



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 805-2016

BRANCH I AQUEDUCT – EAST TUNNEL SHAFT UPGRADES

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 BRANCH I AQUEDUCT – EAST TUNNEL SHAFT UPGRADES

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, November 4, 2016.

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

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

B3. SITE INVESTIGATION

B3.1 Further to C3.1, the Contract Administrator or an authorized representative will be available at the Site from 9:00 AM to 10:00 AM on October 27, 2016 to provide Bidders access to the Site.

B3.2 The Bidder is advised that the valve chamber is a Confined Entry location. Persons wishing to enter the chamber will be required to supply all necessary personal protective safety equipment, including a fall restraint harness, hard hat, safety boots, gas detector, and lighting. The City of Winnipeg will provide a retrieval hoist. Personnel intending on entering the chamber shall provide evidence to the Contract Administrator of confined space entry training in accordance with Manitoba legislation and their individual company policy.

B3.3 The Bidder shall not be entitled to rely on any information or interpretation received at the Site investigation unless that information or interpretation is the Bidder's direct observation, or is provided by the Contract Administrator in writing.

B3.4 Proponents will not be allowed to take pictures at any of the site investigations. The Proponent may request pictures of specific areas from the Contract Administrator identified in D4. The pictures will then be issued to all the Proponents registered for the site investigations.

B3.5 Although attendance at the Site Investigations is not mandatory, the City strongly suggests that Proponents attend.

B3.6 Proponents are required to register for the Site Investigations at least 48 hrs. prior by contacting the Contract Administrator identified in D4.

B3.7 Bidders registered for the site visit must provide the Contract Administrator identified in D4 with a Public Safety Verification search obtained not earlier than one (1) year prior to the site visit.

(a) The Public Safety Verification Check may be obtained from BackCheck. Proponents will need to setup a BackCheck account prior to requesting individual background checks. This process should be done 72 hours prior to requesting the first check. The account can be setup using the following link: <https://forms.sterlingbackcheck.com/partners/platform2-en.php?partner=winnipegcity>. Note that the check will take between up to 48 hours to complete. See PART F - Security Clearance for further information.

(b) The results of the public Safety Verification Check must be received by the City directly through BackCheck. Proponents must set up an account with BackCheck under their company name and grant BackCheck permission to share the results of the Public Safety Verification Check with the City of Winnipeg.

B4. ENQUIRIES

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

- B4.2 If the Bidder finds errors, discrepancies or omissions in the Bid Opportunity, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.
- B4.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator to all Bidders by issuing an addendum.
- B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator only to the Bidder who made the enquiry.
- B4.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B4 unless that response or interpretation is provided by the Contract Administrator in writing.

B5. CONFIDENTIALITY

- B5.1 Information provided to a Bidder by the City or acquired by a Bidder by way of further enquiries or through investigation is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator. The use and disclosure of the confidential information shall not apply to information which:
- (a) was known to the Bidder before receipt hereof; or
 - (b) becomes publicly known other than through the Bidder; or
 - (c) is disclosed pursuant to the requirements of a governmental authority or judicial order.
- B5.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Bid Opportunity to the media or any member of the public without the prior written authorization of the Contract Administrator.

B6. ADDENDA

- B6.1 The Contract Administrator may, at any time prior to the Submission Deadline, issue addenda correcting errors, discrepancies or omissions in the Bid Opportunity, or clarifying the meaning or intent of any provision therein.
- B6.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.
- B6.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/bidopp.asp>
- B6.2.2 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B6.3 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.

B7. SUBSTITUTES

- B7.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.
- B7.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

- B7.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.
- B7.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;
 - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
 - (c) identify any anticipated cost or time savings that may be associated with the substitute;
 - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;
 - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.
- B7.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his/her sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B7.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, to the Bidder who requested approval of the substitute.
- B7.6.1 The Contract Administrator will issue an Addendum, disclosing the approved materials, equipment, methods and products to all potential Bidders. The Bidder requesting and obtaining the approval of a substitute shall be responsible for disseminating information regarding the approval to any person or persons he/she wishes to inform.
- B7.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B7.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/her Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B17.
- B7.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B8. BID COMPONENTS

- B8.1 The Bid shall consist of the following components:
- (a) Form A: Bid;
 - (b) Form B: Prices;
 - (c) Bid Security
 - (i) Form G1: Bid Bond and Agreement to Bond, or
Form G2: Irrevocable Standby Letter of Credit and Undertaking, or
a certified cheque or draft;

- B8.2 Further to B8.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B7.
- B8.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.
- B8.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.
- B8.4.1 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 Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid.
- B8.5 Bidders are advised not to include any information/literature except as requested in accordance with B8.1.
- B8.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B17.1(a).
- B8.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B8.8 Bids shall be submitted to:
The City of Winnipeg
Corporate Finance Department
Materials Management Division
185 King Street, Main Floor
Winnipeg MB R3B 1J1

B9. BID

- B9.1 The Bidder shall complete Form A: Bid, making all required entries.
- B9.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, his/her name shall be inserted;
 - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
 - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
 - (d) if the Bidder is carrying on business under a name other than his/her own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.
- B9.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B9.2.
- B9.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.
- B9.4 Paragraph 12 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, should 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.

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

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

B10. PRICES

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

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

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

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

B11. DISCLOSURE

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

B11.2 The Persons are:

- (a) N/A

B12. QUALIFICATION

B12.1 The Bidder shall:

- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba; and
- (b) be financially capable of carrying out the terms of the Contract; and
- (c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.

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

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

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

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

- (b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and
- (c) have a written workplace safety and health program if required pursuant to The Workplace Safety and Health Act (Manitoba);
- (d) Obtain the Security Clearances in accordance with PART F - Security Clearance;

B12.4 Further to B12.3(a) the Bidder and/or any proposed Subcontractor undertaking the chamber piping upgrades (valve replacement) must be able to demonstrate the following qualifications in accordance with B12.6 (Form L: Contractor Experience). Senior project site personnel (foremen, superintendents, or similar) which can demonstrate the following qualifications will be considered when evaluating the qualifications of the Bidder or Subcontractor:

- (a) A minimum of one (1) successful installation of a 1200 mm or larger butterfly valve.
- (b) A minimum of three (3) successful installations of 900 mm or larger butterfly valves.
- (c) A minimum of three (3) successful valve chamber construction projects involving piping larger than 600 mm in diameter.

B12.5 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) a copy of their valid Manitoba COR certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Certificate of Recognition (COR) Program administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or
- (b) a copy of their valid Manitoba SECOR™ certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Small Employer Certificate of Recognition Program (SECOR™) administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or
- (c) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>).

B12.6 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.

B12.7 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) 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); or
- (b) an irrevocable standby letter of credit, in the amount of at least ten percent (10%) of the Total Bid Price, and undertaking issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form included in the Bid Submission (Form G2: Irrevocable Standby Letter of Credit and Undertaking); or

- (c) a certified cheque or draft payable to “The City of Winnipeg”, in the amount of at least fifty percent (50%) of the Total Bid Price, drawn on a bank or other financial institution registered to conduct business in Manitoba.

- 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 performance security furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.
- B13.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B13.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.
- B13.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.
- 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 Bid Opportunity.

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.
- B14.2 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/default.stm>
- B14.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/default.stm>
- B14.4 The Bidder is advised that any information contained in any Bid may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

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 performance security 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 12 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 12 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 Bid Opportunity, or acceptable deviation there from (pass/fail);
 - (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B12 (pass/fail);
 - (c) Total Bid Price;
 - (d) economic analysis of any approved alternative pursuant to B7.
- 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 responsible and qualified.
- B17.4 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.
- B17.4.1 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 responsible and 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 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B17.
- B18.3.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his/her Bid upon written request to the Contract Administrator.
- B18.3.2 If no Contract is awarded, then the City of Winnipeg will pay the requested Bidder up to a maximum of five hundred dollars (\$500.00) for each of the requested submissions listed in E3 for the preparation and delivery of Shop Drawings. Delivery of the Shop Drawings to the City and payment of the above amounts will constitute full and final consideration of each party to the other and neither party will have any further liability to the other with respect to this Bid Opportunity.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

- C0.1 The *General Conditions for Construction* (Revision 2006 12 15) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm
- C0.2 A reference in the Bid Opportunity to a section, clause or subclause with the prefix “**C**” designates a section, clause or subclause in the *General Conditions for Construction*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of replacing existing gate valves on the Branch I Aqueduct at the East Tunnel Shaft and completing structural modifications to the existing valve chamber.

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

- (a) Excavation.
- (b) Removal of existing chamber roof.
- (c) Removal of valve chamber components including existing gate valves and air release valves.
- (d) Installation of City supplied 1,200 and 1,050 mm butterfly valves and associated components.
- (e) Installation of new air release valve.
- (f) Modification of existing valve chamber piping to suit new valves.
- (g) Preparation and painting of existing piping within the valve chamber.
- (h) Reconstruction of the existing sump
- (i) Installation of new drain valves
- (j) CCTV inspection of the existing drain line
- (k) Extension of the existing chamber walls and construction of a new roof slab.
- (l) Installation of new roof hatches, ladders, grating, and chamber insulation.
- (m) Backfilling and restoration.

D3. DEFINITIONS

D3.1 When used in this Bid Opportunity:

- (a) "AWWA" means American Waterworks Association,
- (b) "CSA" means Canadian standard Association,
- (c) "NSF" means National Sanitation Foundation,
- (d) "ASTM" means American Society for Testing and Materials,
- (e) "ASME" means American Society of Mechanical Engineers,
- (f) "ANSI" means American National Standards Institute,
- (g) "NACE" means National Association of Corrosion Engineers,
- (h) "NAPF" means National Association of Pipe Fabricators,
- (i) "SSPC" means Society for Protective Coatings, and
- (j) "C.M.P." means Critical Path Method.

D3.2 Notwithstanding C1.1, when used in this Bid Opportunity:

- (a) "**Business Day**" means any Calendar Day, other than a Saturday, Sunday, or a statutory or civic holiday.
- (b) "**Valve Supply Contractor**" means the Contractor supplying the butterfly valves to be installed as part of this Contract.

D4. CONTRACT ADMINISTRATOR

D4.1 The Contract Administrator is AECOM, represented by:

Adam Braun, P.Eng.
Municipal Engineer

Telephone No. 204 477-5381
Facsimile No. 204-284-2040
Email Address adam.braun@aecom.comemail address.

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

D5. CONTRACTOR'S SUPERVISOR

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

D6. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

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

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

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

- (a) information provided to the Contractor by the City or acquired by the Contractor during the course of the Work;
- (b) the Contract, all deliverables produced or developed; and
- (c) any statement of fact or opinion regarding any aspect of the Contract.

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

D7. NOTICES

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

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

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

The City of Winnipeg

Chief Financial Officer

Facsimile No.: 204 949-1174

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

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

Facsimile No.: 204 947-9155

- D7.5 Bids Submissions must not be submitted to the above facsimile numbers. Bids must be submitted in accordance with B8.**

D8. FURNISHING OF DOCUMENTS

- D8.1 Upon award of the Contract, the Contractor will be provided with five (5) complete sets of the Bid Opportunity. If the Contractor requires additional sets of the Bid Opportunity, they will be supplied to him/her at cost.

SUBMISSIONS

D9. AUTHORITY TO CARRY ON BUSINESS

- D9.1 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.

D10. SAFE WORK PLAN

- D10.1 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.
- D10.2 The Safe Work Plan should be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/Safety/default.stm>
- D10.3 Notwithstanding B12.5 at any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require an updated COR Certificate or Annual Letter of good Standing. A Contractor, who fails to provide a satisfactory COR Certificate or Annual Letter of good Standing, will not be permitted to continue to perform any Work.

D11. INSURANCE

- D11.1 The Contractor shall provide and maintain the following insurance coverage:
- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period;

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

D11.2 Deductibles shall be borne by the Contractor.

D11.3 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 C4.1 for the return of the executed Contract.

D11.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D12. PERFORMANCE SECURITY

D12.1 The Contractor shall provide and maintain performance security until the expiration of the warranty period in the form of:

- (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; or
- (b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or
- (c) a certified cheque or draft payable to "The City of Winnipeg", drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.

D12.1.1 Where the performance security is in the form of a certified cheque or draft, it will be deposited by the City. The City will not pay any interest on certified cheques or drafts furnished as performance security.

D12.2 The Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of 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.

D13. SUBCONTRACTOR LIST

D13.1 The Contractor shall provide the Contract Administrator with a complete list of the Subcontractors whom the Contractor proposes to engage (Form J: Subcontractor List) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D14. EQUIPMENT LIST

D14.1 The Contractor shall provide the Contract Administrator with a complete list of the equipment which the Contractor proposes to utilize (Form K: Equipment List) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D15. DETAILED WORK SCHEDULE

- D15.1 The Contractor shall provide the Contract Administrator with a detailed work schedule at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.
- D15.2 The detailed work schedule shall consist of the following:
- (a) a Gantt chart for the Work based on the C.P.M. schedule.
- D15.3 Further to D15.2(a) the C.P.M. schedule shall clearly identify the start and completion dates of all of the following activities/tasks making up the Work as well as showing those activities/tasks on the critical path:
- (a) Site preparation and excavation
 - (b) Removal of roof structure
 - (c) Branch I Aqueduct shutdown window
 - (d) Replacement of chamber components
 - (e) Preparation and painting of chamber piping
 - (f) Construction of walls and roof slab
 - (g) Backfill and restoration
 - (h) Substantial Performance
 - (i) Total Performance

SCHEDULE OF WORK

D16. COMMENCEMENT

- D16.1 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.
- D16.2 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 D9;
 - (ii) evidence of the workers compensation coverage specified in C6.15;
 - (iii) the Safe Work Plan specified in D10;
 - (iv) evidence of the insurance specified in D11;
 - (v) the performance security specified in D12;
 - (vi) the Subcontractor list specified in D13;
 - (vii) the equipment list specified in D14; and
 - (viii) the detailed work schedule specified in D15.
 - (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.
 - (c) The Contractor has provided Security Clearances as specified in PART F - Security Clearance.
- D16.3 The Contractor shall commence the Work no later than January 30, 2017.
- D16.4 The City intends to award this Contract by December 15, 2016.
- D16.4.1 If the actual date of award is later than the intended date, the dates specified for Commencement, Critical Stages, Substantial Performance, and Total Performance will be adjusted by the difference between the aforementioned intended and actual dates.

D17. SCHEDULE RESTRICTIONS

- D17.1 Shutdown of the Branch I Aqueduct will be scheduled based on a number of factors including routine maintenance and repair work, water demand, weather and other factors. The City shall endeavour to make the specified time periods available to the Contractor to schedule his Work requiring isolation and draining of the Branch I Aqueduct, without limiting the City's control over the operation of the regional water system to complete other work, maintain adequate system service and maintain the integrity of the infrastructure. The City shall reserve the right to cancel and/or delay these schedule dates at any time, due to any circumstances that could adversely affect water supply system operation, including but not limited to high water demand, abnormal weather, failures of related water system components and/or security concerns.
- D17.2 The Contractor shall provide notice to the Contract Administrator in writing, a minimum of fifteen (15) Business Days prior to requiring the shutdown. The City will endeavour to schedule the shutdown as requested, pursuant to D17.1.
- D17.3 Branch I Aqueduct Shutdown:
- (a) Further to D17.1, shutdown of the Branch I Aqueduct is limited to a maximum of eight (8) Calendar Days, measured from the completion of draining the Aqueduct by City forces to turn over of system back to the City of Winnipeg for refilling.
 - (b) The Branch I Aqueduct shutdown will only be permitted between September 15, 2016 and May 15, 2017.
 - (c) The Branch I Aqueduct will not be taken out of service unless all piping, valves, connectors, fittings and miscellaneous components required to complete the installation are on site, tested, and pre-fitted, to ensure that the Aqueduct can be restored to service with the timeframe noted in D17.3.
 - (d) Changes to these criteria will not be permitted without the approval of the City of Winnipeg Water and Waste Department.
 - (e) The shutdown windows listed in D17.3(a) shall be considered a Critical Stage. Shutdowns exceeding those listed in D17.3(a) shall be subject to Liquidated Damages in accordance with D22.
- D17.4 All work involving the chamber drain and Branch I Aqueduct underdrain shall be completed by March 3, 2017.

D18. WORKING DAYS

- D18.1 Further to C1.1(gg), the Contract Administrator's determination of whether or not atmospheric and Site conditions are such that a Working Day is deemed to have elapsed may be based at one time on one type of work while at another time a Working Day may be based on another type of work. When more than one type of major work is involved, the quantity of equipment that must be able to work in order to meet the requirements of a Working Day may vary considerably from that specified in the General Conditions.
- D18.2 In the event that incidental work is behind schedule which, in the opinion of the Contract Administrator, should have been or could have been carried out by the Contractor in conjunction with or immediately following work of a major type, the City hereby reserves the right to charge Working Days on the incidental work until such time as it is up to schedule.
- D18.3 When the major type of work involves restoration of the site to the condition it was prior to rainfall, Working Days shall not be charged.
- D18.4 The Contract Administrator will furnish the Contractor with a daily record for each major type of work showing various information concerning the equipment, the time it worked, could have worked and Working Days charged. This report is to be signed each day by an authorized representative of the Contractor.

D18.5 Notwithstanding C1.1(gg) if the Contractor chooses to work on a Saturday, Sunday, or statutory or civic holiday and is able to complete at least seven (7) hours of work during the period between 7:00 a.m. Winnipeg time or the time the Contractor's operations normally commence, whichever is earlier, and 7:00 p.m. Winnipeg time the day shall be considered a Working Day.

D19. CRITICAL STAGES

D19.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

- (a) Shutdown of the Branch I Aqueduct for the following work shall be completed within eight (8) Calendar Days as measured in D17.3(a).
 - (i) Replacement of the 1200 mm and 1050 mm butterfly valves;
 - (ii) Replacement of the 200 mm air release valve;
 - (iii) Painting of the existing Branch I Aqueduct piping.

D20. SUBSTANTIAL PERFORMANCE

D20.1 The Contractor shall achieve Substantial Performance within forty (40) consecutive Working Days of the commencement of the Work as specified in D16.

D20.2 When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D20.3 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.

D21. TOTAL PERFORMANCE

D21.1 The Contractor shall achieve Total Performance within seventy (70) consecutive Working Days of the commencement of the Work as specified in D16.

D21.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D21.3 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.

D22. LIQUIDATED DAMAGES

D22.1 If the Contractor fails to achieve Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Working Day for each and every Working Day following the days fixed herein for same during which such failure continues:

- (a) Substantial Performance – one thousand six hundred dollars (\$1,600);
- (b) Total Performance – five hundred dollars (\$500).

D22.2 If the Contractor fails to achieve Critical Stages in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Calendar Day

for each and every Calendar Day following the days fixed herein for same during which such failure continues:

(a) Critical Stage for shutdown of the Branch I Aqueduct - two thousand dollars (\$2,000);

D22.3 The amounts specified for liquidated damages in D22.1 and D22.2 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve critical stages, Substantial Performance or Total Performance by the days fixed herein for same.

D22.4 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

CONTROL OF WORK

D23. JOB MEETINGS

D23.1 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.

D23.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

D24. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D24.1 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).

D25. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

D25.1 Further to B12.5, 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 B12.5.

MEASUREMENT AND PAYMENT

D26. PAYMENT

D26.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D27. WARRANTY

D27.1 Notwithstanding C13.2, 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.

D27.1.1 In such case, the date specified by the Contract Administrator for the warranty period to begin shall be substituted for the date specified in C13.2 for the warranty period to begin.

FORM H1: PERFORMANCE BOND
(See D12)

KNOW ALL MEN BY THESE PRESENTS THAT

_____ ,
(hereinafter called the "Principal"), and

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

_____ dollars (\$_____)

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

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

BID OPPORTUNITY NO. 805-2016

BRANCH I AQUEDUCT – EAST TUNNEL SHAFT UPGRADES

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

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

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

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

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

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

_____ day of _____, 20____.

SIGNED AND SEALED
in the presence of:

(Witness as to Principal if no seal)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

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

**FORM H2: IRREVOCABLE STANDBY LETTER OF CREDIT
(PERFORMANCE SECURITY)**
(See D12)

(Date)

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

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 805-2016
BRANCH I AQUEDUCT – EAST TUNNEL SHAFT UPGRADES

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

(Name of Contractor)

(Address of Contractor)

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

_____ Canadian dollars.

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

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

Partial drawings are permitted.

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

(Address)

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

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

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

(Date)

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

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

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

(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

FORM K: EQUIPMENT
(See D14)

BRANCH I AQUEDUCT – EAST TUNNEL SHAFT UPGRADES

<p>1. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>2. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>3. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>

FORM K: EQUIPMENT
(See D14)

BRANCH I AQUEDUCT – EAST TUNNEL SHAFT UPGRADES

<p>4. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>5. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>6. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>

FORM L: CONTRACTOR EXPERIENCE

(See B11)

BRANCH I AQUEDUCT – EAST TUNNEL SHAFT UPGRADES

Attach additional resumes and documents as required. Indicate whether Projects/Project Personnel are for Contractor or Subcontractor, and if applicable include name of Subcontractor.

1. Project References:

Project Client/Contact: _____
(Name)

(Address)

_____ (phone) _____ (email)

<u>Year</u>	<u>Description of Project, including type of pipe</u>	<u>Value</u>
-------------	---	--------------

_____	_____	_____
_____	_____	_____
_____	_____	_____

2. Project References:

Project Client/Contact: _____
(Name)

(Address)

_____ (phone) _____ (email)

<u>Year</u>	<u>Description of Project, including type of pipe</u>	<u>Value</u>
-------------	---	--------------

_____	_____	_____
_____	_____	_____
_____	_____	_____

FORM L: CONTRACTOR EXPERIENCE

(See B11)

BRANCH I AQUEDUCT – EAST TUNNEL SHAFT UPGRADES

3. Project References:

Project Client/Contact: _____

(Name)

(Address)

(phone)

(email)

<u>Year</u>	<u>Description of Project, including type of pipe</u>	<u>Value</u>
-------------	---	--------------

_____	_____	_____
_____	_____	_____
_____	_____	_____

4. Project References:

Project Client/Contact: _____

(Name)

(Address)

(phone)

(email)

<u>Year</u>	<u>Description of Project, including type of pipe</u>	<u>Value</u>
-------------	---	--------------

_____	_____	_____
_____	_____	_____
_____	_____	_____

FORM L: CONTRACTOR EXPERIENCE

(See B11)

BRANCH I AQUEDUCT – EAST TUNNEL SHAFT UPGRADES

5. Project References:

Project Client/Contact: _____

(Name)

(Address)

(phone)

(email)

<u>Year</u>	<u>Description of Project, including type of pipe</u>	<u>Value</u>
-------------	---	--------------

_____	_____	_____
_____	_____	_____
_____	_____	_____

6. Project References:

Project Client/Contact: _____

(Name)

(Address)

(phone)

(email)

<u>Year</u>	<u>Description of Project, including type of pipe</u>	<u>Value</u>
-------------	---	--------------

_____	_____	_____
_____	_____	_____
_____	_____	_____

FORM L: CONTRACTOR EXPERIENCE

(See B11)

BRANCH I AQUEDUCT – EAST TUNNEL SHAFT UPGRADES

7. Project Personnel:

Name and Title: _____
(Name)

Qualifications: (attach resume and fill out information below)

<u>Year</u>	<u>Description of Past Project</u>	<u>For Whom Work Was Performed</u>	<u>Value</u>

8. Project Personnel:

Name and Title: _____
(Name)

Qualifications: (attach resume and fill out information below)

<u>Year</u>	<u>Description of Past Project</u>	<u>For Whom Work Was Performed</u>	<u>Value</u>

9. Project Personnel:

Name and Title: _____
(Name)

Qualifications: (attach resume and fill out information below)

<u>Year</u>	<u>Description of Past Project</u>	<u>For Whom Work Was Performed</u>	<u>Value</u>

FORM L: CONTRACTOR EXPERIENCE

(See B11)

BRANCH I AQUEDUCT – EAST TUNNEL SHAFT UPGRADES

10. Project Personnel:

Name and Title: _____
(Name)

Qualifications: (attach resume and fill out information below)

<u>Year</u>	<u>Description of Past Project</u>	<u>For Whom Work Was Performed</u>	<u>Value</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

- E1.1 These Specifications shall apply to the Work.
- E1.2 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/Spec/Default.stm> .
- E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.2.3 Further to C2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.3 The following are applicable to the Work:

<u>Appendix No.</u>	<u>Title</u>
A	Forms
B	Photos of Existing Chamber and Valves
C	Shop Drawings of City Supplied Valve
D	Record Drawings

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
1-0751A-D0001-001	Cover Sheet
1-0751A-C0001-001	Site Plan
1-0751A-C0002-001	Existing Chamber & Piping, Plans, Sections & Removals
1-0751A-C0003-001	Proposed Piping Modifications, Plans, Sections & Details
1-0751A-S0001-001	Demolition Plan & Section, Design Notes & Details
1-0751A-S0002-001	New Work, Roof & Concealed Beam, Plans and Sections
1-0751A-S0003-001	Forming & Reinforcing, Sections & Details
1-0751A-S0004-001	Removable Platform, Plan and Details

GENERAL REQUIREMENTS

E2. SITE SECURITY

- E2.1 Description
- (a) This specification covers on site security requirements during construction.
- E2.2 Site Security
- (a) A site key will be provided to the Contractor with a \$10,000 holdback applied to the first progress estimate and released upon return of the key to the City.
- (b) All personnel on site are required to obtain a Criminal Record Search Certificate and Public Safety Verification Check, as outlined in PART F - Security Clearance. The Contractor shall submit copies of the Criminal Record Search Certificates to the Contract Administrator identified in D4.
- (c) The Contractor is required to take measures necessary to secure the work areas when the work areas are vacated. The Contractor shall ensure that all openings to valve chambers are properly secured when off site. Valve chamber hatches shall be locked. Removable concrete cover openings shall be secured with timber framing or other approved temporary cover, properly secured to prevent easy removal. Where access to valve chambers is

required the City shall be permitted to include a “double lock” mechanism whereby the City can add a City of Winnipeg lock, to permit access to City personnel in off hours.

- (d) Should removal of the perimeter fence be required to facilitate construction the Contractor shall erect temporary security fencing as specified herein until the existing fencing can be restored back to its existing condition.

E2.3 Photographs

- (a) All site photographs required for construction documentation shall be approved by City of Winnipeg Water Services Division representative, as identified by the Contract Administrator.

E2.4 Materials

E2.4.1 The temporary security fencing shall meet the following requirements:

- (a) Constructed of premanufactured steel panel sections
- (b) Minimum height of 1.8 m in height
- (c) Steel rails, posts, and fencing
- (d) Non-Climbing fence
- (e) Fence sections shall be clamped or bolted together to eliminate easy disassembly
- (f) Fence sections shall be anchored to the ground and securely fastened to the existing fence at the termination points

E2.5 Measurement and Payment

- (a) The work specified in E2 shall be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

E3. SHOP DRAWINGS

E3.1 Description

- (a) This Specification shall revise, amend, and supplement the requirements of CW 1100 of the City of Winnipeg’s Standard Construction Specifications.
- (b) The term “Shop Drawings: means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, which are to be provided by the Contractor to illustrate details of a portion of the Work.

E3.2 Submit all Shop Drawings in accordance with CW 1100 except as modified herein.

E3.3 The Contractor shall submit specified Shop Drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be shown.

E3.4 Submit Shop Drawing submissions within five (5) Business Days of a request as indicated in E3 or receipt of Notice of Award in accordance with B18, whichever is earlier.

E3.5 Allow for a five (5) Business Day period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.

E3.6 Shop Drawings not meeting the requirements of CW 1100 or the requirements specified herein will be returned to the Contractor without review for resubmission.

E3.7 Shop Drawing submissions will be limited to two (2) reviews per Shop Drawing. This shall include a review of the initial submission and a review of the revised submission. Costs associated with subsequent reviews will be charged to the Contractor.

E3.8 Expedited Shop Drawings

E3.8.1 Further to CW 1100, in order to expedite Shop Drawings with critical timelines, the lowest responsive Bidder, as outlined in B17, will be required, after receiving a written request from the Contract Administrator, to arrange for the preparation of Shop Drawings for the following items with critical timelines:

- (a) 1050 and 1200 mm Restrained Dismantling Joints.
- (b) 200 mm Air Release Valve
- (c) 200 mm Butterfly Valve

E3.8.2 Schedule to submit Shop Drawing listed in E3.8.1 within five (5) Business Day of a request as indicated in E3.4 or receipt of Notice of Award in accordance with B18, whichever is earlier.

E3.9 Measurement and Payment

- (a) If Award is made to the lowest responsive Bidder, then the provision of Shop Drawings will be considered incidental to the Work and no separate payment will be made. If no contract is awarded payment for Shop Drawings prepared will be paid in accordance with B18.3.2.

E4. OPERATING CONSTRAINTS FOR WORK IN CLOSE PROXIMITY TO FEEDERMANS

E4.1 Description

E4.1.1 This Section details operating constraints for all work to be carried out in close proximity to City of Winnipeg's Branch I Aqueduct and associated yard piping at the Tache Booster Pumping Station. Close proximity shall be deemed to be any construction activity within a 5 m horizontal offset from the centreline of the feedermain, within 5 m of valve chambers and other appurtenances, and any other infrastructure identified below.

E4.2 Affected Critical Water Infrastructure:

E4.2.1 Branch I Aqueduct:

- (a) Constructed of 1200 mm cast iron pressure pipe, manufactured and installed in approximately 1917.

E4.2.2 Tache Booster Pumping Station Suction and Discharge Line:

- (a) Constructed of 1050 mm steel pressure pipe, manufactured and installed in 1949.

E4.3 General Considerations for Work in Close Proximity to Critical Water Infrastructure:

E4.3.1 The Branch I Aqueduct and Tache Booster Pumping Station are critical components of the City of Winnipeg Regional Water Supply System and work in close proximity to the pipelines identified herein shall be undertaken with an abundance of caution. The Branch I Aqueduct cannot typically be taken out of service for extended periods to facilitate construction and inadvertent damage caused to the pipe would have catastrophic consequences.

E4.3.2 Work around the Branch I Aqueduct shall be planned and implemented to minimize the time period that work is carried out in close proximity to the pipe and to ensure that the pipeline is not subjected to excessive construction related loads, including excessive vibrations and/or concentrated or asymmetrical lateral loads during backfill placement.

E4.3.3 Large diameter pressure pipe generally has limited ability to withstand increased earth and live loading. Therefore, every precaution must be undertaken to ensure that applied loading during all phases of construction is within accepted loading parameters.

E4.3.4 Construction in close proximity to critical infrastructure shall not commence until both the equipment and construction method statements have been submitted, reviewed, and accepted by the Contract Administrator.

E4.4 Submittals

- E4.4.1 Submit proposed construction equipment specifications to the Contract Administrator for review a minimum of five (5) Business Days prior to construction. The equipment submission shall include:
- (a) Equipment operating and payload weights.
 - (b) Equipment dimensions, including: wheel or track base, track length or axle spacing, track widths or wheel configurations.
 - (c) Load distributions in the intended operating configuration.
- E4.4.2 Submit a construction method statement to the Contract Administrator a minimum of ten (10) Business Days prior to construction. The construction method statement shall contain the following minimum information:
- (a) Proposed construction plan including excavation locations, haul routes, stockpiles, excavation equipment locations, and loading positions.
 - (b) Any other pertinent information required to accurately describe the construction activities in close proximity to the critical water infrastructure and permit the Contract Administrator to review the proposed construction plans.
 - (c) Plans and procedures for existing valve removals and the installation of new valves and chamber piping components.
- E4.4.3 Incomplete or partial submissions will be not be reviewed and will be returned to the Contractor for resubmission.
- E4.4.4 Allow five (5) Business Days for review by the Contract Administrator.
- #### E4.5 Pre-Work, Planning and General Execution
- E4.5.1 No work shall commence in close proximity to feeder mains, chambers, and critical infrastructure until the equipment specifications and construction method statement have been submitted and accepted, and feeder main locations have been clearly delineated in the field. Work over feeder mains shall only be carried out with equipment that has been reviewed and quantified in terms of its loading implications on the pipe.
- E4.5.2 Generally, legal traffic loads, equivalent to an AASHTO HS20 design vehicle, or other City of Winnipeg regional roadway restrictions in place at the time of the Works, will be permitted to cross piping. Larger loads may be permitted upon approval of the Contract Administrator.
- E4.5.3 Contact the City of Winnipeg WWD Department, Construction Services Coordinator, Duane Baker (204-986-4289 or DuaneBaker@winnipeg.ca) prior to construction.
- E4.5.4 Visually delineate all critical infrastructure identified herein on site by use of paint, staking/flagging, construction fencing, snow fencing, or other suitable methods
- E4.5.5 Only utilize construction practices and procedures that do not impart excessive vibratory loads on the identified pipelines.
- E4.5.6 Only equipment and construction practices stipulated in the accepted construction method statement and the supplemental requirements noted herein may be utilized in close proximity to feeder mains, chambers, and other critical infrastructure identified herein.
- E4.5.7 Construction operations should be staged in such a manner as to limit multiple construction loads at one time, (e.g. offset crossings sufficiently from each other, rollers should remain a sufficient distance behind spreaders to limit loads. A reasonable offset distance is 3m between loads).
- E4.5.8 Granular material, construction material, soil, and/or other material shall not be stockpiled on the pipelines or within 5 m of pipelines and critical water infrastructure identified herein.
- E4.5.9 The Contractor shall ensure that all crew members understand and observe the requirements of working near feeder mains, valve chambers, and critical infrastructure.

Prior to commencement of on-site work, the Contractor shall jointly conduct an orientation meeting with the Contract Administrator, all superintendents, foreman, and heavy equipment operators to make all workers on site fully cognizant of the limitations of altered loading on, the ramifications of inadvertent damage to, and the constraints associated with work in close proximity to feeder mains, valve chambers, and critical infrastructure. New personnel introduced after commencement of the project need to be formally orientated as outlined herein. It is recommended that restrictions associated with the crossing, consistent with the Contractor's submitted method statement be posted on site and near the crossing.

E4.6 Demolition, Excavation and Backfill

- E4.6.1 Use of pneumatic and hydraulic machine mounted concrete breakers within 3.0 metres (horizontal) of the Branch I Aqueduct and Tache Booster Pumping Station discharge or suction line is prohibited. Pavement and other concrete structures including the existing East Tunnel Shaft shall be saw cut and carefully removed. Use of hand held jackhammers for concrete removal is permitted.
 - E4.6.2 Offset excavation equipment a minimum of 3.0 m from the centerline of a feeder main or critical pipeline when undertaking excavations where there is less than 2.4 m of earth cover over the feeder main.
 - E4.6.3 Utilize only smooth edged excavation buckets, soft excavation or hand excavation techniques where there is less than 1.5 m of earth cover over the pipeline. Where there is less than 1.0 m of soil cover above the pipeline, provide full time supervision and complete the excavation utilizing hand excavation or soft excavation methods.
 - E4.6.4 Equipment should not be allowed to operate while positioned directly over a feeder main or critical pipeline except where permitted herein and outlined in the reviewed and accepted construction method statement.
 - E4.6.5 Compaction of backfill materials within 3.0 m (horizontally) of a feeder main or critical pipeline shall be either carried out by static methods (without vibration) or with smaller approved equipment such as hand held plate packers or smaller roller equipment.
- E4.7 Measurement and Payment
- (a) The work specified in E4 shall be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

E5. ENVIRONMENTAL PROTECTION

- E5.1 The Contractor shall be aware that the Tache Booster Pumping Station compound and piping is for potable water supply and no contamination by fuel, chemicals, etc. shall be permitted at any time. Fuels or chemicals shall not be stored within 30 metres of the surge tower, Booster Pumping Station, Branch I Aqueduct, or yard piping.
- E5.2 The Contractor shall plan and implement the Work of this Contract strictly in accordance with the requirements of the environmental protection measures as herein specified.
- E5.3 The Contractor is advised that at least the following Acts, Regulations, and By-laws apply to the Work:
 - E5.3.1 Federal
 - (a) Canadian Environmental Protection Act (CEPA) c.16
 - (b) Transportation of Dangerous Goods Act and Regulations c.34
 - E5.3.2 Provincial
 - (a) The Dangerous Goods Handling and Transportation Act D12
 - (b) The Endangered Species Act E111
 - (c) The Environment Act c.E125

- (d) The Fire Prevention Act F80
- (e) The Manitoba Nuisance Act N120
- (f) The Public Health Act c.P210
- (g) The Workplace Safety and Health Act W120
- (h) And current applicable associated regulations.

E5.4 The Contractor is advised that the following environmental protection measures apply to the Work.

E5.4.1 Fuel Handling and Storage

- (a) Fueling of stationary equipment shall be completed with portable tanks containing only enough fuel to fill equipment.

E5.4.2 Waste Handling and Disposal

- (a) The construction area shall be kept clean and orderly at all times during and at completion of construction.
- (b) At no time during construction shall personal or construction waste be permitted to accumulate for more than one day at any location on the construction site, other than at a dedicated storage area as may be approved by the Contract Administrator.
- (c) Indiscriminate dumping, littering, or abandonment shall not take place.
- (d) No on-site burning of waste is permitted.

E5.4.3 Dangerous Goods/Hazardous Waste Handling and Disposal

- (a) Dangerous goods/hazardous waste are identified by, and shall be handled according to, The Dangerous Goods Handling and Transportation Act and Regulations.
- (b) The Contractor shall be familiar with The Dangerous Goods Handling and Transportation Act and Regulations.

E5.4.4 Emergency Spill Response

- (a) The Contractor shall ensure that due care and caution is taken to prevent spills.
- (b) The Contractor shall report all major spills of petroleum products or other hazardous substances with the potential for impacting the environment and threat to human health and safety to the Contract Administrator and Manitoba Environment, immediately after occurrence of the environmental accident, by calling the 24-hour emergency telephone phone number (204) 945-4888.
- (c) The Contractor shall designate a qualified supervisor as the on-site emergency response coordinator for the project. The emergency response coordinator shall have the authority to redirect manpower in order to respond in the event of a spill.
- (d) The following actions shall be taken by the person in charge of the spilled material or the first person(s) arriving at the scene of a hazardous material accident or the on-site emergency response coordinator:
 - (i) Notify emergency-response coordinator of the accident:
 - identify exact location and time of accident
 - indicate injuries, if any
 - request assistance as required by magnitude of accident (Manitoba Environment 24-hour Spill Response Line (204) 945-4888, Police, Fire Department, Ambulance, company backup)
 - (ii) Assess situation and gather information on the status of the situation, noting:
 - personnel on site
 - cause and effect of spill
 - estimated extent of damage
 - amount and type of material involved
 - proximity to waterways and the Aqueduct

- (iii) If safe to do so, try to stop the dispersion or flow of spill material:
 - approach from upwind
 - stop or reduce leak if safe to do so
 - dike spill material with dry, inert sorbent material or dry clay soil or sand
 - prevent spill material from entering waterways and utilities by diking
 - prevent spill material from entering Aqueduct manholes and other openings by covering with rubber spill mats or diking
- (iv) Resume any effective action to contain, clean up, or stop the flow of the spilled product.
- (e) The emergency response coordinator shall ensure that all environmental accidents involving contaminants shall be documented and reported to the Manitoba Environment according to The Dangerous Goods Handling and Transportation Act Environmental Accident Report Regulation 439/87.

E5.5 Controlled Products

- (a) Materials classified as “Controlled Products” under Regulation 52/88, “Workplace Hazardous Materials Information System”, including amendments, are prohibited inside the Aqueduct, unless the material will be directly employed in the Work.
- (b) Notwithstanding the aforementioned requirement, materials have been tested by an ANSI accredited laboratory and meet the requirements of ANSI/NSF 60, “Standard for Drinking Water Treatment and Chemicals – Health Effects”, and ANSI/NSF 61, “Standard for Drinking Water System Components – Health Effects”, including the patching repair material, and epoxy resin adhesive, as specified in the Specifications, shall be permitted inside the Aqueduct.

E5.6 Measurement and Payment

- (a) The work specified in E5 shall be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

E6. EXCAVATION, SHORING, AND BACKFILL

E6.1 Description

- (a) This Specification covers the requirements for excavations and backfilling of trenches and structures.

E6.2 Submittals

- (a) Shop Drawings for all excavation shoring (where required) shall be prepared and submitted in accordance with E3 a minimum of five (5) Business Days prior to undertaking the excavation and shoring installation. Where required by Workplace Safety and Health Regulation, shoring Shop Drawings shall be sealed by a Professional Engineer, registered in the Province of Manitoba, experienced in the design of excavation shoring systems.

E6.3 Excavation and Shoring Design

- (a) Shoring shall be provided for excavations in accordance with CW 2030.
- (b) All excavations and shoring systems shall comply with Manitoba Workplace Safety and Health requirements.

E6.4 Backfill

- (a) Backfill the new structure with Class 3 backfill.
- (b) Notify the Contract Administrator at least one (1) full Working Day in advance of any backfilling operation. No backfill shall be placed against concrete until approved by the Contract Administrator and in no case before field cured test cylinders show the concrete strength to be 75% of that specified.

E6.5 Measurement and Payment

- (a) Excavation, shoring, and backfilling shall be considered incidental to the lump sum price for "Chamber Modifications" and will not be measured for payment. No separate payment will be made.

E7. DEMOLITION OF STRUCTURES

E7.1 Construction Methods

- (a) Where indicated on the Drawings, excavate and expose structures in preparation for demolition.
- (b) Carefully expose existing cables and wires and provide protection, support or relocation.
- (c) Coordinate electrical and control removals prior to commencing demolition.
- (d) Provide full depth saw cuts in concrete to isolate from structures to remain
- (e) Carefully demolish structures, taking care not damage components, piping electrical or other equipment to remain.
- (f) Dispose of all demolition materials off site.
- (g) Provide barricades around open structures and excavations

E7.2 Measurement and Payment

- (a) Demolition of existing structures shall be considered incidental to the lump sum price for "Chamber Modifications" and will not be measured for payment. No separate payment will be made.

E8. CHAMBER PIPING

E8.1 Description

- (a) This Specification covers the requirements for installation of owner supplied butterfly valves, air release valves, and other associated chamber piping components.

E8.2 Submittals

E8.2.1 Submit Shop Drawings for all fittings, valves, piping, and couplings in accordance with E3, including:

- (a) Dismantling couplings
- (b) 200 mm butterfly valve, air release valve, and spool piece
- (c) All gaskets
- (d) 300 mm gate valve and backwater valve
- (e) Valve stem extension shafts

E8.2.2 Submit Shop Drawings of all temporary support structures, beams, hoists anticipated for the valve and pipe removal and installation.

E8.3 Supply of Butterfly Valves

E8.3.1 The 1200 mm and 1050 mm butterfly valves and actuators are being supplied under a separate Bid Opportunity, City of Winnipeg Bid Opportunity No. 445-2016. The valve and actuator supplied under Bid Opportunity 445-2016 will be delivered to the City of Winnipeg Tache Booster Pumping Station at 866 Tache Avenue on November 1, 2016. The Valve Supply Contractor is:

Corix Water Products Limited
(204) 632-0331

- E8.3.2 The Contractor shall attend a delivery inspection, with the Valve Supply Contractor, and Contract Administrator. The Valve Supply Contractor, prior to turning valves over to the Installation Contractor, shall rectify any damage noted during the delivery inspection. Written acceptance of the valves and actuators by a duly completed "Certificate of Equipment Delivery (Form 200)" (Appendix A) shall constitute acceptance for installation from the Installation Contractor.
- E8.3.3 Shop Drawings for the valves have been attached in Appendix C.
- E8.3.4 The Valve Supply Contractor will complete testing of the valves prior to delivery.
- E8.3.5 The Contractor may leave the valves and actuators in storage at the City facility at 866 Tache Avenue, until required on-site for pre-assembly and installation.
- E8.3.6 Once removed from storage at the Tache Booster Pumping Station, the Contractor shall provide 24 hour secure storage for the valves.
- E8.3.7 The Contractor shall supply new bolts and gaskets for the butterfly valves.
- E8.4 Materials
- E8.4.1 Bolts
- (a) Bolts for chamber piping shall be ASTM A307 grade B. Bolt size, type and diameter shall be in accordance to AWWA C207. Bolt length suitable for coupling AWWA C207 Class D flanges and existing chamber piping flanges.
 - (b) Anti-seize compound shall be used on all bolts.
 - (c) The Contractor shall confirm all bolt diameters and lengths and have all required bolting hardware on site prior to shutdown of the Branch I Aqueduct and disassembly of the existing chamber piping.
- E8.4.2 Flange Gaskets
- (a) 3mm, full-faced, SBR rubber gaskets or neoprene in accordance with AWWA C207.
 - (b) Gaskets shall be one piece construction where possible.
 - (c) Segmented gaskets shall be constructed of a minimum number of segments and joints shall be of dovetailed construction, or other jointing methods approved by the Contract Administrator.
- E8.4.3 Restrained Dismantling Coupling:
- (a) Coupling body (rings) to be constructed from ASTM A36 steel, minimum wall thickness: 9.5 mm
 - (b) AWWA C207, Class D Flanges
 - (c) NBR gasket conforming to ASTM D 2000.
 - (d) Fusion bonded epoxy coated in accordance with AWWA C213, and meeting the requirements of ANSI/NSF 61 "Standard for Drinking Water System Components – Health Effects".
 - (e) Stainless steel, type 316 tie rods and nuts, minimum diameter: 38 mm (1.5")
 - (f) Restrained dismantling joints shall have the following minimum number of tie rods:
 - (i) 1200 mm – 6
 - (ii) 1050 mm – 4
 - (g) Approved products:
 - (i) DJ400 Series Dismantling Joint as manufactured by Romac Industries Ltd.,
 - (ii) 7900DJ Series Dismantling Joint manufactured by Robar Industries Ltd.,
 - (iii) Baker Dismantling Joint manufactured by Baker Coupling Products,
 - (iv) or approved equal in accordance with B7.

E8.4.4 Combination Air Valves

- (a) Combination air/vacuum valve shall conform to AWWA C512, and the following requirements;
 - (i) 150mm ANSI Class 125 flanged inlet
 - (ii) Dual body design
 - (iii) Suitable for 50 to 275 kPa (7-40 psi) operating pressure
 - (iv) Minimum 4.75mm orifice
 - (v) Cast Iron or Ductile Iron body, cover and Baffle
 - (vi) Stainless steel float and trim
 - (vii) Buna-N seat
 - (viii) Fusion bonded epoxy coated in accordance with AWWA C550 and AWWA C213, and meeting the requirements of ANSI/NSF 61 "Standard for Drinking Water System Components – Health Effects".
 - (ix) Valves shall be certified under NSF/ANSI 61, Drinking Water System Components—Health Effects
- (b) Approved products:
 - (i) Dual Body Clean Water Combination Air Valves manufactured by Val-Matic Valve and Manufacturing Corp,
 - (ii) APCO Dual Body Combination Air Valves (Series 1800) manufactured by Dezurik,
 - (iii) or approved equal in accordance with B7.

E8.4.5 Fabricated Steel Pipe and Fittings

- (a) Steel pipe and fittings shall conform to AWWA C200 and meet the following requirements:
 - (i) Minimum steel yield strength of 207 MPa (30,000 psi)
 - (ii) Minimum wall thickness of 9.51 mm.
- (b) Flanges shall conform to AWWA C207, Class D.
- (c) Welds shall be inspected by a certified welding inspector, using magna-flux or other methods approved by the Contract Administrator. A detailed inspection report including test data shall be submitted to the Contract Administrator within 5 Business Days of completion of testing.
- (d) All exposed steel surfaces (interior and exterior) shall be coated in accordance with E8.4.11 or E8.4.13 and E8.5.5.

E8.4.6 Small Diameter Butterfly Valves (200 mm and less)

- (a) Ductile-Iron butterfly valve conforming to AWWA C504 with the following: Class 150B, resilient seat, complete with 316 Stainless Steel disc, shaft and hardware.
- (b) Butterfly valves shall be supplied complete with a gear box and hand wheel conforming to AWWA C504 and the following:
 - (i) Quarter turn, manual geared actuators shall be of worm gear drive type designed for one person operation and for a maximum pull on the handwheel rim, at maximum torque conditions of not more than 356 Newtons (80 ft-pounds).
 - (ii) Number of actuator turns to open or close the valve shall be kept to as few as possible to avoid over torquing and damage to the actuator.
 - (iii) IP 68 submersible rating.
 - (iv) Accessible parts of the actuator requiring lubrication shall be provided with button-head alemite grease fittings.
 - (v) Adjustable, external stop-limiting devices shall be provided on the actuators to prevent over-travel of the valve disc in the open and closed position.

- (vi) Under circumstances where spur gear attachments are installed on the input side of the actuator to facilitate the maximum input operating torque of 356 Newtons (80 ft. pounds), input limit stops shall be installed on the input side of the spur gear attachment.
 - (vii) A shear pin or other torque regulating device shall be provided on the actuator or handwheel/operating nut as an extra precaution against actuators being over-torqued.
 - (viii) A mechanical, valve position indicator shall be provided and mounted on the outside of each valve actuator. The dial or scale plate shall be 316 stainless steel and shall be clearly graduated and marked. A 316 stainless steel pointer shall be aligned to show the exact position of the valve disc in the valve body. The fastener for the indicator dial shall be made of 316SS stainless steel.
 - (ix) The handwheel shall be of the rimmed type with finger grips, an arrow, the word "OPEN" cast in relief on the rim and have an easy slide fit onto the mating shaft. Direction of opening shall be counter clockwise.
- (c) ASME B16.1 Class 125 flanges
 - (d) Butterfly Valves, actuators, and hand wheels to be fusion bonded epoxy coated in accordance with AWWA C213, and meeting the requirements of ANSI/NSF 61 "Standard for Drinking Water System Components – Health Effects".

E8.4.7 Gate Valves

- (a) Gate valves shall conform to CW2110, City of Winnipeg Specification AT-4.21.1.7, AWWA C509, and shall be supplied with the following:
 - (i) Flanged joints conforming to AWWA 509.
 - (ii) Fusion bonded epoxy coating conforming to AWWA C550.
 - (iii) 50 mm AWWA operating nut.

E8.4.8 PVC Backwater Valves and Piping

- (a) PVC pipe and fittings shall conform to CSA B182.1 and B182.2.
- (b) Drain piping shall utilize a solvent weld joint type.
- (c) Piping conforming to CSA 182.2 shall have a dimension ratio of 35.
- (d) The backwater valve shall utilize an EPDM seat rated to 275 kPa of back pressure.
- (e) The backwater valve shall conform to ASME A112.14.1

E8.4.9 Chamber Vent

- (a) Steel pipe shall meet the requirements of ASTM A53.
 - (i) Minimum wall thicknesses: Schedule 80.
 - (ii) Minimum Grade: Grade A
- (b) Flanges: ASME B16.1 Class 125 flanges.
- (c) Two-Way Air Damper, acceptable products:
 - (i) FrostSafe by Val-Matic Valve and Manufacturing Corp,
 - (ii) or approved equal in accordance with B7.
- (d) Security Screen, acceptable products:
 - (i) VentSafe by Val-Matic Valve and Manufacturing Corp,
 - (ii) or approved equal in accordance with B7.
- (e) Galvanizing:
 - (i) Piping and flanges shall be galvanized to ASTM A 123/A 123M.
 - (ii) All bolting hardware shall be galvanized to ASTM A 153/A 153M.
 - (iii) Clean all members receiving galvanizing material to SSPC SP-10 "near white blast cleaning".

E8.4.10 Stainless Steel Extension Shafts

- (a) A 50 mm diameter stainless steel extension shaft shall be supplied with the butterfly valves for surface operation as shown on the Drawings.
- (b) The extension shaft shall be configured for a 50 mm AWWA operating nut.
- (c) The extension shaft shall be located a minimum of 150 mm and maximum of 350 mm from the proposed final grade.
- (d) The extension shaft shall be manufactured from Type 316 Stainless Steel.

E8.4.11 Polyurethane roof sealant for valve boxes

- (a) Sealant
 - (i) Joint filler for concrete slab shall be self-leveling, polyurethane sealant to meet requirements of ASTM C920, Type S, Grade P, Class 25, Use T, M, A, O, and I.
 - (ii) Approved product: Vulkem 45 as manufactured by Tremco, Sikaflex 1C SL, or approved equal in accordance with B7.
- (b) Joint Cleaner: xylol, methylethyleketon or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

E8.4.12 Liquid Epoxy Coatings

- (a) Liquid epoxy coatings shall conform to AWWA C210.
- (b) Liquid epoxy coatings shall be NSF 61 certified for immersion service in pipelines.
- (c) All coatings shall be applied in a minimum of two (2) or more layers (5 mils dry film thickness minimum each coat) for a minimum final coating dry film thickness of the greater of 16 mils or the thickness recommended by the manufacturer for immersion service.
- (d) Interior pipe linings shall be a 100% solids liquid epoxy product. Approved products: Enviroline 230, Bar-Rust 234P, Specialty Polymer Coatings SP-7888, or approved equal in accordance with B7.
- (e) Exterior coatings for all exposed steel, piping, valves, and actuators shall be Polyamide Epoxy. Approved products: Enviroline 230, Bar-Rust 234P, Specialty Polymer Coatings SP-7888, Tnemec Series 140F Pota-Pox Plus, Amerlock 2 or approved equal in accordance with B7.
- (f) Submit product data for interior lining and exterior coating products in accordance with E3.

E8.4.13 Fusion Bonded Epoxy Coatings

- (a) Fusion bonded epoxy coatings shall conform to AWWA C213 for steel components and AWWA C116 for ductile iron fittings.
- (b) Fusion bonded epoxies shall be NSF 61 certified for immersion service in pipelines.
- (c) The final minimum coating thickness shall be the greater of 16 mils or the thickness recommended by the manufacturer for immersion service.
- (d) Submit product data for interior lining and exterior coating products in accordance with E3.

E8.5 Construction Methods

E8.5.1 Removal of the Existing Valves

- (a) The Contractor shall not proceed with valve removal until the City has successfully dewatered the Branch I Aqueduct, all required valves have been locked out, and all required materials for the valve replacements are on site, have been inspected and test fit, and written authorization to proceed with the valve removal has been provided by the Contract Administrator.

- (b) Loosening and replacement of individual bolts on the existing flange connections is permitted prior to dewatering of the Branch I Aqueduct provided that not more than two (2) bolts are removed at one given time and the bolts are located on opposite sides of the pipe.
- (c) The existing valves and chamber piping were constructed without means of disassembly. The Contractor shall be prepared to disassemble the existing gate valves (remove the bonnet and gate) and cut apart the existing valve body to facilitate removal.
- (d) The Contractor shall make all efforts to protect the existing chamber piping remaining in service from damage. The use of temporary supports is recommended. The use of jackhammers or machine mounted hydraulic or pneumatic breakers will not be permitted.

E8.5.2 Protection of the Branch I Aqueduct from Contamination.

- (a) The Contractor shall install temporary closures on the existing piping to prevent contamination of the Branch I Aqueduct and Tache Booster Pumping Station yard piping when not on site or actively working on the piping itself.
- (b) Temporary closures shall be constructed to prevent the ingress of water, air, contaminants, debris, and animals. Closures shall be constructed and installed in such a manner as to prevent inadvertent puncture, displaced or otherwise damaged in a manner that could result in the contamination of the Branch I Aqueduct or Tache Booster Pumping Station yard piping.
- (c) It is recommended that the closures are gasketed and bolted to the existing pipe flanges.

E8.5.3 Installation of Owner Supplied Butterfly Valve

- (a) Install the owner supplied butterfly valves and restrained dismantling couplings as shown on the Drawings. Valve shall be installed with the valve shaft in the horizontal position. The Valve Supply Contractor is obligated to provide installation supervision and will complete Form 202 (Appendix A) upon successful installation.
- (b) Construct a concrete valve base to accommodate the new valves.

E8.5.4 Commissioning of Butterfly Valve

- (a) The Contractor shall assist in operation of the butterfly valve for the purpose of commissioning. The Supply Contractor is required to complete Form 203 (Appendix A), indicating a qualified representative has checked the installed equipment, and has found the equipment to be installed and operating in accordance to the specifications.

E8.5.5 Coatings

- (a) Coating of piping within the chamber shall be undertaken during the planned Branch I Aqueduct shutdown.
- (b) Prepare metal surfaces for recoating using the following methods:
 - (i) Steel - Prepare steel surfaces for recoating by blast cleaning to near-white metal as specified by Joint Surface Preparation Standard NACE No.2/SSPC-SP10.
 - (ii) Cast and Ductile Iron - Prepare ductile iron surface in accordance with NAF 500-03.
 - (iii) Remove all dust and loose residues from the prepared surfaces and chamber floor. The surface shall be roughened to a degree suitable for the coating system employed.
- (c) Protect valve seals, machined surfaces, threads, and nameplates from sandblasting.
- (d) Primer coat to follow immediately after completion of sandblasting and prep.
- (e) Apply liquid epoxies of prepared surfaces in accordance with AWWA C210, E8.4.11, and the manufacturer's recommendations.

- (f) Apply fusion bonded epoxies of prepared surfaces in accordance with AWWA C213, E8.4.13, and the manufactures recommendations.
- (g) Provide adequate ventilation and heat to facilitate curing of coatings.
- (h) Interior linings for pipes and fittings shall be applied and cured as recommended by the manufacturer prior to placing into service. Linings must be fully cured for immersion service prior to installation and reinstating the line into service. Where accelerated cure times are required for assembly and water immersion, a coating and curing plan shall be submitted to the Contract Administrator in accordance with E3.

E8.5.6 Disinfection of Aqueduct Piping

- (a) Disinfection of the Branch I Aqueduct piping and shall be completed in accordance with CW2125 and AWWA C651 except flushing will not be required.
- (b) Further to CW 2125, disinfection of all valves and components shall be completed by swabbing or spraying as outlined in Section 3.3.16 of CW 2125.
- (c) In accordance with Section 4.3 of AWWA Standard 651, the Contractor shall take all preventative and corrective measures during construction to prevent debris from entering the pipeline. If, in the opinion of the Contract Administrator, deleterious substances have entered the pipeline, the Contractor shall flush the pipeline with sanitized pipeline cleaning equipment.
- (d) Disinfection of pipelines shall be performed by persons having a minimum Class II Water Distribution Operator and Class III Water Treatment Operator certification from the Manitoba Water and Waste Association or approved equivalent association.
- (e) After the City has completed refilling of the Branch I Aqueduct with potable water, water samples for health tests shall be taken in accordance with CW 2125. Notwithstanding CW 2125, test samples shall be taken each day at least 24 hours apart for three (3) successive days. The sampling location will be identified by the City prior to refilling of the Aqueduct. The sampling location may be within the Tache Booster Pumping Station or elsewhere on the City's Regional Water System.
- (f) If required, chlorinated water shall be treated by one of the following methods, as recommended in AWWARF - GUIDANCE MANUAL FOR THE DISPOSAL OF CHLORINATED WATER:
 - (i) Discharged into a nearby WWS manhole if possible at a rate which will does not overload the WWS system.
 - (ii) De-chlorination of water with discharge into the LDS system or directly to the river. If discharging directly to the river the Contractor shall take all necessary precautions to prevent erosion of the river bank. De-chlorination may be accomplished using the following:
 - ◆ Sodium Ascorbate,
 - ◆ Vita-D-Chlor TM by Integra Chemical,
 - ◆ or approved equal in accordance with B7.
- (g) Contain chlorinated water on Site until chlorine has dissipated to acceptable limits.

E8.6 Lock-out and Tag-out Procedures

E8.6.1 The City of Winnipeg will endeavor to provide redundant valve closures (double blocking) of pressurized pipelines that enter the work space where possible. However, there are locations within the system where it is impractical to provide double blocking without widespread service disruption. Where regional water system network does not allow double blocking, non-redundant valve closures (single blocking) will be provided.

E8.6.2 At locations where only single valve blocking is practical, additional safety measures and monitoring will be required in order to provide a safe work environment for employees. Development of adequate safety plans in accordance to the WorkPlace Safety and Health Act and Regulation 217/06 are the responsibility of the Contractor, but as a minimum shall include:

- (a) Provision of adequate egress from confined spaces including removal of removable roof slabs and manhole covers, and provision of ladders and other means of site exit
- (b) Use of body harnesses and safety hoisting equipment at all times when pressurized systems are disassembled and protected only by single block valves.
- (c) Monitor and assess water leakage in closed system prior to disassembly of system. Monitor water leakage rate and advise Contract Administrator immediately of change in inflow rates. Evacuate confined space if necessary.

E8.6.3 The Contractor, City of Winnipeg Water and Waste Department, and Contract Administrator will all be required to lock out all valves closed in order to facilitate this work. Where site access and lockout space on system valves is limited, the following lockout/tag out procedures will be implemented;

- (a) City of Winnipeg will provide a single lock, chains and other devices to adequately secure valves within pits and chambers. The Contractor has the right to inspect the installation and satisfy that the lockout system is adequate. All locks utilized will be commonly keyed.
- (b) Key(s) for single locked valves will be place in secure lock box at the site. City staff, Contractors, and Contract Administrator will place personal/company locks complete with identification and tag out information on this lock box.
- (c) Key(s) placed within the secure lock box will not be removed until all City staff, Contractor, and Contract Administrator locks have been removed from the lock box, and verified that the work is completed.
- (d) City staff will then unlock all valves, and will commence with restoration of the systems to service.

E8.6.4 Lockout locations for valves will be identified by the City during the pre-construction meeting.

E8.7 Measurement and Payment

E8.7.1 Piping modifications shall be measured on a lump sum basis and paid for at the Contract Price for "Piping Modifications". The lump sum price shall include the following:

- (a) Construction of temporary access, falseworks, heating, and hording as required for valve removal and installation;
- (b) removal of existing gate valves, air release valves, and associated appurtenances;
- (c) installation of owner-supplied butterfly valves;
- (d) supply and installation of restrained dismantling couplings, miscellaneous valves, air release valves, bolts, gaskets, fittings and all other appurtenances specified on the Drawings and herein;
- (e) supply and installation of valve stem extensions;
- (f) construction of valve support blocks;
- (g) reconstruction of the existing floor sump;
- (h) supply and installation of the chamber vent;
- (i) and any other materials or labour required to complete the Work specified in E8 except as noted below.

E8.7.2 Painting of the existing piping and metal components within the chamber shall be measured on a lump sum basis and paid for at the lump sum price for "Painting of Chamber Piping". The lump sum price for painting shall include all preparation works, priming, painting, heating, hording, and other labour and materials required to complete the work specified herein.

E9. CHAMBER MODIFICATIONS

E9.1 Description

- (a) This Specification shall cover the structural modification to the existing valve chamber as shown on the Drawings.

E9.2 Materials

E9.3 Excavation, Shoring and Backfill

- (a) Excavation, Shoring and Backfill shall conform to E6.

E9.4 Demolition of Structures

- (a) Demolition shall conform to E7.

E9.5 Cast-In-Place Concrete

- (a) Cast-In-Place Concrete shall conform to E10.

E9.6 Concrete Accessories

- (a) Concrete Accessories shall conform to E11.

E9.7 Reinforcing Steel

- (a) Reinforcing Steel shall conform to E12.

E9.8 Aluminum Fabrications

- (a) Aluminum Fabrications shall conform to E14.

E9.9 Metal Fabrications

- (a) Metal Fabrications shall conform to E15.

E9.10 Rough Carpentry

- (a) Rough Carpentry shall conform to E16.

E9.11 Sheet Metal Cladding

- (a) Sheet Metal Cladding shall conform to E17.

E9.12 Roof Accessories

- (a) Roof Accessories shall conform to E18.

E9.13 Dampproofing

- (a) Dampproofing shall conform to E19.

E9.14 Rigid Insulation

- (a) Rigid Insulation shall conform to E20.

E9.15 Measurement and Payment

- (a) Modification of the valve chamber will be measured on a Lump Sum Basis and paid at the Contract Price for "Chamber Modifications" 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.

E10. CAST-IN-PLACE CONCRETE

E10.1 Description

- (a) This Specification shall cover the construction of cast-in-place concrete for the valve chamber, which the Contractor shall carry out in accordance with Specification CW 2160 and CSA A23.1, except as amended or supplemented herein.
- (b) Provide heating and hoarding in order to install the materials.

E10.2 Submittals

- (a) Shop Drawings
 - (i) Provide Shop Drawings in accordance with E3.
 - (ii) Shop Drawings for the Mix Design are to bear the seal of a Professional Engineer, registered in the Province of Manitoba.
- (b) Submit and implement a Quality Control Plan a minimum of four (4) weeks prior to first scheduled concrete casting; the Quality Control Plan shall include:
 - (i) Identify the Quality Control Manager.
 - (ii) Qualifications of construction supervisory personnel.
 - (iii) Quality Control testing plan for concrete.
 - (iv) Third party testing data from trial batching of each Mix Type.
 - (v) Pre-placement procedures and checklists for concrete.
 - (vi) Post-placement procedures and checklists for concrete.
- (c) Submit mix design statements for each type of concrete:
 - (i) Submit documentation a minimum of four (4) weeks prior to the first scheduled concrete casting demonstrating that the proposed mix designs and materials will achieve the required strength, durability, and performance requirements.

E10.3 Materials

- (a) Concrete Mix Types:
 - (i) Provide concrete mixed in accordance with requirements of CAN/CSA-A23.2.
 - (ii) Structural concrete design shall be in accordance with performance specification having the following properties:
 1. Walls and Chamber Sump: Class of Exposure: S-1; Minimum Compressive Strength @ 28 days: 35 MPa
 2. Slab: Class of Exposure: C-1: Minimum Compressive Strength @ 28 days: 35 MPa.
 - (iii) Self-consolidating concrete mixes will not be permitted for use on this project.

E10.4 Cast-in-Place Concrete Construction

- (a) A minimum of forty-eight (48) hours notice shall be given to the Contract Administrator prior to the casting of any concrete to allow for inspection of reinforcing steel.

E10.4.1 Finishing Slab Surfaces

- (a) Light broom finish exterior slab top surfaces to achieve nonslip surface conforming to CSA A23.1.

E10.4.2 Finishing Formed Concrete

- (a) Finish above grade concrete wall and slab edge to formed surfaces with Sack-Rubbed Finish conforming to CSA A23.1.
- (b) Finish exterior formed below grade surfaces to Smooth-Form Finish conforming to CSA A23.1.

E10.4.3 Wall Extension

- (a) Form wall extension to follow the existing wall contour.
- (b) Top surface of the wall extension top shall be levelled for removable slab full bearing.
- (c) Newly placed concrete to be fully cured and gained full design strength prior to placing the roof slab.

E10.5 Curing and Protection

- (a) Concrete shall receive moist curing for a period of at least seven (7) Calendar Days. One of the following methods shall be used as soon as the concrete has hardened sufficiently to prevent marring:
 - (i) A liquid membrane forming curing sealer, applied at the rate recommended by the Manufacturer.
 - (ii) Surfaces of concrete that are protected by formwork that is left in place for seven (7) Calendar Days, shall not require any additional curing (except as specified for hot weather). If the formwork is removed in less than seven (7) Calendar Days, the concrete shall receive moist curing as above.
- (b) No concreting will be allowed until all materials required for the curing phase are on-site and ready for use.
- (c) At the end of the curing and protection period, the temperature of the concrete shall be reduced gradually at a rate meeting both the requirements of CSA A23.1 Table 21 for allowable differential temperature in the concrete and ACI 306R Table 5.1 for the allowable rate of temperature change of the edges of the concrete until the outside air temperature has been reached.
- (d) Concrete that is allowed to freeze or attain insufficient curing conditions shall be subject to all necessary investigations and testing as deemed necessary by the Contract Administrator and all such concrete shall be removed and the portion reconstructed as directed by the Contract Administrator, at the Contractor's cost.

E10.6 Measurement and Payment

- (a) Supply and placement of cast-in-place concrete shall be considered incidental to "Chamber Modifications" and will not be measured for payment. No separate payment will be made.

E11. CONCRETE ACCESSORIES

E11.1 Description

- (a) This Specification shall cover all concrete accessories work, in accordance with Specification CW 2160, except as amended or supplemented herein.
- (b) Provide heating and hoarding for the installation of the materials.

E11.2 Submittals

- (a) Submit the following Shop Drawings; in accordance with E3.
 - (i) Bonding Agent
 - (ii) Waterstop
 - (iii) Lifting System
 - (iv) Davit Mount Sleeve and Cap
 - (v) Grout under Base Plates
 - (vi) Sealants
 - (vii) Bearing Pad
- (b) Submit Shop Drawings in accordance with E3.

E11.3 Materials

- (a) Bonding Agent:
 - (i) Epoxy bonding adhesive shall be Sikadur 32, Hi Mod by Sika Canada or approved equal in accordance with B7.
- (b) Waterstop
 - (i) Sika SwellStop or approved equal in accordance with B7.
- (c) Lifting System
 - (i) Lifting System shall be from Dayton Superior with safe working load tension rating of 10,886 kg (24000 lbs) and shall have the following components:
 - (ii) Dayton Superior P-75-H Utility Anchors
 - (iii) Dayton P76 Utility Anchor Setting Plug # 90P875
 - (iv) Dayton Superior P101 Fleet Lift Holding Rod.
- (d) Davit Mount Sleeve and Cap
 - (i) Davit mount sleeve shall be DBI Sala Advanced Flush Floor Mount Sleeve, Model # 8512828, stainless steel construction.
 - (ii) Cap shall be DBI Sala Advanced Heavy Duty Sleeve Cap, Model #8510827, stainless steel construction.
- (e) Grout under Base Plates
 - (i) Grout, if required, shall be Sika Embed Standard by Sika Canada Inc. or approved equal in accordance with B7.
- (f) Sealants Horizontal
 - (i) Shall be self-leveling, polyurethane sealant; Sikaflex 1C SL, or approved equal in accordance with B7. Colour: Precast.
- (g) Sealant Vertical and at Stainless Steel Signage
 - (i) Shall be non sag, polyurethane sealant; Sikaflex 2C NSL, or approved equal in accordance with B7. Colour: Precast.
- (h) Backer rod
 - (i) General: compatible with primers and sealants, outsized 30 to 50%. Polyethylene, urethane, neoprene or vinyl: extruded closed cell foam, Shore A hardness 20, tensile strength 140 to 200 kPa.
- (i) Bond Breaker: pressure sensitive plastic tape, which will not bond to sealants.
- (j) Joint Cleaner: xylol, methylethyleketon or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.
- (k) Bearing Pad: Elastomeric pads for new bearings shall be fabricated from neoprene or natural rubber, AASHTO low temperature Grade 5, with a 60 Durometer Shore A hardness.

E11.4 Construction Methods

- (a) Install materials in accordance with the Manufacturer's written instructions.

E11.5 Measurement and Payment

- (a) Supply and placement of concrete accessories shall be considered incidental to "Chamber Modifications" and will not be measured for payment. No separate payment will be made.

E12. REINFORCING STEEL

E12.1 Description

- (a) This Specification shall cover all reinforcing steel work, in accordance with Specification CW 2160, except as amended or supplemented herein.

E12.2 Shop Drawings

- (a) The Contractor shall submit Shop Drawings in accordance with E3 for the Contract Administrator's approval two (2) weeks prior to the fabrication of any reinforcing steel.

E12.3 Materials

E12.3.1 Reinforcing Steel

- (a) Further to CW 2160 Sentence 2.6 Materials: Reinforcing Steel, all reinforcing steel shall conform to the requirements of CSA G30.18, Grade 400.

E12.3.2 Bar Accessories

- (a) Bar accessories shall be of type approved by the Contract Administrator. They shall be made from a non-corroding material, and they shall not stain, blemish, or spall the concrete surface for the life of the concrete. Bar chairs are to be PVC; galvanized bar chairs are not acceptable.

E12.4 Construction Methods

E12.4.1 Placing of Reinforcing Steel

- (a) Reinforcing steel shall be placed accurately in the positions shown on the Contract Drawings. Carefully adjust the location of reinforcing steel adjacent to openings to frame those openings in accordance with good practice, and maintain the bar spacing intent.
- (b) Splices in reinforcing steel shall be made only where indicated on the Contract Drawings. Prior approval of the Contract Administrator shall be obtained where, in the opinion of the Contractor, other splices must be made. All splices shall have Class 'B' top lap splices in accordance with Reinforcing Steel Manual of Standard Practise. Welded splices shall not be used.
- (c) Adjust the location of the reinforcing steel adjacent to openings and in location of the lifting hook in accordance with good practice, and maintain the bar spacing intent.
- (d) Do not use welded splices for reinforcing steel.

E12.5 Construction Methods

- (a) Install materials in accordance with the Manufacturer's written instructions.

E12.6 Measurement and Payment

- (a) Supply and placement of reinforcing steel shall be considered incidental to "Chamber Modifications" and will not be measured for payment. No separate payment will be made.

E13. PATCHING REPAIR AND NON-SHRINK GROUT REPAIR

E13.1 Description

E13.1.1 This Specification shall cover the Work of removing, preparing, and patching areas of defective concrete on the interior surfaces of the existing structure.

E13.1.2 Provide heating and hoarding in order to install the materials.

E13.2 Submittals

- (a) Submit Shop Drawings for all materials in accordance with E3.

E13.3 Materials

E13.3.1 General

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

E13.3.2 Delivery, Storage, and Handling of Materials

- (a) All material shall be delivered to the Work site, stored, and handled in a careful and workmanlike manner in accordance with manufacturers' printed instructions and recommendations.
- (b) Store materials in a manner which will prevent deterioration and contamination. Deteriorated or contaminated materials shall be removed from site.

E13.3.3 Testing

- (a) There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes.
- (b) Any materials which, 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 shall be replaced by the Contractor at their own expense.

E13.3.4 Patching Repair Material

- (a) Patching repair material shall be polymer modified mortar based Sika Top 123 Plus by Sika Canada Inc., Master Emaco S 488CI by BASF Master Builders Solutions, or approved equal in accordance with B7.

E13.3.5 Epoxy Bonding Adhesive

- (a) Epoxy bonding adhesive shall be Sikadur 32, Hi Mod by Sika Canada Inc., MasterEmaco ADH 1090RS by BASF Master Builders Solutions, or approved equal in accordance with B7.

E13.3.6 Non-Shrink Grout

- (a) Non-shrink grout shall be cement based Sika Grout 212 SR by Sika Canada Inc., or approved equal in accordance B7.
- (b) Extend non-shrink grout utilizing clean round stone in accordance with non-shrink grout manufacturers written instructions.

E13.4 Equipment

E13.4.1 General

- (a) Mechanical chipping hammers shall be limited to maximum lightweight hammers.

E13.5 Construction Methods

E13.5.1 Concrete Patching

- (a) Miscellaneous concrete patching of walls, within the valve chamber will be identified by the Contract Administrator.
- (b) Provide heating and hoarding to maintain the manufacturer's minimum installation and curing substrate temperature.
- (c) Use materials in accordance with manufacturer's printed instructions, and as specified.
- (d) The Contract Administrator shall designate the limits of the defective concrete to be repaired.
- (e) Remove delaminated, loose, and spalled concrete using lightweight mechanical chipping hammers or other suitable means to sound concrete. Protect reinforcing bars during removal.
- (f) Thoroughly clean all surfaces previously chipped of any loose concrete and/or laitance and prepare surface for patching in accordance with printed instructions from the manufacturer of the patching mortar. Use pressure washing to clean and prepare concrete surfaces. Do not damage the structures.

- (g) Apply material to concrete substrate in accordance with the manufacturer's printed instructions required.
- (h) The patch repair and non-shrink grout shall be finished to match the profile of the surrounding concrete.
- (i) Wet cure patch repairs and non-shrink grout in accordance with E10 Cast-in-Place Concrete.

E13.6 Quality Control

E13.6.1 Corrective Action

- (a) The Contractor shall at their own expense, correct such work or replace such materials found to be defective under this Specification and carry out additional quality control testing.

E13.7 Method of Measurement and Basis of Payment

E13.7.1 Repair of spalled concrete will be measured on a lump sum basis and paid at the Contract Price for "Repair of Spalled Concrete (up to 1.5 m2)" 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.

E13.7.2 Repair of existing form penetrations will be measured on a unit basis and paid at the Contract Price for "Repair of Existing Form Penetrations" 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.

E14. ALUMINUM FABRICATIONS

E14.1 Description

- (a) This Specification shall cover design, fabrication and installation of aluminum items as shown on the Drawings.

E14.2 General

- (a) Design Code and Quality Assurance
 - (i) National Building Code of Canada, 2010.
 - (ii) CAN/CSA-S157, Strength Design in Aluminum
 - (iii) CSA W59.2, Welded Aluminum Construction
 - (iv) CSA W47.2, Certification of Companies for Fusion Welding of Aluminum
 - (v) ASTM F 593, Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
 - (vi) ASTM F 594, Specification for Stainless Steel Nuts
 - (vii) Aluminum Association Standard SSA-46
- (b) Design Requirements
 - (i) Use Loads, load combinations and stress levels shown on Drawings and in accordance with the NBC 2010 and the Manitoba Amendments.
 - (ii) Connections are to be designed by a Professional Engineer registered in the Province of Manitoba. Design connections for loads indicated on the Drawings as a minimum.
- (c) Qualifications
 - (i) All work is to be performed by a firm certified by the Canadian Welding Bureau to the requirements of CSA W47.2 in Division 2.
- (d) Inspection and Testing
 - (i) Welds will be considered defective if they fail to meet quality requirements of CSA W59.2.

(e) Submittals

- (i) Shop Drawings and design briefs are to bear the seal of a Professional Engineer, registered in the Province in Manitoba.
- (ii) Submit Shop Drawings for review in accordance with E3.
- (iii) Clearly indicate profiles, sizes, spacing and locations of structural members, connections, attachments, reinforcing, anchorage, framed openings, size and type of fasteners, cambers and loads, accessories, column anchor bolt locations, setting details.

E14.3 Products

(a) Materials

- (i) All materials shall be new.
- (ii) Aluminum to requirements of CAN/CSA-S157, 6061-T6 or 6063-T6 aluminum alloy. All aluminum shapes based on Alcan structural shapes.
- (iii) Aluminum grating: to Type 30 (Metric) as manufactured by Fisher & Ludlow using 6063-T6 aluminum alloy for bearing bars and 6063-T5 aluminum alloy for cross bars. Provide serrated grating for exterior applications. Provide stainless steel Type D hold down clips; Type C may be used if Type D is impractical.
- (iv) Fastening devices connecting aluminum parts to aluminum, concrete, or other materials: stainless steel bolts to ASTM F 593, stainless steel nuts to ASTM F 594, with appropriate isolation devices.
- (v) Welding materials: conforming to CSA W59.2.
- (vi) Bituminous paint: to MPI (Master Paint Institute) EXT 5.5D, without thinner.
- (vii) Concrete anchors: stainless steel Hilti HY-200 Adhesive Anchors, manufactured by Hilti (Canada) Ltd. where indicated.

(b) Fabrication

- (i) Fabricate aluminum members in accordance with CAN/CSA-S157 using Alcan structural shapes.
- (ii) Conform to requirements of CSA W59.2 for recommended filler alloy and welding.
- (iii) Verify all Drawing dimensions prior to commencing fabrication.
- (iv) Provide connections for loads indicated on the Drawings as a minimum
- (v) Provide bolted connections wherever possible. Bolted connections shall be bearing-type connections with the thread excluded from the planes of shear. Welded connections will not be permitted unless acceptable to the Engineer. Inform Engineer if required welding procedures will negatively influence the original yield strength of the members at the compression or tension flange. Adjust welding procedures as required by the Engineer at no additional cost.
- (vi) Provide perimeter banding for grating; banding to be the same size as bearing bars.
- (vii) Provide banding of same size as bearing bars for all required openings through grating as required unless noted. Contractor to coordinate location of openings prior to Shop Drawing submission.
- (viii) Match position of bearing bars and cross bars in adjacent panels to preserve a continuous appearance.
- (ix) Provide removable hold down clip style Type D complete with appurtenances for all grating. At locations where Type D clip is impractical, provide Type C clip.
- (x) Provide minimum four (4) hold-down clips at each end of the panels if not detailed on the Drawings.
- (xi) Clip adjacent grating panels edges together at maximum 1500 mm spacing to prevent differential vertical movement.
- (xii) Install one Ladder Up Safety Post LU-3 as manufactured by The Bilco Company on each ladder assembly.

- (c) Construction Method
 - (i) Erect aluminum in accordance with CAN/CSA-S157 and Drawings.
 - (ii) Obtain permission of Engineer prior to site cutting or making adjustments that are not part of the scheduled Work.
 - (iii) Install items plumb, square, and level; fit accurately and maintain free from distortion or defects detrimental to appearance and performance.
 - (iv) Paint aluminum surfaces in contact with concrete with two (2) coats of alkali-resistant bituminous paint. After erection touch up abrasions and damage to bituminous coatings
 - (v) Prevent electrolysis between aluminum and dissimilar metals in contact with appropriate isolation devices.

E14.4 Measurement and Payment

- (a) Supply and installation of fabricated aluminum components shall be considered incidental to "Chamber Modifications" and will not be measured for payment. No separate payment will be made.

E15. METAL FABRICATIONS

E15.1 Description

- (a) This Specification shall cover design, fabrication and installation of miscellaneous metal items as shown on the Drawings.

E15.2 General

- (a) Design Code and Quality Assurance
 - (i) Design in accordance with National Building Code of Canada 2010 along with the Manitoba Building Code amendment.
 - (ii) Perform welding in accordance with ANSI/AWS D1.6/D1.6M: 2007 for Stainless Steel.
 - (iii) Welding work on all load carrying structures and assemblies is to be performed by a firm certified by the Canadian Welding Bureau to the requirements of CSA W47. in Division 2.
 - (iv) All welders employed to weld load carrying structures in the field are to possess valid "S" Classification Class "O" certificates issued by the Canadian Welding Bureau.
- (b) Shop Drawings
 - (i) Submit Shop Drawings in accordance with E3.
 - (ii) Clearly indicate profiles, sizes, connections, attachments, reinforcing, anchorage and size and type of fasteners and accessories.
 - (iii) Include erection drawings, elevations and details where applicable.
 - (iv) Indicate welded connections using CISC standard welding symbols. Clearly indicate net weld lengths.
 - (v) Shop Drawings and design briefs are to bear the seal of a Professional Engineer registered in the Province of Manitoba.

E15.3 Materials

- (a) Structural Steel Wide Flange Sections (W Shapes), plates and miscellaneous steel: conforming to ASTM A 276 Standard Specification for Stainless Steel Bars and Shapes, with minimum yield of 210 MPa utilizing alloy Type 304.
- (b) Welding materials: ANSI/AWS D1.6/D1.6M: 2007 for Stainless Steel
- (c) Stainless steel sheet: Type 304
- (d) All bolts, nuts, fasteners, rod, washers, etc. to be stainless steel.

- (e) Isolation coating: Bituminous paint: to MPI (Master Paint Institute) EXT 5.5D, without thinner.
- (f) Concrete anchors: as manufactured by Hilti (Canada) Ltd. where indicated or approved equal in accordance with B7.

E15.4 General Fabrication

- (a) All metal fabrications are to be aluminum finish unless noted otherwise.
- (b) Verify all dimensions on site prior to shop fabrication.
- (c) Fabricate items of sizes and profiles detailed on Drawings, with joints neatly fitted and properly secured.
- (d) Fit and shop assemble in largest practical sections for delivery to site.
- (e) Supply all components required for proper anchorage of steel fabrications. Fabricate anchorage and related components of stainless steel, unless otherwise specified or shown.
- (f) Accurately form all connections and joints with exposed faces flush, mitres and joints tight.
- (g) Exposed welds and metal sections shall be smooth and flush; grind or file as required.
- (h) Provide for flush welded or hairline butt field joints.
- (i) Shop fabricated openings in members for other building components. Reinforce openings to restore member to original design strengths.
- (j) Provide lugs, clips, brackets, hangers and struts as required for attaching steel items securely to building structure.

E15.5 Construction Method

- (a) Obtain the Contract Administrator's permission prior to Site cutting or making adjustments that are not part of scheduled work.
- (b) Install items plumb, square, level and fitted accurately and maintain free from distortion or defects detrimental to appearance and performance.
- (c) Make provision for erection stresses and temporary bracing. Keep Work in alignment at all times.
- (d) Replace items damaged in course of installation.
- (e) Perform required field welding. Exposed welds shall be smooth and flush; grind or file as required.
- (f) Perform necessary cutting and altering for the installation of Work of other Sections, and as indicated on Drawings. No additional cutting is to be done without the permission of the Contract Administrator.
- (g) Perform all field assembly bolting and welding to match standard of shop bolting and welding. Bolts and screws are to be concealed whenever possible.

E15.6 Measurement and Payment

- (a) Supply and installation of fabricated metal components shall be considered incidental to "Chamber Modifications" and will not be measured for payment. No separate payment will be made.

E16. ROUGH CARPENTRY

E16.1 Description

- (a) Wood furring and related appurtenances.

E16.2 Materials:

- (a) Pressure treated exterior plywood and lumber shall conform to CSA O80, Use Category UC4.2 utilizing:
 - (i) CSA O121M - Douglas fir CSA O151M material or Softwood lumber CSA O141.
- (b) Wood preservative pressure treatment: CSA O80M using waterborne preservative with 0.30% retainage, manufactured by Wolman.
- (c) Stainless steel anchorage screws: 410 Stainless Steel Tapcon Screws (4.8 mm diameter x 32 mm embedment) as manufactured by ITW Buildex.

E16.3 Construction Method

- (a) Site Applied Wood Treatment
 - (i) Apply preservative treatment in accordance with CSA O80M and the Manufacturer's instructions.
 - (ii) Treat site-sawn ends.
 - (iii) Allow preservative to cure prior to erecting members.
- (b) Erect wood furring members level and plumb.
- (c) Space furring as noted on the Drawings.
- (d) Provide blocking, sized to suit, for support of surface mounted accessories.
- (e) Place miscellaneous blocking, furring, where indicated on Drawings and as required for secure support of anchorage of other materials. Place members true to lines and levels.
- (f) Secure rigidly in place utilizing stainless steel fasteners.

E16.4 Measurement and Payment

- (a) Supply and installation of rough carpentry components shall be considered incidental to "Chamber Modifications" and will not be measured for payment. No separate payment will be made.

E17. SHEET METAL CLADDING

E17.1 Description

- (a) Aluminum (sheet metal) cladding panel and related appurtenances on the interior walls, ceiling of the Chamber and interior of the Chamber roof access hatches.

E17.2 Submittals

- (a) Submit Shop Drawings for review in accordance with E3.
- (b) Clearly indicate material type, profiles, sizes, spacing and locations of components, connections, attachments, anchorage, profiles of drip edges, caps, and size and type of fasteners.

E17.3 Materials

- (a) Sheet Metals
 - (i) Aluminum Cladding: Mill Finish aluminum, non-painted, minimum 1.0 mm base aluminum thickness, model; C-40-1/2 as manufactured by Morin, a Kingspan Group Company.
 - (ii) Drip edge, caps, inside and outside corners: Mill Finish aluminum, non-painted, minimum 1.0 mm base aluminum thickness, as manufactured by Morin, a Kingspan Group Company.
 - (iii) Aluminum material: Alloy 3003-H14 in accordance with ASTM B209/ASTM B209M, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- (b) Sheet Metal Fastening Systems
 - (i) Aluminum Cladding: exposed fasteners ITW Buildex:

- (i) Self-drilling, TruGrip Scots 300 Series Stainless Steel screws into wood substrate and 410 Stainless Steel Tapcon screws into the concrete substrate where necessary.
 - (ii) Utilize pan head stainless steel screws for securing of other aluminum materials.
- (c) Polyethylene Sheet: shall be minimum 150 µm (6 mil to CAN/CGSB-51.34-M86 Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- (i) Utilize stainless steel staples to secure the polyethylene sheet.
- (d) Bituminous paint: to MPI (Master Paint Institute) EXT 5.5D, without thinner.

E17.4 Construction Methods

- (a) Install materials in accordance with the Manufacturer's written instructions.
- (b) Field measure site conditions prior to fabricating Work.
- (c) Fabricate all components in the factory, ready for field installation.
- (d) Provide Aluminum Cladding and all accessories in longest practicable length to minimize field lapping of joints.
- (e) Aluminum Cladding is to be installed tight to the face of the Rigid Insulation.
- (f) Segment drip edging, caps, inside and outside corners as required to secure to curved substrate where applicable. Ensure segmented components lap adjoining segmented components in the same nominal plane.
- (g) Provide inverted 'U' shaped caps at around the interior face of the Access Hatches.
- (h) Form sections square, true and accurate to size, free from distortion, and other defects detrimental to appearance or performance.
- (i) Install Polyethylene Sheet over all dissimilar materials, pressure treated furring and blocking.
 - (i) Backpaint aluminum components with bituminous paint where the installation of Polyethylene Sheet is not practical.
- (j) Fasten liner sheet to substrate utilizing stainless steel fasteners. Ensure all fasteners are driven normal to the plane of the liner panel.

E17.5 Measurement and Payment

- (a) Supply and installation of aluminum cladding components and related appurtenances shall be considered incidental to "Chamber Modifications" and will not be measured for payment. No separate payment will be made.

E18. ROOF ACCESSORIES

E18.1 Submittals

- (a) Submit Shop Drawings in accordance with E3.

E18.2 Materials

- (a) Access Hatch: VM VersaMount (custom design) as manufactured by The Bilco Company with all standard features and additional features as per Drawings and the below:
 - (i) Cover shall be reinforced to support a minimum live load of 4.8 kPa (100 psf) in conjunction with 1.72 kPa snow load and with a maximum deflection of 1/240th of the span.
 - (ii) Custom flashing over concrete curb with minimum 30 mm vertical cap portion over concrete curb vertical face and minimum 12 mm drip edges.
 - (iii) Custom bent stainless steel anchorage devices to interior concrete curb's vertical face complete with stainless steel anchors.
 - (iv) Frame opening size to be 1120mmx1120mm.

- (v) Hold open device with grip handle.
- (vi) Aluminum composite spring tube and steel compression springs in grease.
- (vii) Type 316 stainless steel slam lock with fixed interior handle and removable exterior turn/lift handle. Latch release is protected by a flush, gasketed, removable screw plug. Supply two (2) additional turn/lift handles and two (2) removable screw plugs as spare parts.
- (viii) All exposed welds are to be ground flush.
- (ix) All components are to be shop fabricated.

E18.3 Construction Methods

- (a) Install materials in accordance with the Manufacturer's written instructions.
- (b) Field measure site conditions prior to fabricating Work.
- (c) Fabricate all components in the factory, ready for field installation.

E18.4 Measurement and Payment

- (a) Supply and installation of the roof accessories shall be considered incidental to "Chamber Modifications" and will not be measured for payment. No separate payment will be made.

E19. DAMPPROOFING

E19.1 Submittals

- (a) Submit Manufacturer's instructions and details for application, application rates, number of layers, protection board in accordance with E3.

E19.2 Materials

- (a) Henry/Bakor 810-07 system as manufactured by Henry Company:
 - (i) First coat: 1.6 to 2.0 m²/L
 - (ii) Second coat: 1.6 to 2.0 m²/L
- (b) Dampproofing Protection Board: Henry/Bakor Polypropylene Protection Board with Protection Board adhesive to suit backfilling works as manufactured by Henry Company

E19.3 Construction Method

- (a) Provide heating and hoarding as required to complete the Works.
- (b) Ensure concrete substrate is dry and cured for a minimum of 14 days.
- (c) Install materials in accordance with the Manufacturer's written instructions.
- (d) Do not allow the Dampproofing material to come in contact with Sealants.
- (e) Install Dampproofing Protection Board after Dampproofing material is fully cured.

E19.4 Measurement and Payment

- (a) Supply and installation of dampproofing components shall be considered incidental to "Chamber Modifications" and will not be measured for payment. No separate payment will be made.

E20. RIGID INSULATION

E20.1 Submittals: Submit Manufacturer's data sheets in accordance with E3.

E20.2 Materials

- (a) 50 mm thick rigid insulation CAN/ULC-S701, Type 4 rigid, closed cell type, with integral high density skin, extruded polystyrene insulation, 610 mm wide x 2440 mm long, edge treatment: butt edge and ship lapped. As manufactured by Dow Chemical or Celfortec.

- (b) Spray Foam Insulation
 - (i) Spray Foam Insulation: closed-cell foam with water-resistant outer skin when cured, Great Stuff as manufactured by Dow Chemical.

E20.3 Construction Method

- (a) Verify insulation boards are unbroken, free of damage, with face membrane undamaged.
- (b) Butt edges and ends tight to adjacent board and protrusions.
- (c) Ensure Rigid Insulation panels are tight to the substrate. No void is allowed between the Rigid Insulation panel and the substrate. Cut Rigid Insulation panels to suit substrate profile.
- (d) Secure the Rigid Insulation to the substrate utilizing the Rigid Insulation Manufacturer's recommended wall adhesive for wet substrates or other approved securement methods that will not deteriorate under wet conditions.
- (e) Spray foam voids between rigid insulation sheet joints.

E20.4 Measurement and Payment

- (a) Supply and installation of rigid insulation shall be considered incidental to "Chamber Modifications" and will not be measured for payment. No separate payment will be made.

E21. PIPE PENETRATION SEALS

E21.1 Description

- (a) This Specification covers the requirements for supply and installation of expanding foam joint seals.

E21.2 Submittals

- (a) Submit Shop Drawings for the proposed seal product and profiling mastic.

E21.3 Materials

E21.3.1 Precompressed Foam Seal

- (a) The seal shall be comprised the following three components:
 - (i) Cellular polyurethane foam impregnated with a hydrophobic 100% acrylic, water based emulsion, factory coated on both faces with water-resistant silicone
 - (ii) Field-applied epoxy adhesive primer
 - (iii) Field-applied silicone sealant bands
- (b) The form seal shall be capable of movements $\pm 50\%$ of its intended installation thickness.
- (c) The seal shall come precompressed to permit installation into the existing annulus.
- (d) Accepted products:
 - (i) DSM-DS System produced by Emseal,
 - (ii) or approved equal in accordance with B7.

E21.3.2 Profiling Mastic

- (a) Cold applied self-supporting molding mastic containing beads of closed cell cellular polymer and flow control additives.
- (b) Meets the requirements of AWWA C217.
- (c) No VOC's.
- (d) Accepted Manufactures:
 - (i) Denso North America,

- (ii) Specialty Polymer Coatings,
- (iii) Trenton Corporation,
- (iv) Petro Coating Systems Ltd,
- (v) or approved equal in accordance with B7.

E21.4 Methods

- (a) Confirm the annular gap dimension prior to procurement of the foam seal.
- (b) Remove all existing mortar and sealing products from the pipe annulus.
- (c) Prepare the existing cast iron pipe and concrete chamber wall and install profiling mastic and the seals in accordance with the manufactures recommendations.
- (d) The seal shall be installed slightly recessed from the surface to permit installation of the field applied silicone sealant.
- (e) Install field applied silicone sealant as recommended by the seal manufacturer.

E21.5 Measurement and Payment

- E21.5.1 Supply and installation of pipe penetration seals will be measured on a lump sum basis and paid at the Contract Price for "Supply and Install Pipe Penetration Seals" 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.

E22. CCTV SEWER INSPECTIONS

E22.1 Description:

- (a) This Specification shall cover sewer CCTV inspections identified on the Drawings.

E22.2 Methods

- E22.2.1 Submit the CCTV inspection video to the Contractor Administrator for review in accordance with CW 2145 and as specified herein.

- E22.2.2 Full coding required for all CCTV inspections.

E22.3 Amendments and Supplements to CW 2145:

E22.3.1 Replace Section 3.4 with:

- (a) Ensure each operator is fully trained in all aspects of sewer inspection and capable of making accurate observations and recording all conditions that may be encountered in the sewers.
- (b) Perform condition coding using operators who can demonstrate proficiency coding in accordance with the requirements of the WRc "Manual of Sewer Condition Classification 3RD Edition".

E22.3.2 Replace Section 3.5 with:

- (a) Perform sewer condition coding in accordance with the requirements of the WRc Manual of Sewer Condition Classification 3RD Edition.
- (b) Record place names in accordance with Clause 3.9.4 of the CW 2145.

E22.3.3 Further to Section 3.13, a paper or "hard copy" of the sewer inspection reports is not required and the digital format should be submitted on a CD-R.

- (a) The Contractor shall maintain backup copies of all digital video and inspection data submissions for the duration of the Warranty Period as stated in C13.
- (b) The Contractor shall supply inspection data for review by the Contract Administrator on a DVD.

E22.3.4 Replace Clause 3.8.1 with:

- (a) Provide a minimum of 400 lines of resolution around the periphery of the picture for digital MPEG video playback.

E22.3.5 Replace Clause 3.11.1 with:

- (a) Capture the inspections in digital format in colour from the live video source on archival grade digital versatile discs, DVD-R format to the following minimum requirements. Adjust requirements as required to achieve 400 lines of resolution specified in Clause E8.1.6 of this Specification.
 - (i) XDVD MPEG-2 or MPEG-4 format (MPEG-4 preferred).
 - (ii) Picture Size: NTSC 720 x 480 @ 29.97 frames per second.
 - (iii) Data/Bit Rate: 6.0 M-bits/sec.
- (b) Replace Clause 3.17.7.6, with:
 - (i) Record the distance from the centre of the manhole to the cable calibration location at the start of the inspection and adjust the distance reading so that zero is at the centre of the start manhole. This distance is known as the cable calibration distance. The cable calibration location is the intersection point between the camera's widest horizontal viewing angle and the pipe's side periphery (03 or 09 o'clock) when the camera is level and looking forward.

E22.4 Sewer Inspection Equipment

E22.4.1 Notwithstanding CW 2145, CCTV equipment meet the following requirements:

- (a) Minimum requirements of the in-line inspection platform include:
 - (i) Operable in sewers of various cross-sections and constructed of standard pipe materials including brick, concrete, PVC, HDPE, and steel.
 - (ii) Tethered to facilitate extraction of the platform from the sewer, without causing damage to the sewer infrastructure, in the event the equipment fails or otherwise becomes uncontrollable within the sewer.
 - (iii) Equipped with sufficient high intensity lighting to illuminate the sewer for visual inspection.
 - (iv) Equipment shall be capable of continuously capturing digital video from first generation recordings with no frame loss, regardless of the progression of the inspection.
 - (v) Equipment shall be used to acquire continuous digital video images of the sewer for the entire length being inspected.

E22.5 Video Coding

- (a) Perform sewer condition coding in accordance with the requirements of the WRc Manual of Sewer Condition Classification 3Rd Edition.
- (b) Perform condition coding using operators who can demonstrate proficiency coding in accordance with the requirements of the WRc "Manual of Sewer Condition Classification 3Rd Edition".
- (c) Ensure each operator is fully trained in all aspects of sewer inspection and capable of making accurate observations and recording all conditions that may be encountered in the sewers.
- (d) Operators failing to meet the accuracy requirements on two occasions will not be permitted to code on the remainder of the contract until they can demonstrate to the Contract Administrator that they can code in accordance with the requirements of the WRc Manual of Sewer Condition Classification 3Rd Edition.
- (e) Incorporate a suitable distance-reading device to measure the location of the equipment in the pipe, to an accuracy of $\pm 0.5\%$ of the length of the inspection.

E22.6 Measurement and Payment

E22.6.1 Sewer inspections will be measured and paid for in accordance with CW 2145 except as modified herein:

- (a) CCTV inspecting of the existing drain line will be measured on a lump sum basis and paid at the Contract Price for "CCTV Inspection of Existing 150 mm Drain Line (up to 10 m)" 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.

E23. RESTORATION

E23.1 Description

- (a) This Specification shall cover the restoration of all work sites.

E23.2 Restoration Works

- (a) Sod all maintained grassed areas in accordance with CW3510.
- (b) Restore the existing fence to existing condition if removed or modified to facilitate construction.

E23.3 Measurement and Payment

E23.3.1 Supply and installation of sod using imported topsoil shall be measured and paid in accordance with CW 3510 at the Contract Price for "Supply and Placement of Sod using Imported Topsoil".

E23.3.2 Restoration of the existing perimeter fence shall be considered incidental to "Chamber Modifications" and will not be measured for payment. No separate payment will be made.

E23.3.3 Payment for restoration works will be limited to areas disturbed to facilitate construction. Surface restoration outside of the designated construction areas shall be at the Contractors expense.

PART F - SECURITY CLEARANCE

F1. SECURITY CLEARANCE

F1.1 Each individual proposed to perform Work under this Contract within the Winnipeg Drinking Water Treatment Plant shall be required to obtain a Criminal Record Search Certificate and a Public Safety Verification Check as detailed below:

- (a) the Criminal Record Search Certificate may be obtained from one of the following:
 - (i) a police service having jurisdiction at his/her place of residence.
 - (i) the original Criminal Record Search Certificate (Form P-253) will be provided by the Winnipeg Police Service to the individual applicant. The original has a validation sticker from the Winnipeg Police Service in the top right hand corner.
 - (ii) The applicant shall provide the original Criminal Record Search Certificate (Form P-253) to the Project Manager, or
 - (ii) using BackCheck, proponents will need to setup a BackCheck account prior to requesting individual background checks. This process should be done 72 hours prior to requesting the first check. The account can be setup using the following link. <https://forms.sterlingbackcheck.com/partners/platform2-en.php?&partner=winnipegcity>. The Criminal Record Search Certificate must be received by the City directly through BackCheck;
 - (i) proponents must set up an account with BackCheck under their company name and grant BackCheck permission to share the Criminal Record Search Certificate with the City of Winnipeg;
 - (ii) proponents will then be contacted by BackCheck with instructions on how to complete the Criminal Record Search Certificate; and
 - (iii) if additional assistance is required to obtain the Criminal Record Search Certificate, the Bidder may contact the following BackCheck representative:
Linda Ferens;
email: linda.ferens@sterlingbackcheck.ca
phone: (204) 999-0912; or
 - (iii) filling out the Core of Commissionaires (Manitoba Division) form which can be obtained by visiting: <https://www.commissionaires.ca/en/manitoba/home>.
- (b) the Public Safety Verification Checks can be obtained from BackCheck, proponents will need to setup a BackCheck account prior to requesting individual background checks. This process should be done 72hrs prior to requesting the first check. The account can be setup using the following link. <https://forms.sterlingbackcheck.com/partners/platform2-en.php?&partner=winnipegcity>. The results of the Public Safety Verification Check must be received by the City directly through BackCheck.
 - (i) proponents must set up an account with BackCheck under their company name and grant BackCheck permission to share the Criminal Record Search Certificate with the City of Winnipeg;
 - (ii) proponents will then be contacted by BackCheck with instructions on how to complete the Public Safety Verification Check; and
 - (iii) if additional assistance is required to obtain the Public Safety Verification Check, the Bidder may contact the following BackCheck representative:
 - (i) Linda Ferens;
 - (ii) email: linda.ferens@sterlingbackcheck.ca;
 - (iii) phone: (204) 999-0912.

F1.2 Prior to the award of Contract, and during the term of the Contract if additional or replacement individuals are proposed to perform Work, the Consultant shall supply the Project Manager with a Criminal Record Search Certificate and a Public Safety Verification Check obtained not earlier than one (1) year prior to the Submission Deadline, or a certified true copy thereof, for each individual proposed to perform the Work.

- F1.3 Any individual for whom a Criminal Record Search Certificate or a Public Safety Verification Check is not provided, or for whom a Criminal Record Search Certificate or a Public Safety Verification Check indicates any convictions or pending charges related to property offences or crimes against another person will not be permitted to perform any Work.
- F1.4 Any Criminal Record Search Certificate and Public Safety Verification Check obtained thereby will be deemed valid for the duration of the Contract subject to a repeated records search as hereinafter specified.
- F1.5 Notwithstanding the foregoing, at any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require an updated Criminal Records Search Certificate or Public Safety Verification Check. Any individual who fails to provide a satisfactory Criminal Record Search Certificate or Public Safety Verification Check as a result of a repeated criminal records search will not be permitted to continue to perform any Work.