all the signs, barricades, and flashers have been erected to the satisfaction of the Contract Administrator.
- (e) Remove concrete and other removal items with appropriate equipment satisfactory to the Contract Administrator. Jackhammers heavier than nominal 14 kg class and chipping hammers heavier than nominal 7 kg class shall not be used. The Contractor shall take all necessary precautions to ensure that material does not fall onto any roadways or sidewalks or pathways during removal operations.
- (f) In no case will the Contractor be permitted to use removal equipment, or other equipment or methods which may cause damage to any remaining structural elements or to any new construction. In the event that any element is damaged, the Contractor shall repair such element at his own expense to the satisfaction of the Contract Administrator.
- (g) The Contractor shall only use methods of concrete removal that will not damage the existing structure to remain or new structures.
- (h) Provide sawcuts where necessary to limit the extent of demolition.
- (i) Repair any over demolition and reinforcing steel damage to the satisfaction of the Contract Administrator.

E5.6.2 Details of Existing Structure

- (j) The applicable details and structure dimensions of the existing structures are shown on the Drawings for information only in establishing the methods and limits of Work.

- (k) The accuracy of this information is not guaranteed and the Contractor must verify all information before commencing Work.

E5.6.3 Waste Handling and Disposal of Removed Materials

- (l) Wherever practical, the Contractor shall recycle disposed materials.
- (m) The Contractor shall promptly haul all removed materials indicated for disposal, off and away from the site. No storage of any materials on-site will be allowed without written approval from the Contract Administrator. It shall be the Contractor's responsibility to find suitable disposal areas away from the site.

E5.7 Quality Control

E5.7.1 Inspection

- (a) All workmanship and all materials furnished and supplied under this Specification are subject to 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 specified Work.
- (b) 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.

E5.7.2 Access

- (a) The Contractor shall allow the Contract Administrator free access to all parts of the Work at all times. The Contractor shall supply samples to the Contract Administrator or his inspector for testing purposes as required. There will be no charge to the City for samples taken.

E5.8 Measurement and Payment

E5.8.1 Concrete Removals

- (a) No separate measurement or payment shall be made for this Work. This Item of Work shall be included in the "Concrete Repairs" Contract Unit Price as per Specification E6, Clause E6.6.2, which price shall be paid in full for supply of all materials and performing all operations herein described and all other items incidental to the Work.

E6. CONCRETE REPAIRS

E6.1 Description

- E6.1.1 The Work covered under this item shall include all operations relating to the construction of concrete repairs, as herein specified and shown on the Drawings. The specific locations and extents of repairs will be marked out by the Contract Administrator. Additional locations may be required as directed by the Contract Administrator.
- E6.1.2 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 things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E6.2 Scope of Work

- (a) Construction of concrete repairs as shown on the Drawings, including the following Work:
 - (i) Work Platforms
 - (ii) Traffic Control
 - (iii) Concrete Removals
 - (iv) Concrete Repairs

(v) Overhead Sign Structure Capping

- (b) Quality Control and Quality Assurance testing, including retention of a third-party testing company, acceptable to the Contract Administrator, retained and paid for by the Contractor. Quality Control testing shall be undertaken by the Contractor.

E6.3 Materials

E6.3.1 General

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

E6.3.2 Handling and Storage of Materials

- (a) All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with CSA Standard CAN/CSA-A23.1.

E6.3.3 Testing and Approval

- (a) All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by a 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) 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 own expense.

E6.3.4 Bonding Agents

(a) Latex Bonding Agent

- (i) Latex bonding agent shall be SikaCem 810, or equal as approved by the Contract Administrator.

(b) Bonding Grout

- (i) Grout for bonding new concrete to existing concrete, if used, may consist of the following constituents by weight:
- 1 part water;
 - 1 part latex bonding agent; and
 - 1 ½ parts Type GUSF Portland Cement
- (ii) 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.

E6.3.5 Curing Compound

- (a) If permitted for use, curing compound shall be liquid membrane-forming and conform to the requirements of ASTM Standard C309 and the proposed standard ASTM P198. Rate of application shall be 1.5 times the rate required to meet the requirements of ASTM P198 for the texture of concrete to which the curing compound is being applied.
- (b) Curing compounds shall be resin-based and white-pigmented.

E6.3.6 Patching Mortar for Minor Surface Defects

- (a) The use of patching mortar shall be limited to patching minor new surface defects as directed by the Contract Administrator. Patching Mortar is not to be used for general concrete repairs.
- (b) The patching mortar shall be made of the same cementitious 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 1 part

cement to 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 and placing.

E6.3.7 Formwork

- (a) Formwork materials shall conform to CSA Standard CAN/CSA-A23.1, and American Concrete Publication SP:4, "Formwork for Concrete".
- (b) No "stay-in-place" formwork or falsework is permitted.
- (c) 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-M1978, a minimum of 20 mm thick.
- (d) Where form liner is not being used, form sheeting shall be Douglas Fir, overlay form liner type conforming to CSA Standard O121-M1978. Approved manufacturers are "Evans" and "C-Z".
- (e) Boards used for formwork shall be fully seasoned and free from defects such as knots, warps, cracks, etc., which may mark the concrete surface.
- (f) 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 galvanized steel; and they shall not stain, blemish, or spall the concrete surface for the life of the concrete.
- (g) Forms for exposed concrete surfaces that do not require a form liner may be either new plywood or steel as authorized by the Contract Administrator.
- (h) Studding shall be spruce or pine and shall have such dimensions and spacing that they shall withstand distortion from all the forces to which the forms will be subjected. Minimum dimensions shall be 50 mm x 150 mm.
- (i) Walers shall be spruce or pine, with minimum dimensions of 100 mm x 150 mm.
- (j) All forms are incidental to these Works and must be removed by the Contractor once adequate strength and curing of the concrete has been achieved.

E6.3.8 Stainless Steel Welded Wire Mesh

- (a) All stainless steel welded wire mesh shall conform to the requirements of AISI 304. If, in the opinion of the Contract Administrator, any mesh provided for the concrete works exhibits flaws in manufacture or fabrication, such material shall be immediately removed from the Site and replaced with acceptable mesh.

E6.3.9 Adhesive Anchors

- (a) Anchors shall be of a type approved by the Contract Administrator. They shall be made from stainless steel and shall not stain, blemish, or spall the concreted surface for the life of the concrete.
- (b) Anchor accessories shall include wire ties, wire (18 gauge minimum), or other similar devices that may be approved by the Contract Administrator.
- (c) Adhesive shall be epoxy two-part injectable, acceptable product is Hilti RE500, or as accepted by the Contract Administrator.

E6.3.10 Patching Grout

- (a) Concrete repair material shall be compatible with the concrete substrate and the Contractor's method of placement. The Contractor shall use MasterEmaco S440MC low shrink high early strength concrete grout or equivalent, subject to the approval of the Contract Administrator.
- (b) Repair mortars must also meet the following special requirement to ensure compatible behaviour with the corrosion control system:
 - 28-day moist cured electrical resistivity less than 50,000 ohm-cm

- (c) The workability of the repair mortar shall be consistent with the Contractor's placement operations.
- (d) Any proposed proprietary repair mortar shall be subject to the approval of the Contract Administrator.

E6.3.11 Miscellaneous Materials

- (a) The Contractor shall supply all materials, as approved by the Contract Administrator, to ensure the satisfactory completion of the concrete works.

E6.4 Equipment

E6.4.1 General

- (a) All equipment shall be of a type accepted by the Contract Administrator. The equipment shall be in good working order, kept free from hardened concrete or foreign materials, and shall be cleaned at frequent intervals.
- (b) The Contractor shall have sufficient standby equipment available on short notice at all times.

E6.4.2 Miscellaneous Equipment

- (a) The Contractor shall provide all miscellaneous equipment as required to properly and thoroughly execute and complete all operations related to the supply and placement of concrete.

E6.5 Construction Methods

E6.5.1 General

- (a) The Contractor shall form and use pressure grout application methods for all types of concrete repairs as shown on the Drawings. Other methods shall be subject to the approval of the Contract Administrator.

E6.5.2 Preparation for Concreting Against Hardened Concrete

- (a) All hardened concrete against which new concrete is to be placed shall be prepared in the following manner:
 - (i) Following the completion of concrete removals, all surfaces at the cold joint interface including concrete and exposed reinforcing steel are to be sandblasted to the requirements of SSPC-SP6/NACE No. 3 Commercial Blast Cleaning to reveal a clean substrate and kept clean until concrete placement. Sandblasting shall be followed by a high pressure water wash to remove all residues.

E6.5.3 Formwork and Shoring

- (a) Formwork shall be designed, erected, braced, and maintained to safely support all vertical and lateral loads until such loads can be supported by the concrete.
- (b) As a maximum, the following spacings shall apply, for studding and whaling:
 - (i) 20 mm plywood: studding – 450 mm centre to centre
 - (ii) Walers – 760 mm centre to centre
- (c) Forms shall be clean before use. Plywood and other wood surfaces shall be sealed against adsorption of moisture from the concrete by a field-applied form coating or a factory-applied liner.
- (d) Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be a commercially manufactured type. The portion remaining within the concrete shall leave no metal within 50 mm of the surface when the concrete is exposed to view. Spreader cones on ties shall not exceed 25 mm in diameter.
- (e) All exposed edges shall be chamfered 25 mm unless otherwise noted on the Drawings.

- (f) Slots, recesses, chases, sleeves, inserts, bolts, hangers, and other items shall be formed or set in coordination and cooperation with the trade concerned. No openings shall be made in structural members that are not shown on the structural drawings without the prior approval of the Contract Administrator.
- (g) Shores shall be provided with positive means of adjustment (jacks or wedges). All settlement shall be taken up before or during concreting as required.
- (h) Mud sills of suitable size shall be provided beneath shores, bedded in sand or stone, where they would otherwise bear on soil. The soil below shores must be adequately prepared to avoid settlements during or after concreting. Shores must not be placed on frozen ground.
- (i) Brace shores horizontally in two directions and diagonally in the same two vertical planes so that they can safely withstand all dead and moving loads to which they will be subjected.
- (j) The loads and lateral pressures outlined in Part 3, Section 102 of "Recommended Practice for Concrete Formwork" (ACI 347) and wind loads as specified by the National Building Code shall be used for design. Additional design considerations concerning factors of safety for formwork elements and allowable settlements outlined in Section 103 of the above reference shall apply.
- (k) Formwork shall have sufficient strengths and rigidity so that the resultant finished concrete conforms to the shapes, lines and dimensions of the members shown on the Drawings.
- (l) Formwork shall be constructed to permit easy dismantling and stripping and such that removal will not damage the concrete. Provision shall be made in the formwork for shores to remain undisturbed during stripping where required.
- (m) Forms shall be constructed and maintained so that the completed Work is within minus 3 mm or plus 6 mm of the dimensions shown on the Drawings.
- (n) Formwork shall be cambered, where necessary to maintain the specified tolerances, to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete and due to construction loads.
- (o) Forms shall be sufficiently tight to prevent leakage of grout or cement paste.
- (p) Form panels shall be constructed so that the contact edges are kept flush and aligned.
- (q) All form lumber, studding, etc. becomes the property of the Contractor when the Work is finished, and it shall be removed from the concrete and the Site by the Contractor after the concrete is set, free of extra charge, and the entire Site left in a neat and clean condition.

E6.5.4 Bonding New Concrete to Existing Concrete

- (a) The Contractor is responsible to create a bond between the new mortar/grout and the existing substrates. This may be done by either the application of a suitable bonding agent or grout or by using a self-bonding mortar or concrete. The Contract Administrator will check all repaired areas for bond using a hammer "sounding" method after form removal. Place mortar or concrete by trowelling, pumping, or into forms ensuring that all entrapped air is removed.
- (b) Should a bonding grout be used, it shall be applied immediately before concrete placement. It shall be thoroughly brushed onto the existing hardened concrete surface in a thin and even coating that will not puddle.

E6.5.5 General Curing

- (a) The use of curing compound will not be allowed on concrete areas that are to receive additional concrete or waterproofing.
- (b) Unformed concrete surfaces shall be covered and kept moist by means of wet polyester blankets for seven (7) consecutive days immediately following finishing

operations or otherwise approved by the Contract Administrator and shall be maintained at above 10°C for at least seven (7) consecutive days thereafter. Construction joints shall only be covered and kept saturated by means of wet polyester curing blankets for the curing period.

- (c) If permitted for use, curing compounds shall be applied at the rate of not less than 4 m²/L. The compound must be applied uniformly and by roller. Spraying of the compound will not be permitted.
- (d) 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 hours after the end of the curing period.
- (e) Changes in temperature of the concrete shall be uniform and gradual and shall not exceed 3° in any one hour period or 20° in any twenty-four hour period.
- (f) Formed surfaces shall receive, immediately after stripping and patching, the same application of curing compound as finished surfaces.
- (g) After completing the finishing of unformed surfaces, where curing compound is not permitted, the surfaces shall be promptly covered with a minimum of a single layer of clean, damp polyester curing blanket and 6 mil polyethylene.
- (h) 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.

E6.5.6 Form Removal

- (a) All forms shall remain in place for a minimum of seven (7) days. The Contract Administrator must be notified at least 24 hours prior to any form removal. The Contractor must receive approval from the Contract Administrator prior to beginning Work.
- (b) Field-cured test specimens, representative of the in-place concrete being stripped, may be tested to verify the concrete strength

E6.5.7 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 fifty (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 hour before final finishing to permit 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.

E6.5.8 Cold Weather Concreting

- (a) The requirements of CSA Standard A23.1-19 shall be applied to all concreting operations during cold weather.
- (b) Protection of concrete shall be considered incidental to its placement. Concrete damaged as a result of inadequate protection against weather conditions shall be removed and replaced by the Contractor at their own expense. Also, concrete allowed to freeze prior to completion for the curing period will not be accepted for payment.

E6.5.9 Clean Up

- (a) The Contractor shall maintain the Sites of Work in a tidy condition and free from the accumulation of waste and debris to the satisfaction of the Contract Administrator.

E6.6 Measurement and Payment

E6.6.1 Overhead Sign Structure Capping

- (a) Overhead Sign Structure Capping will not be measured and paid for at the Contract Lump Sum Price for "Overhead Sign Structure Capping". Which price shall be payment in full for supplying all materials and for performing all operations have in described and all other items incidental to the work in accordance with this Specification and accepted by the Contract Administrator.

E6.6.2 Concrete Repairs

- (a) Concrete repairs will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Concrete Repairs", which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the Work, included in this Specification and accepted by the Contract Administrator.

E7. SURFACE PREPARATION AND METALLIZING OF STRUCTURAL STEEL

E7.1 Description

E7.1.1 General

- (a) This Specification shall cover surface preparation and metallizing of existing structural steel pier nose armour plates, corner protection plates, and pier nosings, at the Norwood and Main Street Bridges.
- (b) The quality control testing of all materials.
- (c) 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.

E7.2 REFERENCES

E7.2.1 Reference Standards

- (a) Perform work in accordance with the requirements of the latest issue of the following specifications and standards:
 - (i) American Society of Testing Material
 - ASTM D 4285, Standard Test Method for Indicating Oil or Water in Compressed Air;

- ASTM B833, Standard Specifications for Zinc Wire for Thermal Spraying (Metallizing);
 - ASTM D4541, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers;
 - ASTM D4417, Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel.
- (ii) Society of Protective Coatings;
- SSPC-AB 1, Mineral and Slag Abrasives;
 - SSPC-AB 2, Specification for Cleanliness of Recycled Ferrous Metallic Abrasives;
 - SSPC-AB 3, Newly Manufactured or Re-Manufactured Steel Abrasives;
 - SSPC-PA 2, Measurement of Dry Coating Thickness with Magnetic Gages;
 - SSPC-QP 1, Standard Procedure for Evaluating Painting Shop Contractors (Field Application to Complex Structures);
 - SSPC-QP 2, Standard Procedure for Evaluating the Qualifications of Painting Shop Contractors to Remove Hazardous Paint;
 - SSPC-SP 1, Solvent Cleaning;
 - SSPC-SP 5/NACE No. 1, White Metal Blast Cleaning;
 - SSPC-SP 11, Power Tool Cleaning to Bare Metal;
 - SSPC-SP 12/NACE No. 5, Surface Preparation and Cleaning of Metals by Water Jetting Prior to Recoating;
 - SSPC-SP 16, Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals;
 - SSPC-PA 17, Procedure for Determining Conformance to Steel Profile/Surface Roughness/Peak Count Requirements;
 - SSPC-VIS 1, Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning;
 - SSPC-VIS 5, Guide and Reference Photographs for Steel Prepared by Wet Abrasive Blast Cleaning;
 - SSPC-Guide 15, Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Surfaces;
 - SSPC-CS 23.00/AWS C2.23M/NACE No. 12, Specification for the Application of Thermal Spray Coatings (Metallizing) of Aluminum, Zinc, and Their Alloys and Composites for the Corrosion Protection of Steel;
 - SSPC-PA 18, Specification for Application of Thermal Spray Coatings to Steel Bridges.
- (iii) American National Standards Institute/American Welding Society;
- ANSI/AWS C2.25/C2.25M, Specification for Thermal Spray Feedstock- Wire and Rods;
 - AWS C2.16/C2.16M, Guide for Thermal-Spray Operator Qualification;
 - S8.2-2017 Specification for Application of Thermal Spray Coating Systems to Steel Bridges.
- (b) Metallizing wire and coating manufacturer's application instructions, MSDS and product data sheets.

E7.3 Submittals

- (a) At least twenty-one (21) Calendar Days prior to the scheduled commencement of any surface preparation and coating operations, the Contractor shall submit to the Contract Administrator, the proposed schedule, methods and sequence of operations for review.
- (b) Drawings sealed by a Professional Engineer registered in the Province of Manitoba shall be submitted detailing the Contractor's proposed scaffolding, platforms, and swingstages to be employed. All scaffolding, platforms, and swingstages shall be designed, constructed, erected and operated in accordance with Workplace Safety and Health Division requirements. No Works shall commence without prior written approval of the Contract Administrator.
- (c) The Contract Administrator will provide written notification to the Contractor when submittals are complete and acceptable. No surface preparation work shall begin until that notification is received.
- (d) This acceptance shall not be construed to imply approval of any particular method or sequence for conducting the work, or for addressing health and safety concerns. Acceptance does not relieve the Contractor from the responsibility to conduct the work according to the requirements of Federal, Provincial, or Local regulations and this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the Work.
- (e) The Contractor remains solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

E7.4 Materials

E7.4.1 General

- (a) The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification. All materials supplied under this Specification shall be subject to inspection and acceptance by the Contract Administrator. There shall be no charge to the City for any material taken by the Contract Administrator for testing purposes.
- (b) Materials called for under these Specifications and on the Drawings shall, unless otherwise specified, satisfy the testing procedures and be in strict accordance with the requirements set out in the latest edition of the standards identified.

E7.4.2 Metallizing Wire

- (a) All thermal spray feedstock (metallizing wire) shall be the products of a single manufacturer, meet the requirements below, and meet the thermal spray equipment manufacturer's specifications:
 - (i) The metallizing wire shall consist of 85/15 Zinc/ Aluminum complying with ASTM B-833 and ANSI/AWS C2.25/C2.25M.
 - (ii) The Contractor shall provide a certificate of chemical composition of the proposed metallizing wire from the metallizing wire manufacturer.

E7.4.3 Coating Material Supply Requirements

- (a) All metallizing material shall be delivered in the original unopened spools with manufacturer's labels intact. Any material that has been damaged or otherwise deteriorated shall not be used. The Contractor shall provide, if and when requested by the Contract Administrator, a listing, updated weekly, of the weight and number of spools and the type of metallizing material (as identified by a mill test report and corresponding heat number for each spool) received from the metallizing manufacturer on this project.
- (b) All material shall be stored under cover in a secured place as approved by the Contract Administrator and shall be kept within storage temperature limitations recommended by the manufacturer.

E7.4.4 Abrasive for Blast Cleaning

- (a) The blast-cleaning abrasive shall be free of corrosion-producing contaminants. Acceptable angular shaped abrasives include, but are not limited to, aluminum oxide, steel grit, and crushed slag. Silica sand shall not be used. Steel shot and other abrasives producing a rounded surface profile are not acceptable, even if mixed with angular grit abrasives. The blast-cleaning abrasive and grit size employed shall be capable of achieving an average profile peak-to-valley height of at least 3.5 mils and not exceeding 4.5 mils.

Abrasive suppliers shall provide written certification that expendable abrasives and recyclable steel grit abrasives meet the requirements of SSPC-AB 1 and AB 3, respectively. Abrasive suppliers shall certify that abrasives are not oil contaminated and shall have a water extract pH value within the range of 6 to 8.

E7.4.5 Incidental and Miscellaneous Materials

- (a) Incidental and miscellaneous materials utilized in undertaking the surface preparation and coating Works shall be supplied strictly in accordance with the manufacturer's guidelines, as approved in advance by the Contract Administrator, and in accordance with these Specifications.

- (b) This will include solvent mixtures associated with solvent cleaning operations, and any other incidental materials used in conjunction with the Works of this Specification.

The use of all such materials shall be reviewed with the Contract Administrator to ensure conformance with the Specification, prior to the use of same in the Works. The Contract Administrator's decision in these matters shall be final.

E7.4.6 Surface Preparation and Metallizing Equipment

- (a) All equipment shall be of a type approved by the Contract Administrator and capable of preparing the existing structural steelwork surfaces in accordance with these Specifications.

- (b) The coating application equipment shall be designed such that the coating will be applied uniformly to all surfaces in the locations required as shown on the Drawings and approved by the Contract Administrator and shall be kept in good working order.

- (c) The Contractor shall provide surface preparation, and metallizing equipment as needed to perform the work as specified herein.

- (d) Metallizing application equipment shall be portable electric arc thermal spray units that are set-up, adjusted and operated in accordance with the manufacturer's written instructions.

- (e) All cleaning equipment shall include gages capable of accurately measuring fluid and air pressures and shall have valves capable of regulating the flow of air, water or paint as recommended by the equipment manufacturer. The equipment shall be maintained in proper working order.

- (f) Diesel or gasoline powered equipment shall be positioned or vented in a manner to prevent deposition of combustion contaminants on any part of the structure.

- (g) Hand tools, power tools, pressure washing, water jetting, abrasive blast cleaning equipment, brushes, rollers, and spray equipment shall be of suitable size and capacity to perform the work required by this specification. Appropriate filters, traps and dryers shall be provided for the compressed air used for abrasive blast cleaning and conventional spray application.

E7.5 Construction Methods

E7.5.1 General

- (a) The surface preparation and metallizing shall be according to the SSPC Specification for the Application of Thermal Spray Coatings (Metallizing) of Aluminum, Zinc and their Alloys and Composites for the Corrosion Protection of Steel, SSPC-CS 23.00/AWS C2.23M/NACE No. 12 except as modified herein. In the event of a conflict, the requirements of this specification shall prevail.

- (b) The Contractor shall notify the Contract Administrator twenty-four (24) hours in advance of beginning surface preparation operations.

E7.5.2 Access

- (a) Access methods for workers and equipment to access all areas of the structure must be submitted by the Contractor and approved by the Contract Administrator at least ten (10) working days prior to the proposed commencement of construction.

E7.5.3 Test Areas (Sections)

- (a) Prior to proceeding with production work on the project, the Contractor shall prepare test sections of at least 10 square feet (0.93 sq. m). More than one test section may be needed to represent the various design configurations of the structure. The test section(s) shall be blast cleaned and metallized in accordance with the requirements specified herein using the same equipment, materials and procedures that will be used for the production.
- (b) During the blast cleaning, and metallizing of the test section(s), in the presence of the Contract Administrator, the Contractor shall perform all quality control tests and inspections required by this specification including complete documentation.

In addition, the Contractor shall allow sufficient time for the Contract Administrator to perform any or all quality assurance tests and inspections desired.
- (c) Production work shall not proceed until the Contract Administrator agrees that the blast cleaning, and metallizing work, along with the quality control testing, inspection, and documentation are acceptable.
- (d) No additional compensation will be paid for the preparation of the test section(s).

E7.5.4 Protective Coverings and Damage

- (a) Prior to undertaking any Works, the Contractor shall take all necessary precautions to prevent blast-cleaning overspray and overspray/splatter/drift of the coating, all in accordance with E8 Environmental Containment Collection and Disposal for Metallizing. All splatter, overspray, and spills shall be promptly removed by the Contractor at his own expense to the satisfaction of the Contract Administrator.
- (b) The Contractor must provide adequate protection against sandblast or coating damage to the substructure, bearings, vehicles, water crafts, private property, and the public in the vicinity of the bridge. The Contractor will be held solely liable for any damages or claims resulting from the blast cleaning and coating operations.

E7.5.5 Ambient Conditions

- (a) Surfaces prepared for metallizing shall be free of moisture and other contaminants. The Contractor shall control operations to insure that dust, dirt, or moisture do not come in contact with surfaces on which work will take place.
- (b) Under no circumstances shall the metallizing be applied until the surface preparation has been inspected and approved by the Contract Administrator immediately prior to commencement of metallizing application operations.
- (c) The manufacturers' published literature shall be followed for specific temperature, dew point, and humidity restrictions during the application of each paint coat.
- (d) Metallizing shall not be applied in rain, wind, snow, fog or mist. Ambient conditions shall be maintained during the drying period specified by the manufacturer.

E7.5.6 Compressed Air Cleanliness

- (a) Prior to using compressed air for abrasive blast cleaning, blowing down surfaces, and metallizing application, the Contractor shall verify that the compressed air is free of moisture and oil contamination according to the requirements of ASTM D 4285.

- (b) The tests shall be conducted at least one (1) time per shift for each compressor system in operation. If air contamination is evident, the Contractor shall change filters, clean traps, add moisture separators or filters, or make other adjustments as necessary to achieve clean, dry air.
- (c) The Contractor shall also examine the work performed since the last acceptable test for evidence of defects or contamination caused by the contaminated compressed air. Contaminated work shall be repaired at no additional cost to the City.

E7.5.7 Solvent Cleaning

- (a) All traces of oil, grease, and other detrimental contaminants on the steel surfaces to be metallized shall be removed by solvent cleaning in accordance with SSPC-SP 1.
The brand name of proposed cleaning solvent(s) and/or proprietary chemical cleaners including manufacturers' product data sheet and MSDS shall be submitted for the Contract Administrator's acceptance prior to use.
- (b) Under no circumstances shall blast cleaning be performed in areas containing surface contaminants or in areas where the Contract Administrator has not accepted the solvent cleaning. Rejected surfaces shall be re-cleaned to the specified requirements at no additional cost to the City.

E7.5.8 Abrasives

- (a) Abrasive blast cleaning shall be performed using either expendable abrasives or recyclable steel grit abrasives. Expendable abrasives shall be used one (1) time and discarded. The abrasive shall be angular in shape.
- (b) On a daily basis, the Contractor shall verify that recycled abrasives are free of oil and contamination by performing a vial test in accordance with SSPC-AB 2.
- (c) All surfaces that are found to have been prepared using abrasives not meeting the SSPC-AB 1, AB 2, or AB 3 requirements, as applicable, are oil contaminated, or have a pH outside the specified range, shall be solvent cleaned or low pressure water cleaned, and re-blast cleaned at no cost to the City.

E7.5.9 Surface Preparation

- (a) Before any blast cleaning operations or any coating applications commence, the following surface cleaning operations shall be undertaken on all structural steel members designated to receive a coating system.
 - (i) All organic materials such as bird droppings, and any other non-structural obstructions or pollutants attached to the steel are to be removed by hand cleaning operations.
 - (ii) All oil and grease shall be removed manually as per E7.5.7;
 - (iii) Remove all existing copper metallizing coating by grinding, chipping prying, abrasive blasting, or other means as approved by the Contract Administrator where the copper metallizing is intact is a minimum thickness of 120 mils.
- (b) The following method of surface preparation shall be used:
 - (i) Near-White Metal Blast Cleaning: All steel surfaces to be metallized shall be near white metal blast cleaned in accordance with SSPC-SP 10 using dry abrasive blast cleaning methods.
 - (ii) Base Metal Irregularities: If hackles, burrs, or slivers in the base metal are visible on the steel surface after cleaning, the Contractor shall remove them by grinding followed by re-blast cleaning.

E7.5.10 Surface Profile

- (a) Blast cleaning abrasives shall be of the size and grade that will produce a uniform angular surface profile depth of 3.5 to 4.5 mils (89 to 114 microns).

- (b) If the metallizing wire manufacturer's profile requirements are more restrictive, the Contractor shall advise the Contract Administrator and comply with those requirements. For recycled abrasives, an appropriate operating mix shall be maintained in order to control the profile within these limits.
- (c) The average surface profile shall be determined each work day with a minimum frequency of one (1) location per every 200 sq ft (18.6 sq m) per piece of equipment. All surfaces, shall be tested in accordance with SSPC-PA 17.
- (d) Surface profile replica tape or electronic profilometer shall be used. The tape shall be retained and included with the daily QC report. Single measurements less than 3.5 mils (89 microns) are unacceptable. In that event, additional testing shall be done to determine the limits of the deficient area and, if it is not isolated, work will be suspended.
- (e) The Contractor shall submit a plan for making the necessary adjustments to insure that the specified surface profile is achieved on all surfaces. Work shall not resume until the Contract Administrator provides written acceptance.
- (f) Any areas shielded or hidden from the effects of sandblasting shall be cleaned manually or by other means to the satisfaction of the Contract Administrator.
- (g) The blasting shall be performed so as not to damage or contaminate any previously coated areas.

E7.5.11 Clean-up Operations

- (a) Following all blast cleaning operations and prior to the Contract Administrator's inspection, all surfaces involved shall be blown off with compressed air or cleaned by vacuum for the purpose of removing any and all traces of blast products from the surface, and for the removal of abrasive from all pockets and corners.
- (b) Following surface preparation clean-up operations, the Contractor shall immediately notify the Contract Administrator so that an inspection can be made prior to the application of coating.
- (c) The coating shall be applied as soon as possible after the surface preparation clean-up operation as approved by the Contract Administrator.

E7.5.12 Surface Condition Prior to Metallizing

- (a) The Contractor shall provide the Contract Administrator with a minimum of four (4) hours' notice prior to coating, to allow for testing and inspection of prepared surfaces.
- (b) Prepared surfaces shall meet the requirements of SSPC-SP 10 immediately prior to metallizing, and shall be metallized within six (6) hours of blast cleaning. If rust appears or bare steel has been exposed for more than six (6) hours, the affected area shall be re-blasted at no additional cost to the City.
- (c) All dust and surface preparation residue on steel surfaces shall be removed prior to metallizing.
- (d) The quality of surface preparation and cleaning of surface dust and debris shall be accepted by the Contract Administrator prior to metallizing. No coating shall be applied to any prepared surface until written acceptance of complete surface preparation of an area has been given by the Contract Administrator.
- (e) The Contract Administrator has the right to reject any work that was performed without adequate provision for quality assurance observations to accept the degree of cleaning. Rejected metallizing work shall be removed and replaced at no additional cost to the City.

E7.5.13 Daily Metallizing Operator-Equipment Qualification - Bend Tests

- (a) Unless directed otherwise by the Contract Administrator, each day that metallizing will be applied, the Contractor shall perform bend testing prior to beginning production work.

For each metallizing applicator, five (5) carbon steel coupons 50 mm x 200 mm x 1.3 mm thick shall be blast cleaned using the same equipment and abrasive used for the production work. Each applicator shall apply the metallizing to five (5) coupons in accordance with the requirements of this Specification to a dry film thickness of 8.0 to 12.0 mils (200 to 300 µm).

- (b) 180 degree bend testing shall be performed on all five (5) coupons using a 13 mm mandrel in accordance with the requirements and acceptance criteria of SSPC-CS 23/AWS C2.23M/NACE 12. Minor cracks that cannot be lifted from the substrate with knife blade are acceptable. If lifting occurs on any coupon, the surface preparation and/or metallizing process shall be modified until acceptable results are achieved before proceeding with production work.

E7.5.14 Application of Metallizing

- (a) Application shall be done in overlapping passes in a cross-hatch pattern (i.e., a second set of overlapping passes shall be applied at right angles to the first set of overlapping passes) to ensure uniform coverage.
- (b) The gun shall be held at such a distance from the work surfaces that the metal is still molten on impact. The metallizing shall be applied as a continuous film of uniform thickness, firmly adherent, and free from thin spots, misses, lumps or blisters, and have a fine sprayed texture. Thin spots and misses shall be re-metallized.
- (c) If touch up metallizing or the application of additional metallizing to previously applied metallizing does not occur within twenty-four (24) hours, the surface of the metallizing shall be brush off blast cleaned according to SSPC-SP7 to remove oxidation and surface contaminates prior to the application of additional metallizing.
- (d) The final appearance of the metallizing when left shall be uniform without excessive blotchiness or contrast in color. If the surface does not have a uniform appearance, the Contractor will remove and replace the metallizing at no cost to the City.
- (e) If the configuration of the surface being metallized does not allow for a proper gun-to-work piece standoff distance, the Contractor shall notify the Contract Administrator.
- (f) The existing metal shall not be heated to a temperature exceeding three hundred and fifty degrees Celsius (350°C).
- (g) All metallized surfaces should be smoothed down to a polished surface by grinding and polishing to remove all peaks and particle splatter the finish surface shall be smooth and even.

E7.5.15 Metallizing Thickness

- (a) The thickness of the metallizing shall be a minimum 12.0 mils (200-300 microns). Thickness shall be measured as specified by SSPC-PA 2 (use a Type 2 Electronic Gauge only).

E7.5.16 Metallizing Adhesion

- (a) Adhesion testing of metallizing applied each day shall be determined with a self-adjusting adhesion tester in accordance with ASTM D 4541.
- (b) Unless otherwise directed by the Contract Administrator, a minimum of one (1) test shall be conducted for every 500 square feet (46 square metres) of metallized surface.
- (c) The tests shall be conducted prior to application of any coating. If any of the tests exhibit less than 700 psi (4.83 MPa) for 85/15 or less than 500 psi (3.45 MPa) for zinc, additional tests shall be conducted to determine the extent of the deficient material.
- (d) All deficient metallizing shall be removed by blast cleaning and re-applied at no additional cost to the City
- (e) At the discretion of the Contract Administrator, a representative blast cleaned test panel (or steel companion panel approximately 12 inch x 12 inch x 1/4 inch thick) can be metallized at the same time each 500 square feet (46 square metres) of surface

area, or portion thereof, is metallized. Adhesion testing can be performed on the companion panel rather than on the structure

- (f) If the adhesion tests on the panels are acceptable, the metallizing on the structure is considered acceptable and testing on the structure is not required. If adhesion testing of the panels fails, testing shall be conducted on the structure.
- (g) If adhesion testing on the structure is acceptable, the metallizing on the structure is considered to be acceptable.
- (h) If tests on the structure are unacceptable, complete removal of the failing metallizing and re-metallizing in accordance with this Specification shall be performed at no additional cost to the City.

E7.5.17

Quality Control

- (a) The Contractor performing the shop work shall perform first line, in process QC inspections. The Contractor shall implement the accepted QC Program to insure that the work complies with these specifications.
- (b) The designated Quality Control inspector shall be onsite full time during any operations that affect the quality of the system (e.g., surface preparation, metallizing application, paint application, and final inspection at project completion).
- (c) The Contractor shall use the Contractor Daily (QC) Metallizing & Painting Report form to record the results of quality control tests and inspections. The completed reports shall be given to the Contract Administrator before work resumes the following day.
- (d) QC inspections shall include, but are not limited to the following:
 - (i) Ambient conditions;
 - (ii) Surface preparation (solvent cleaning, abrasive blast cleanliness, surface profile depth, etc.);
 - (iii) Metallizing application (specified materials used, bend test, continuity and coverage, adhesion, dry film thickness);
 - (iv) Verification that the MISTIC test ID number for the paint system has been issued when painting is specified;
- (e) The personnel managing the QC Program shall possess a minimum classification as a NACE CIP Level 2, or shall provide evidence of successful inspection of three (3) projects of similar or greater complexity and scope completed in the last two (2) years. References shall include the name, address, and telephone number of a contact person employed by the facility owner.
- (f) The personnel performing the QC tests shall be trained in all tests, inspections, and instrument use required for the inspection of surface preparation, metallizing and paint application. Documentation of training shall be provided. The QC personnel shall be solely dedicated to quality control activities and shall not perform any production work. QC personnel shall take the lead in all inspections, but applicators shall perform wet film thickness measurements during application of the coatings, with QC personnel conducting random spot checks. The Contractor shall not replace the QC personnel assigned to the project without advance notice to the Contract Administrator, and acceptance of the replacement(s), by the Contract Administrator.
- (g) The Contractor performing the work shall supply all necessary equipment to perform the QC tests and inspections as specified. Equipment shall include the following at a minimum.
 - (i) Psychrometer or comparable equipment for measurement of dew point and relative humidity, including weather bureau tables or psychrometric charts;
 - (ii) Surface temperature thermometer;
 - (iii) SSPC Visual Standard VIS 1;
 - (iv) Surface profile replica tape and spring micrometer or electronic micrometer designed for use with replica tape; or electronic profilometer designed for measuring blast profile;

- (v) Blotter paper for compressed air cleanliness checks;
 - (vi) Type 2 Electronic Dry Film Thickness Gage;
 - (vii) Calibration standards for dry film thickness gage;
 - (viii) Bend test coupons and bend test mandrel;
 - (ix) Adhesion testing instrument;
 - (x) Companion panels for adhesion testing (if that option is selected);
 - (xi) All applicable ASTM, ANSI, AWS, and SSPC Standards used for the work (reference list included).
- (h) The instruments shall be verified for accuracy and adjusted by the Contractor's personnel in accordance with the equipment manufacturer's recommendations and the Contractor's QC Program. All inspection equipment shall be made available to the Contract Administrator for quality assurance observations as needed.

E7.5.18 Quality Assurance

- (a) The Contract Administrator will conduct quality assurance observations of any or all phases of the work. The presence or activity of the Contract Administrator observations in no way relieves the Contractor of the responsibility to perform all necessary daily QC inspections of their own and to comply with all requirements of this Specification.
- (b) The Contract Administrator has the right to reject any work that was performed without adequate provision for quality assurance observations.

E7.5.19 Measurement and Payments

- (a) Surface preparation and metallizing of structural steel, will be measured on area basis and paid for at the Contract Unit Price per square meter for "Surface Preparation and Metallizing of Structural Steel". The payment will be considered full payment for supplying all materials and for performing all operations herein described and all other items incidental to the Work, included in this specification and accepted by the contract administrator.

E8. ENVIRONMENTAL CONTAINMENT COLLECTION AND DISPOSAL FOR METALLIZING

E8.1 Description

- E8.1.1 This Specification shall cover environmental protection and capture systems during surface preparation and metallizing of structural steel components in the field, including the necessary enclosure system(s) as specified herein.
- E8.1.2 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 things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E8.2 Scope of Work

- (a) The Work under this Specification shall include the following items, or as otherwise directed by the Contract Administrator:
 - (i) It is intended that this Specification cover the following Works associated with environmental protection:
 - (ii) Containment, collection and disposal of spent sandblasting abrasive and new metallizing overspray (hazardous waste unless proven otherwise by the Contractor). Should the Contractor want to have this waste stream reclassified as non-hazardous waste, the Contractor shall provide additional testing to prove that at their own cost and submit test results to the Contract Administrator for acceptance. Until these test results are found acceptable to

the Contract Administrator this waste stream shall be treated as hazardous waste.

- (iii) Containment, collection and disposal of debris generated by concrete demolition Works as well as reinforcing steel and concrete surface preparation Works (non-hazardous waste unless contaminated with spent sandblasting abrasive and new metallizing overspray).

E8.3 Submittals

The Contractor shall submit the following to the Contract Administrator, in accordance with the Specification:

- E8.3.1 At least fourteen (14) working days prior to scheduled commencement of any surface preparation and metallizing operations, the Contractor shall submit to the Contract Administrator for review the proposed environmental protection measures to be taken during surface preparation and metallizing of structural steel in the field. The detailed submission shall include a description of the environmental protection measures to be undertaken so as to ensure complete containment, collection and disposal of spent blasting abrasives, removed coating, all other debris products from surface preparation as well as new metallizing over spray. The detailed submission shall also include a detailed description of the proposed methods and procedures, sequence of operations, equipment, detailed drawings of the proposed enclosure system and all other applicable details relating to environmental protection measures during surface preparation and metallizing.
- E8.3.2 Design drawings sealed by a Professional Engineer registered in the Province of Manitoba shall be submitted detailing the Contractor's proposed containment hoarding system. The details will not be accepted if not sealed by the Professional Engineer. The submission of such details to the Contract Administrator shall in no way relieve the Contractor of full responsibility for the safety and structural integrity of the containment hoarding system. The containment hoarding shall be designed, constructed, erected and operated in accordance with Workplace Safety and Health requirements. No Work shall commence before the Contract Administrator has completed the review and advised the Contractor. As part of his responsibilities, the design Engineer whose seal is on the documents will be required to inspect the containment hoarding on site to ensure conformity with the design. The design Engineer will certify this conformity in writing and submit this certification to the Contract Administrator.

E8.4 Materials

(a) General

- a) The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification. All materials supplied under this Specification shall be subject to inspection and approval by the Contract Administrator.

E8.5 Construction Methods

E8.5.1 General

- (a) In general the Contractor shall ensure that the debris from concrete demolition Works, surface preparation of structural steel, reinforcing steel and concrete surfaces and the overspray from metallizing application will not result in harmful effects or nuisance to river, land, buildings, vehicles, pedestrian and water craft in the vicinity of the Contract area.
- (b) The Contractor shall conduct his operations in accordance with all current Federal, Provincial or other regulations with respect to environmental protection and pollution control. It shall be the Contractor's responsibility to be familiar with all applicable environmental regulations, to obtain all necessary approvals and permits for his operations and to ensure that all applicable environmental requirements are met and adhered to.

E8.5.2 Allowable Construction Loads

- (a) The loading from all equipment, platforms, materials, work persons, etc. shall be restricted so that the total forces from these loadings on to the river ice are less than or equal to the allowable forces.

E8.6 Containment, Collection and Disposal

(a) Spent Sandblasting Abrasive and metallizing Overspray (Hazardous Waste)

- (i) The Contractor is advised of the general concern regarding contamination of land areas and waterways by old paint, blasting abrasives and new metallizing materials. The Contractor shall ensure that such contamination does not take place.
- (ii) The Contractor shall provide for containment of the pier steel areas during all surface preparation and metallizing application operations. The containment shall be achieved by hoarding (tarps, scaffolding, etc.) so that the structure is enclosed in order to prevent spent blasting abrasives, cleaned-off paint residue and new metallizing material overspray from migrating to outside the enclosure.
- (iii) The Contractor shall ensure that the amount of blasting medium to remove old paint and the amount of overspray from the application of new metallizing material is kept to the absolute minimum by conscientious efforts of his workforce and by efficient use of equipment.
- (iv) The Contractor shall collect all spent blasting abrasives, cleaned-off paint residue and new metallizing material overspray from the Work area. All such materials shall be disposed of offsite by the Contractor in accordance with the appropriate regulations to the satisfaction of the appropriate environmental authority and the Contract Administrator.
- (v) The Contractor is advised that the waste that will be generated will be classified as hazardous waste as determined by MR 282/87 respecting Classification Criteria for Products, Substances and Organisms Regulation under the Dangerous Goods Handling and Transportation Act. The Contractor in accordance with Manitoba Regulation 175/87 shall apply for and submit an initial Generator Registration Report to the Director of Environmental Approvals to obtain a Provincial Registration Number prior to beginning the rehabilitation Works. The Contractor shall employ a licensed Hazardous Waste Carrier to remove, transfer and dispose this hazardous waste at a facility licensed to receive hazardous waste in accordance with the requirements under the City's Provincial Registration Number 1001-195 including all costs for transportation, storage, and disposal of this hazardous waste.

(b) Non-Hazardous Waste

- (i) The Contractor is advised of the general concern regarding contamination of land areas and waterways by the debris generated from concrete and wood removal Works. The Contractor shall ensure that such contamination does not take place.
- (ii) The Contractor shall take necessary precautions to ensure that bridge materials do not fall onto the ground or into the water areas below during concrete and wood removal Works. The Contractor shall provide, erect and maintain platforms, hoarding and other structures as required to catch and retain all concrete and wood waste materials.
- (iii) Any debris that falls off the bridge shall be immediately cleaned up by the Contractor at his own expense.
- (iv) All waste material generated from the concrete and wood removal Works shall become the property of the Contractor. The Contractor shall promptly remove all debris generated by these Works off and away from the site. It shall be the Contractor's responsibility to find suitable disposal areas away from the site.

E8.7 Quality Control

- (a) All workmanship and all materials furnished and supplied under this Specification are subject to 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 approval that may have been previously given.
- (b) The Contract Administrator reserves the right to reject materials or Works which are not in accordance with the requirements of this Specification.

E8.8 Measurement and Payment

- (a) No separate measurement or payment shall be made for this Work. This item or work shall be included in the "Surface Preparation and Metalizing of Structural Steel" Contract price. The payment will be considered full payment for supplying all materials and for performing all operations herein described and all other items incidental to the Work.
- (b) The Contractor shall provide and pay for monitoring within the enclosure to suit the requirements at Workplace Health and Safety. Any waste stream that is not contained, collected and disposed of shall be cleaned up immediately by the Contractor at their own cost.

E9. DISCRETE GALVANIC PROTECTION SYSTEM

E9.1 Description

- (a) The Work under this section consists of designing, supplying, installing and energizing a zinc-based galvanic corrosion control system consisting primarily of embedded zinc anodes, including required electrical connections, materials, testing and ensuring continuity of the reinforcing steel to all elements as outlined in the Drawings.
- (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 Works as hereinafter specified.

E9.1.1 References

- (c) ACI/ICRI 1999 Concrete Repair Manual
- (d) ACI Guideline No. 222 – Corrosion of Metals in Concrete
- (e) ACI 562-13 Code Requirements for Evaluation, Repair and Rehabilitation of Concrete Buildings
- (f) ACI Repair Application Procedure (RAP) Bulletin 8 – Installation of Embedded Galvanic Anodes (2010)
- (g) ICRI Guideline 310.1R-2008 Guide for Surface Preparation for the Repair of Deteriorated Concrete resulting from Reinforcing Steel Corrosion
- (h) ASTM B418-12 – Standard Specification for Cast and Wrought Galvanic Zinc Anodes

E9.2 Submittals

- (a) Shop drawings showing typical galvanic corrosion control system installation details, such as distributed anode installation locations, type and location of anode standoff spacers, reinforcing connections shall be prepared by the Contractor and submitted for approval prior to any field installations. The shop drawings shall clearly illustrate the layout of the anodes, in both elevation and section views.

E9.3 Materials

E9.3.1 Embedded Galvanic Anodes

- (b) Discrete galvanic units shall be alkali-activated zinc meant to be embedded into concrete repairs and for corrosion prevention only. Nominal dimensions shall be 125 mm x 25 mm x 25 mm or as approved. The anodes shall be pre-manufactured with a nominal 60 grams of zinc in compliance with ASTM B418 Type II cast around a pair of uncoated, non-galvanized steel tie wires and encased in a highly alkaline cementitious shell with a pH of 14 or greater.
- (c) The galvanic anodes shall be alkali-activated and shall contain no intentionally added chloride, bromide or other constituents that are corrosive to reinforcing steel as per ACT 562-13. Anode units shall be supplied with integral unspliced wires for directly tying to the reinforcing steel. Embedded galvanic anodes shall be Galvashield® XPT available from Vector Corrosion Technologies (www.vector-corrosion.com) USA (813) 830-7566, Canada (204) 489-9611 or approved equal.
- (d) Application for approved equals shall be requested in writing two weeks before submission of project bids. Application for galvanic anode approved equals shall include verification of the following information:
 - (i) The zinc anode is alkali-activated with an alkaline cementitious shell with a pH of 14 or greater.
 - (ii) The galvanic anode shall contain no intentionally added constituents corrosive to reinforcing steel, e.g. chloride, bromide, etc.
 - (iii) The anode manufacturer shall provide documented test results from field installations showing that the anodes have achieved a minimum of 10 years in service.
 - (iv) The galvanic anode shall have been used in a minimum of ten projects of similar size and application.
 - (v) The galvanic anode units shall be supplied with solid zinc core (ASTM B418) cast around uncoated, non-galvanized, non-spliced steel tie wires for wrapping around the reinforcing steel and twisting to provide a durable steel to steel connection between the tie wire and the reinforcing steel.
 - (vi) The anode manufacturer shall provide third party product evaluation, such as from Concrete Innovations Appraisal Service, BBA, etc.

E9.3.2 Repair Materials

- (a) Repair mortars, concrete, and bonding agents shall be portland cement-based materials with suitable electrical resistivity less than 50,000 ohm-cm. Non-conductive repair materials such as epoxy, urethane, or magnesium phosphate shall not be permitted. Repair materials with significant polymer modification and/or silica fume content may have high resistivity. Insulating materials such as epoxy bonding agents shall not be used unless otherwise called for in the design.

E9.3.3 Storage

- (a) Deliver, store, and handle all materials in accordance with manufacturer's instructions. Anode units shall be stored in dry conditions in the original unopened containers in a manner to avoid exposure to extremes of temperature and humidity.

E9.4 Construction Methods

E9.4.1 General

- (a) The galvanic corrosion protection shall consist of the anodes as indicated on the Drawings. The anode units are connected to the reinforcing steel and encased in a concrete with a minimum of 50 mm of clear concrete cover over the anode units.

E9.4.2 Manufacturer Corrosion Technician

- (a) The Contractor will enlist and pay for a technical representative employed by the galvanic anode manufacturer to provide training and on-site technical assistance during the initial installation of the galvanic anodes. The technical representative shall

be a NACE-qualified corrosion technician (Cathodic Protection Technician—CP2 or higher).

- (b) The qualified corrosion technician shall have verifiable experience in the installation and testing of embedded galvanic protection systems for reinforced concrete structures.
- (c) The contractor shall coordinate its work with the designated corrosion technician to allow for site support during project startup and initial anode installation. The corrosion technician shall provide contractor training and support for development of application procedures, verification of electrical continuity, and project documentation.

E9.4.3 Cleaning and Repair of Reinforcing Steel

- (a) Clean exposed reinforcing steel of rust, mortar, epoxy coating, etc. to provide sufficient electrical connection and mechanical bond.
- (b) If significant reduction in the cross section of the reinforcing steel has occurred, replace or install supplemental reinforcement as directed by the Contract Administrator.
- (c) Secure loose reinforcing steel by tying tightly to other bars with steel tie wire.
- (d) Verify electrical continuity of all reinforcing steel, including supplemental steel, as per Section E9.4.4(f).

E9.4.4 Galvanic Anode Installation

- (a) Install anode units and repair material immediately following preparation and cleaning of the steel reinforcement.
- (b) Anode spacing shall be such to provide full protection for the entire patch perimeter. Anode spacing is dependent on the reinforcing steel density. Maximum anode spacing shall be as per the manufacturer's guidelines to provide a 20 year service life.
- (c) Place the galvanic anodes as close as possible to the patch edge while still providing sufficient clearance between anodes and substrate to allow the repair material to fully encase the anode with a minimum concrete or mortar cover over the anode of 50mm. If necessary, increase the size of the repair cavity to accommodate the anodes.
 - (i) Place the anode such that the preformed BarFit™ groove fits along a single bar or at the intersection between two bars and secure to each clean bar.
 - (ii) If less than 25 mm of concrete cover is expected, place anode beneath the bar and secure to clean reinforcing steel.
- (d) The tie wires shall be wrapped around the cleaned reinforcing steel at least one full turn in opposite directions and then twisted tight to create a secure electrical connection and allow no anode movement during concrete placement.
- (e) Repair materials with resistivity greater than 50,000 ohm-cm are not to be used.
- (f) Electrical Continuity
 - (i) Confirm electrical connection between anode tie wire and reinforcing steel by measuring DC resistance (ohm Ω) or DC potential (mV) with a multi-meter.
 - (ii) Electrical connection is acceptable if the DC resistance measured with the multi-meter is 1 Ω or less or the DC potential is 1 mV or less.
 - (iii) Confirm electrical continuity of the exposed reinforcing steel within the repair area. If necessary, electrical continuity shall be established by tying discontinuous steel to continuous steel using steel tie wire.
 - (iv) Electrical continuity between test areas is acceptable if the DC resistance measured with multi-meter is 1 Ω or less or the potential is 1 mV or less.

E9.4.5 Concrete or Mortar Replacement

- (a) If the repair procedures require the concrete surface to be saturated with water, do not damage the anode nor allow the anode units to be soaked for greater than 20 minutes.

- (b) Complete the repair with the repair material, taking care not to damage, loosen or leave voids around the anode

E9.5 Measurement and Payment

E9.5.1 Discrete Galvanic Anode System

- (a) The supply and installation of Discrete Galvanic Protection System as shown on the Drawings will be measured on a Unit Basis. This work shall be paid for at the Contract Unit Price Per Unit for "Discrete Galvanic Anode System" which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator

E10. BENCH REFURBISHMENT

E10.1 Description

- (a) This Specification shall cover all operations related to the refurbishment of benches as shown or described on the Drawings and in this Specification.
- (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 other things necessary for and incidental to the satisfactory completion of all Work as hereinafter specified.

E10.2 Scope of Work

E10.2.1 The Work under this Specification shall specifically include the following items as shown on the Drawings or as otherwise directed by the Contract Administrator:

- (a) Removal of existing benches;
- (b) All materials not identified for salvage and reuse shall be disposed of at an approved disposal facility by the Contractor;
- (c) Supply and fabricate new HSS section and new connection plates;
- (d) Hot dip galvanize all salvaged and new steel members after fabrication;
- (e) Clean and sand salvaged wooden slats all around to remove all surface defects; and
- (f) Assemble and install refurbished benches.

E10.3 References

E10.3.1 References and Related Specifications

- (a) All related Specifications shall be current issued or latest revision at the first date of tender advertisement.
- (b) CAN/CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel
- (c) CAN/CSA W48, Filler Metals and Allied Materials for Metal Arc Welding
- (d) CSA W59, Welded Steel Construction (Metal Arc Welding)
- (e) CAN/CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles
- (f) CSA W47.1, Certification of Companies for Fusion Welding of Steel
- (g) ASTM A36, Standard Specification for Carbon Structural Steel
- (h) ASTM A53, Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless
- (i) ASTM A108, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
- (j) ASTM A123, Standard Specification for Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products

- (k) ASTM F3125, High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength
- (l) ASTM A449, Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use

E10.4 Submittals

E10.4.1 The Contractor shall submit the following to the Contract Administrator:

- (a) For each bench a complete set of Shop Drawings prior to commencement of fabrication. The Contractor shall indicate on the Shop Drawings all the necessary material specifications for the materials to be used and identify the components in accordance with the Drawings and Specifications;
- (b) Shop Drawings shall be drawn based on field verification of all dimensions and components for each bench in the Metric system; and
- (c) In no case will the Contractor be relieved of responsibility for errors or omissions in the Shop Drawings.

E10.5 Materials

E10.5.1 General

- (a) The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification. All materials supplied under this Specification shall be subject to inspection and acceptance by the Contract Administrator.
- (b) The Contractor shall mark all materials to identify its existing position for reuse and installation. This shall be done by suitable marking or by a recognized colour coding.

E10.5.2 Structural Steel

- (a) Steel for new HSS section and connection plates shall be in accordance with latest edition of CAN/CSA G40.21, Grade 300W.
- (b) All steel shall be hot-dip galvanized in accordance with ASTM A123 and CSA G164 to a minimum net retention of 610 g/m², after fabrication.

E10.5.3 Zinc

- (a) Zinc for hot dipped, galvanized coatings shall conform to the requirements of ASTM A123.

E10.5.4 Hardware

- (a) Bolts, nuts, screws, anchors, and washers, are all hot-dip galvanized.

E10.5.5 Drop-In Anchors

- (a) Anchors connecting the bench rails/cross bars and the HSS section to the limestone blocks shall be HDI Drop-In Anchors by Hi/ii, or equal as accepted by the Contract Administrator, in accordance with B6, "Substitutes".

E10.5.6 Miscellaneous Materials

- (a) Miscellaneous materials shall be of the type specified on the Drawings or as accepted by the Contract Administrator, in accordance with B6, "Substitutes".

E10.6 Construction Methods

E10.6.1 General

- (a) The Contractor shall review the sample bench recently refurbished by the City. The sample bench is the most southerly bench on the Norwood Bridge northbound. The Contractor shall provide workmanship meeting the standard of quality established by the sample refurbished bench.

E10.6.2 Remove Existing Benches

- (a) Cut and remove limestone anchor rods.
- (b) Fill limestone anchor rod holes with epoxy.
- (c) Cut welds on bench members, and salvage all plate bars straps and crossbars.
- (d) Remove and dispose of connection plates and HSS section.
- (e) Unscrew and salvage wood slats from steel members.

E10.6.3 Refurbish Benches

- (a) Supply and fabricate new HSS section and new connection plates. Welding shall conform to the requirements of CSA W59 Welded Steel Construction.
- (b) Hot dip galvanize all salvaged and new steel members after fabrication. Galvanizing shall be done in accordance with ASTM A123. All metal surfaces to be galvanized shall be cleaned thoroughly of rust, rust scale, mill scale, dirt, paint and other foreign material to SSPC – SP 6 (sand, grit or shop blasting or pickling) prior to galvanizing. Heavy deposits of oil and grease shall be removed with solvents prior to blasting or pickling to SSPC – SP 1.
- (c) Clean and sand salvaged wooden slats all around to remove all surface defects. Prior to sanding the entire area of the wooden slats shall be washed clean by using a 1,500 psi high pressure water washing to remove all dirt. All surfaces of the wooden slats shall be sanded with a minimum of three cuts using coarse, medium and fine sandpapers. Final sanding shall be performed with a screen and disk sander. The final sanding shall provide a smooth and even surface, similar to the sample bench.

E10.6.4 Assemble and Install Refurbished Benches

- (a) Drill holes for limestone anchors.
- (b) Connect all steel to wooden slats using new galvanized screws.
- (c) Install new HSS section and connection plates.
- (d) Connect refurbished bench to limestone and HSS section with galvanized bolts and Drop-In threads anchors.
- (e) Install neoprene pad shims between connection plate and limestone surface, as required for tight horizontal fit.

E10.7 Quality Control

- (a) The Contractor shall be responsible for making a thorough inspection of materials to be supplied under this Work.

E10.8 Quality Assurance

- (a) All materials will be subject to physical inspection by the Contract Administrator and will be subject to rejection during the course of the Work and for the length of time as specified in the General Conditions, if, in the opinion of the Contract Administrator, the materials involved do not meet the requirements of the Drawings and this Specification.
- (b) All materials shall be subject to testing by the Contract Administrator and will be approved only if the requirements of the Drawings, standards and this Specification are met. The Contractor shall supply the specimens for testing in accordance with the requests of the Contract Administrator at no additional cost to the City.
- (c) The Contractor shall furnish facilities for the inspection of material and workmanship in the shop and field, and the Contract Administrator shall be allowed free access to the necessary parts of the Works.

E10.9 Measurement and Payment

- (a) Bench Refurbishment will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Bench Refurbishment", which price shall be payment in full for performing all operations herein described and all other items incidental to the Work

included in this Specification and accepted and measured by the Contract Administrator.