

Canada

Manitoba 



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 340-2005

**KENASTON UNDERPASS PROJECT – WILKES AND CHARLESWOOD
FEEDERMAIN RELOCATIONS AND ASSOCIATED WORKS**

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PART B - BIDDING PROCEDURES

B1. PROJECT TITLE

B1.1 KENASTON UNDERPASS PROJECT – WILKES AND CHARLESWOOD FEEDERMAIN RELOCATIONS AND ASSOCIATED WORKS

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, July 29, 2005.

B2.2 Bid Submissions 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 GC:3.1, the Bidder may view the Site without making an appointment.

B4. ENQUIRIES

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

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

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

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

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

B5. ADDENDA

B5.1 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.

B5.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.

B5.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

B5.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Branch internet site for addenda shortly before submitting his Bid.

B5.3 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.

B6. SUBSTITUTES

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

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

B6.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.

B6.4 The Bidder shall ensure that any and all requests for approval of a substitute:

- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;
- (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
- (c) identify any anticipated cost or time savings that may be associated with the substitute;
- (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;
- (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.

B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an "approved equal" or as an "approved alternative", or may refuse to grant approval of the substitute.

B6.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, only to the Bidder who requested approval of the substitute.

B6.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely responsible for disseminating information regarding the approval to any person or persons he wishes to inform.

B6.7 If the Contract Administrator approves a substitute as an "approved equal", any Bidder may use the approved equal in place of the specified item.

B6.8 If the Contract Administrator approves a substitute as an "approved alternative", any Bidder bidding that approved alternative shall base his 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 B15.

B6.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B7. BID SUBMISSION

B7.1 The Bid Submission consists of the following components:

- (a) Form A: Bid;
- (b) Form B: Prices;
- (c) Form G1: Bid Bond and Agreement to Bond, or
Form G2: Irrevocable Standby Letter of Credit and Undertaking, or
a certified cheque or draft;

B7.2 All components of the Bid Submission 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 in ink, to constitute a responsive Bid.

B7.3 The Bid Submission shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.

B7.3.1 Samples or other components of the Bid Submission which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid Submission.

B7.4 Bid Submissions submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.

B7.5 Bid Submissions shall be submitted to:

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

B8. BID

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

B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:

- (a) if the Bidder is a sole proprietor carrying on business in his own name, his 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 own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.

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

B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.

- B8.4 Paragraph 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 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 own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.
- B8.4.1 The name and official capacity of all individuals signing Form A: Bid shall be printed below such signatures.
- B8.4.2 All signatures shall be original and shall be witnessed except where a corporate seal has been affixed.
- B8.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid Submission and the Contract, when awarded, shall be both joint and several.

B9. PRICES

- B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B9.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.
- B9.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

B10. QUALIFICATION

- B10.1 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;
 - (b) be responsible and not be suspended, debarred or in default of any obligation to the City;
 - (c) be financially capable of carrying out the terms of the Contract;
 - (d) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract;
 - (e) have successfully carried out work, similar in nature, scope and value to the Work;
 - (f) employ only Subcontractors who:
 - (i) are responsible and not suspended, debarred or in default of any obligation 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 Branch internet site at <http://www.winnipeg.ca/matmgt>); and
 - (ii) have successfully carried out work similar in nature, scope and value to the portion of the Work proposed to be subcontracted to them, and are fully capable of

performing the Work required to be done in accordance with the terms of the Contract;

- (g) have a written workplace safety and health program in accordance with The Workplace Safety and Health Act (Manitoba);

B10.2 Further to B10.1(g), the Bidder shall, within three (3) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

- (a) a valid COR certification number under the Certificate of Recognition (COR) Program - Option 1 administered by the Manitoba Heavy Construction Association's Safety, Health and Environment Program; or
- (b) a valid COR certification number under the Certificate of Recognition (COR) Program administered by the Manitoba Construction Safety Association; 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 Branch internet site at <http://www.winnipeg.ca/matmgt>.)

B10.3 The Bidder shall be prepared to 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.

B10.4 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.

B11. BID SECURITY

B11.1 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.

B11.1.1 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.

B11.2 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.

B11.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B11.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.

B11.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.

B11.3 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.

B12. OPENING OF BIDS AND RELEASE OF INFORMATION

B12.1 Bid Submissions will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Branch, or in such other office as may be designated by the Manager of Materials.

B12.1.1 Bidders or their representatives may attend.

B12.1.2 Bid Submissions determined by the Manager of Materials, or his designate, to not include the bid security specified in B11 will not be read out.

B12.2 After the public opening, the names of the Bidders and their Total Bid Prices as read out (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 Branch internet site at <http://www.winnipeg.ca/matmgt>.

B12.3 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 Branch internet site at <http://www.winnipeg.ca/matmgt>.

B12.4 The Bidder is advised that any information contained in any Bid Submission 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.

B13. IRREVOCABLE BID

B13.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.

B13.2 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.

B14. WITHDRAWAL OF BIDS

B14.1 A Bidder may withdraw his Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B14.1.1 Notwithstanding GC:23.3, 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.

B14.1.2 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.

B14.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials shall:

- (a) retain the Bid Submission until after the Submission Deadline has elapsed;
- (b) open the Bid Submission 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 B14.1.3(b), declare the Bid withdrawn.

B14.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B13.2 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.

B15. EVALUATION OF BIDS

B15.1 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 (pass/fail);
- (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B10 (pass/fail);
- (c) Total Bid Price;
- (d) economic analysis of any approved alternative pursuant to B6.

B15.2 Further to B15.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid Submission 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 if the interests of the City so require.

B15.3 Further to B15.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid Submission or in other information required to be submitted, that he is responsible and qualified.

B15.4 Further to B15.1(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.

B15.4.1 If there is any discrepancy between the Total Bid Price written in figures, the Total Bid Price written in words and the sum of the quantities multiplied by the unit prices for each item, the sum of the quantities multiplied by the unit prices for each item shall take precedence.

B16. FEDERAL/PROVINCIAL CLAUSES

B16.1 Further to GC:6, the Contractor shall prepare and maintain proper and accurate accounts of records, including invoices, statements, receipts and vouchers, in accordance with generally accepted accounting principles for at least five (5) years from Total Performance. The Contractor agrees that representatives of the Province of Manitoba and the Government of Canada, their Management Committee and their authorized representatives, to the extent possible under the legislation applicable to Manitoba, will have free access to the Site and to any documentation, including accounts and records, relevant for the purpose of audit of the Work.

B16.2 GC 3.2 is hereby amended by deleting 3.2 (a) and substituting the following thereof:

- (a) Does so in good faith and that to the best of his knowledge, no member of the House of Commons or the Senate of Canada will be admitted to any share or part of any contract made pursuant to this Contract, or any benefit arising from it and no member of Council or

any officer or employee of the City has any pecuniary interest, direct or indirect, in the Contract.

B17. AWARD OF CONTRACT

- B17.1 The City will give notice of the award of the Contract by way of a letter of intent, or will give notice that no award will be made.
- B17.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.
- B17.2.1 Without limiting the generality of B17.2, the City will have no obligation to award a Contract where:
- (a) the prices exceed the available City funds for the Work;
 - (b) the prices are materially in excess of the prices received for similar work in the past;
 - (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;
 - (d) only one Bid is received; or
 - (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.
- B17.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid.

PART C - GENERAL CONDITIONS

C1. GENERAL CONDITIONS

C1.1 The *General Conditions for Construction Contracts* (Revision 2000 11 09) are applicable to the Work of the Contract.

C1.1.1 The *General Conditions for Construction Contracts* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

- D1.1 In addition to the *General Conditions for Construction Contracts*, these Supplemental Conditions are applicable to the Work of the Contract.
- D1.2 The General Conditions are amended by striking out "The City of Winnipeg Act" wherever it appears in the General Conditions and substituting "The City of Winnipeg Charter".
- D1.3 The General Conditions are amended by striking out "Tender Package" wherever it appears in the General Conditions and substituting "Bid Opportunity".
- D1.4 The General Conditions are amended by striking out "Tender Submission" wherever it appears in the General Conditions and substituting "Bid Submission".
- D1.5 The General Conditions are amended by deleting GC:6.16 and GC:6.17. The City of Winnipeg is now within the jurisdiction of the Manitoba Ombudsman pursuant to The Ombudsman Act.

D2. SCOPE OF WORK

- D2.1 The Work to be done under the Contract shall consist of relocations of a 300 millimetre watermain, 600 millimetre Charleswood feedermain and 900 mm Wilkes feedermain for the construction of the Kenaston Underpass Project.
- D2.2 The major components of the Work are as follows:
- (a) Supply and Installation of approximately 250 metres of 300 millimetre watermain
 - (b) Supply and Installation of approximately 365 metres of 600 millimetre feedermain
 - (c) Supply and Installation of approximately 372 metres of 900 millimetre feedermain
 - (d) Construction of valve chamber
 - (e) Installation of two (2) 600 millimetre butterfly valves, supplied by others
 - (f) Construction of air release chamber
 - (g) Pressure testing and disinfection of watermains and feedermain
 - (h) Reconnection to existing watermains and feedermain
 - (i) Removal and/or abandonment of existing feedermain.

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; and
 - (e) "PCCP" means Prestressed Concrete Cylinder Pipe

D4. CONTRACT ADMINISTRATOR

D4.1 The Contract Administrator is UMA Engineering Ltd., represented by:

Marv McDonald, C.E.T.
Senior Project Coordinator
1479 Buffalo Place, Winnipeg Manitoba, R3T 1L7
Telephone No. (204) 284-0580
Facsimile No. (204) 475-3646

D4.2 At the pre-construction meeting, Mr. McDonald 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 designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D6. NOTICES

D6.1 Except as provided for in GC:23.2.2, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the Contractor shall be sent to the address or facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid.

D6.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D6.3, D6.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the address or facsimile number identified in D4.1.

D6.3 All notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following address or facsimile number:

The City of Winnipeg
Chief Administrative Officer Secretariat
Administration Building, 3rd Floor
510 Main Street
Winnipeg MB R3B 1B9
Facsimile No.: (204) 949-1174

D6.4 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following address or facsimile number:

The City of Winnipeg
Corporate Services Department
Legal Services Division
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1
Facsimile No.: (204) 947-9155

D7. FURNISHING OF DOCUMENTS

- D7.1 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 at cost.

SUBMISSIONS

D8. SAFE WORK PLAN

- D8.1 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 GC:4.1 for the return of the executed Contract.
- D8.2 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 Branch internet site at <http://www.winnipeg.ca/matmgt>.

D9. INSURANCE

- D9.1 The Contractor shall provide and maintain the following insurance coverage at all times during the performance of the Work and throughout the warrant period except for all claims made policies, which shall be maintained for a minimum period of twenty-four (24) months after the date of Total Performance:
- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) all inclusive, with The City of Winnipeg being added as an additional insured, with a cross-liability clause, such liability policy to also contain a contractual liability, an unlicensed motor vehicle liability and a products and completed operations endorsement to remain in place at all times during the performance of the Work and throughout the warranty period;
 - (b) Automobile Liability insurance for owned automobiles used for or in connection with the Work in the amount of at least two million dollars (\$2,000,000.00).
- D9.2 Deductibles shall be borne by the Contractor.
- D9.3 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.
- D9.4 The Contractor shall provide the City Solicitor with evidence of insurance detailing all insurance requirements, in a form satisfactory to the City Solicitor, 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 GC:4.1 for the return of the executed Contract.
- D9.5 GC:17 is hereby amended by adding the following:
- (a) The Contractor agrees at all times to indemnify and save harmless Her Majesty in the Right of Canada and Her Majesty in the Right of Manitoba, its officers, servants, employees or agents, from and against all claims and demands, loss, costs, damages, actions, suits or other proceedings by whomsoever brought or prosecuted in any manner based upon, or occasioned by any injury to persons, damage to or loss or destruction of property, economic loss or infringement of rights caused by or arising directly or indirectly from:
 - (i) The performance of this Contract or the breach of any term or condition of this Contract by the Contractor, its officers, employees, agents and subcontractors; and

- (ii) Any omission or other wilful or negligent act of the Contractor and its officers, employees, agents and subcontractors except to the extent to which such claims and demands, losses, costs, damages, actions, suit, or other proceedings relate to the act of negligence of an officer, employee or agents of Her Majesty in the Right of Canada or Her Majesty in the Right of the Province of Manitoba in the performance of his or her duties.

D10. PERFORMANCE SECURITY

- D10.1 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.
- D10.1.1 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.
- D10.2 If the bid security provided in his Bid Submission was not a certified cheque or draft pursuant to B11.1(c), 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 GC:4.1 for the return of the executed Contract.

D11. SUBCONTRACTOR LIST

- D11.1 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 GC:4.1 for the return of the executed Contract.

D12. EQUIPMENT LIST

- D12.1 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 GC:4.1 for the return of the executed Contract.

D13. DETAILED WORK SCHEDULE

- D13.1 The Contractor shall provide the Contract Administrator with a detailed work schedule at least fourteen (14) Calendar Days prior to the commencement of any Work on the Site but in no event later than the date specified in GC:4.1 for the return of the executed Contract.

- D13.2 The detailed work schedule shall consist of the following:
- (a) a critical path method (C.P.M.) schedule for the Work;

(b) a Gantt chart for the Work based on the C.P.M. schedule;
all acceptable to the Contract Administrator.

D13.3 Further to D13.2(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) Installation of 300 millimeter watermain
- (b) Testing and Disinfection of 300 millimeter watermain
- (c) Reconnection of 300 millimetre watermain
- (d) Installation of 600 millimeter Charleswood feedermain
- (e) Testing and Disinfection of 600 millimeter Charleswood feedermain
- (f) Construction of offtake valve chamber
- (g) Reconnection of 600 millimeter Charleswood feedermain
- (h) Installation of 900 millimetre Wilkes Feedermain
- (i) Testing and Disinfection of 900 millimetre Wilkes Feedermain
- (j) Construction of air release chamber
- (k) Reconnection of 900 millimetre Wilkes Feedermain
- (l) Substantial Performance
- (m) Total Performance

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

SCHEDULE OF WORK

D14. COMMENCEMENT

D14.1 The Contractor shall not commence any Work until he is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.

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

- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence that the Contractor is 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;
 - (ii) evidence of the workers compensation coverage specified in GC:6.14;
 - (iii) the Safe Work Plan specified in D8;
 - (iv) evidence of the insurance specified in B1;
 - (v) the performance security specified in D9;
 - (vi) the Subcontractor list specified in D11;
 - (vii) the equipment list specified in D12;
 - (viii) the detailed work schedule specified in D13; and
- (b) the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.

D14.3 The Contractor shall commence the Work on the Site on October 3, 2005.

D14.4 The City intends to award this contract by August 12, 2005.

D15. SCHEDULE RESTRICTIONS

D15.1 Feedermain shutdown periods are scheduled based on a number of factors including routine maintenance and repair work, water demand, weather and reservoir operation. The City shall endeavour to make the specified time periods available to the Contractor to schedule his Work requiring removal of the feeder mains from service, without limiting the City's control over the operation of the feeder mains to complete other work, maintain adequate water supply and storage of water 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 the water supply, including but not limited to high water demand, abnormal weather, failures of related water system components and/or security concerns.

D15.2 Work on watermain and feeder mains crossing Kenaston Boulevard and Wilkes Avenue cannot commence prior to completion and opening of the Kenaston Underpass detour and Sterling Lyon Parkway. This Work is scheduled to be completed on October 3, 2005.

D15.3 The Contractor shall base his work schedule on dates specified in D14.3 and D15.2. In the event of delay in these dates out of the Contractor's control, the dates of Substantial Performance and Total Performance will be adjusted and equivalent number of Calendar Days for each day the delay continues. If delay continues such that work cannot be substantially completed prior to November 30, 2005, Works shall be deferred to commence on April 15, 2006. No additional payment will be made for delay or adjustment in schedule.

D15.4 The 600 millimetre Charleswood Feedermain and the 900 millimetre Wilkes Feedermain cannot be taken out of service at the same time. The 600 millimetre Charleswood feedermain must be tested, disinfected, reconnected and recommissioned prior to taking the 900 millimetre Wilkes Feedermain out of service.

D15.5 Butterfly valves for the 600 millimetre feedermain valve chamber are not scheduled for delivery until October 31, 2005.

D16. SEQUENCE OF WORK

D16.1 Further to GC:6.1, the sequence of Work shall be as follows:

D16.2 Stage 1

- (a) Install 300 millimetre watermain relocation.
- (b) Pressure test and disinfect 300 millimetre watermain
- (c) Reconnect 300 millimetre watermain and restore to service.
- (d) Remove / abandon portions on the existing 300 millimetre watermain required for installation of feeder mains.

D16.3 Stage 2

- (a) Install 600 millimetre feedermain from and including valve chamber and the bends immediately south of the existing 600 millimetre feedermain. Feedermain to be isolated on both ends.
- (b) Install temporary test bulkheads.
- (c) Pressure test and disinfect 600 millimetre feedermain.

D16.4 Stage 3

- (a) Install 900 millimetre feedermain from the first pipe joint immediately south of the existing 600 millimetre feedermain. Feedermain to be isolated on both ends.

D16.5 Stage 4

- (a) Connect the 600 millimetre feedermain to the existing feedermain pipe.
- (b) Recommission the 600 millimetre Charleswood Feedermain
- (c) Remove / abandon portions on the existing 600 millimetre feedermain required for installation of the 900 millimetre feedermain

D16.6 Stage 5

- (a) Install remaining 900 millimetre feedermain including the bends immediately south of the existing 900 millimetre feedermain. Feedermain to be isolated on both ends
- (b) Install temporary test bulkheads.
- (c) Pressure test and disinfect 900 millimetre feedermain.
- (d) Connect the existing 900 millimetre feedermain to the existing feedermain pipe.
- (e) Recommission the 900 millimetre Wilkes Feedermain
- (f) Remove / abandon portions of the existing 900 millimetre feedermain as required.

D17. SUBSTANTIAL PERFORMANCE

D17.1 The Contractor shall achieve Substantial Performance by November 15, 2005.

D17.2 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.

D17.3 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.

D18. TOTAL PERFORMANCE

D18.1 The Contractor shall achieve Total Performance by December 15, 2005.

D18.2 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.

D18.3 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.

D19. LIQUIDATED DAMAGES

D19.1 If the Contractor fails to achieve critical stages, 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 Calendar Day for each and every Calendar Day following the days fixed herein for same during which such failure continues:

- (a) Substantial Performance – fifteen hundred dollars (\$1500.00);
- (b) Total Performance – five hundred dollars (\$500.00).

D19.2 The amounts specified for liquidated damages in D19.1 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.

D19.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

CONTROL OF WORK

D20. JOB MEETINGS

D20.1 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.

D20.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

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

D21.1 Further to GC:6.26, 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).

D22. WORK BY OTHERS

D22.1 Work by others on or near the Site will include but not necessarily be limited to:

- (a) Manitoba Hydro- hydro pole/ tower relocation and street lighting on Wilkes Avenue and Sterling Lyon Parkway and temporary street lighting on Kenaston Boulevard road detour.
- (b) MTS-Allstream - extension of ducts on west side of Kenaston Boulevard extending West on Sterling Lyon Parkway to Clarke Transport access road and lowering of cables on McCreary Road.
- (c) City of Winnipeg Geomatics Branch.
- (d) Public Works contract (Bid Opportunity #83-2005) including Sterling Lyon Parkway East of Kenaston Boulevard, forcemain construction and auxiliary lanes on Kenaston Boulevard and utility relocation on Department of National Defence Lands.
- (e) Public Works contract (Bid Opportunity #84-2005) including Sterling Lyon Parkway west of Kenaston Boulevard and Kenaston Boulevard detour on the east side of Kenaston Boulevard.
- (f) CN installation of ballast and track components and railway signals on detour and on Shaftesbury Boulevard.
- (g) Traffic services by City of Winnipeg

- (h) New and relocated traffic signals plant by City of Winnipeg.
- (i) Manitoba Hydro – gas utility relocations on Kenaston Boulevard and lowering on McCreary Road

D23. COORDINATION WITH OTHERS

D23.1 The Contractor shall not have exclusive use of the Site. Numerous other road and utility relocation works will be occurring in the area. The Contractor shall coordinate Site activities with others.

FORM H1: PERFORMANCE BOND
(See D9)

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 dated the

_____ day of _____, 20____, for:

BID OPPORTUNITY NO. 340-2005

KENASTON UNDERPASS PROJECT – WILKES AND CHARLESWOOD FEEDERMAIN RELOCATIONS
AND ASSOCIATED WORKS

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)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

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

**FORM H2: IRREVOCABLE STANDBY LETTER OF CREDIT
(PERFORMANCE SECURITY)**
(See D9)

(Date)

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

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 340-2005

KENASTON UNDERPASS PROJECT – WILKES AND CHARLESWOOD FEEDERMAIN
RELOCATIONS AND ASSOCIATED WORKS

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 (1993 Revision), International Chamber of Commerce Publication Number 500.

(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

FORM K: EQUIPMENT
(See D12)

**KENASTON UNDERPASS PROJECT – WILKES AND CHARLESWOOD FEEDERMAIN RELOCATIONS
AND ASSOCIATED WORKS**

<p>1. Category/type: EXCAVATION</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: COMPACTION</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: SHORING</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 D12)

**KENASTON UNDERPASS PROJECT – WILKES AND CHARLESWOOD FEEDERMAIN RELOCATIONS
AND ASSOCIATED WORKS**

<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>

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS, STANDARD DETAILS AND DRAWINGS

- E1.1 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.1.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.
- E1.1.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.1.3 Further to GC:2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.2 The following Drawings are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
D-8737	Cover Sheet
D-8738	300 & 600 Mains – West Leg of Relocation Wilkes Ave. to South Limit
D-8739	300 & 600 Mains – South Leg of Relocation West Limit to East Limit
D-8740	300 & 600 Mains – East Leg of Relocation South Limit to Wilkes Ave.
D-8741	900 Feedermain – West Leg of Relocation Wilkes Ave. to South Limit
D-8742	900 Feedermain – South Leg of Relocation West Limit to East Limit
D-8743	900 Feedermain – East Leg of Relocation South Limit to Wilkes Ave.
D-8744	Valve Chamber – Sections and Details
D-8745	Miscellaneous Details

E2. SOILS INVESTIGATION REPORT

- E2.1 Further to GC:3.1, the geotechnical report is provided to aid the Contractor's evaluation of the pavement structure and/or existing soil conditions. The geotechnical report is contained in Appendix 'A'. Appendix C of the geotechnical report "Test Hole Logs Sterling Lyon Parkway" is not applicable to this project and has been excluded from the report provided in Appendix A of this specification.

GENERAL REQUIREMENTS

E3. EXCAVATION, BEDDING AND BACKFILL

- E3.1 Submittals
- E3.1.1 Shop drawings for all excavation shoring shall be prepared and submitted in accordance to CW 1100. All shop drawings shall be sealed by a Professional Engineer, registered in the Province of Manitoba, experience in the design of excavation shoring systems.
- E3.2 Shoring Design
- E3.2.1 Excavation shoring shall be designed to accommodate installation of all pipe and fittings.
- E3.3 Demolition
- E3.3.1 Demolition and disposal of existing asbestos cement pipelines shall be completed in compliance to Workplace Health and Safety regulations.

E3.3.2 Transportation and disposal of asbestos based projects within the City of Winnipeg shall be in accordance to the guidelines attached in Appendix C.

E3.4 Excavation

E3.4.1 Excess excavation from trenching operations shall be disposed of off-site.

E3.4.2 Granular bedding in the vicinity of existing pipelines shall be dewatered and stabilized prior to undermining pipes to prevent loss of granular pipe foundation.

E3.4.3 Pipelines less than 400 millimetres in diameter, under pavements excluding walkways, shall be installed by trenchless methods.

E3.5 Backfill

E3.5.1 Backfill under existing and proposed pavements shall be completed to CW 2030, Class 2 standards. Granular backfill shall extend to the underside of the proposed pavement structure, as indicated on the drawings. The remaining trench backfill shall be completed to existing grade to CW 2030, Class 4 standards.

E3.5.2 Backfill under proposed paths and walkways shall be completed to CW 2030, Class 4 standards.

E3.5.3 Backfill within 1 metre of existing and new concrete structures shall be completed with free draining pit run granular material to CW 2030, Class 3 standards. The top 600 millimetres of the backfill adjacent to concrete structures shall be insitu clay material completed to CW 2030, Class 4 standards.

E3.5.4 Pipe bedding and backfill of parallel trenches in the vicinity of thrust blocks shall be carefully backfilled to the levels shown on the drawings with crushed granular backfill conforming to CW 2030 Type 2 material, and thoroughly compacted to CW 2030 Class 2 standards.

E3.6 Site Restoration

E3.6.1 Permanent pavement restoration of existing Wilkes Avenue and Kenaston Boulevard will not be required. Restoration of roadways where permanent pavements have been removed shall be completed with a 300 millimetre layer of 100 millimetre down crushed limestone, and a 100 millimetre layer of 50 millimetre down crushed limestone.

E3.7 Measurement and Payment

E3.7.1 Excavation and shoring for pipe installation and valve chambers will not be measured for payment. Costs for excavation and shoring shall be included in the price for installation of feeder mains, water mains and valve chambers.

E4. SUPPLY AND DELIVERY OF PRESTRESSED CONCRETE PIPE AND APPURTENANCES

E4.1 Description

- (a) This Specification supplements and amends AWWA Specification C301-99, AWWA Manual M9 Concrete Pressure Pipe, and AWWA C304-99 Design of Prestressed Concrete Cylinder Pipe.

E4.2 Materials

(a) Cement

- (i) Portland Cement shall be Type 50 Sulphate resistant Cement.
- (ii) External mortar coating shall contain 10 percent silica fume by weight of cement.

- (iii) Approval in writing is required if the Contractor proposed to use fly ash or pozzolan as a supplementary cementing material in conformance with AWWA Standard C301, Section 4.4.1.
 - (iv) Approval requests should be accompanied by a submission from an independent testing laboratory complete with sampling and testing results of the material conforming to ASTM Standard C311.
- (b) Bell and Spigot Joint Rings
- (i) Where indicated on the drawings, restrained joints shall be harnessed clamp joints.
- (c) Fittings
- (i) Fittings shall be manufactured using minimum steel thicknesses specified in Table 1, Section 4.7 of AWWA C301-99.
 - (ii) Flanges for fittings shall be AWWA C207-01 minimum Class D Flanges.
 - (iii) Pipe sections passing through valve chamber walls shall be manufactured with a minimum 12 mm thick by 150 mm wide steel thrust ring, located at the midpoint of the chamber walls, of adequate design to resist specified design forces.
- (d) Prestressed Concrete Cylinder Pipe Connections to Existing Mains
- (i) For connection to existing 900 mm pipe joints, standard single gasket joints will be permitted. Existing joint diameter is 1041 millimetres, and joint depth 86 millimetres. 'O' ring size is unknown, and to be determined by the Contractor.
 - (ii) For connection to existing 600 millimetre Transite Asbestos Cement Pipe, connections shall be made by means of a bolted steel sleeve coupler. The outside diameter of the Transite pipe is unknown and to be determined by the Contractor prior to construction.
- (e) Pipe Marking
- (i) Each section of pipe and each fitting shall be plainly marked with a waterproof marking material both inside, on the bell or spigot end, and outside, at the pipe's midspan, the classification, the date of manufacture and marks of identification sufficient to show its proper location in the line by the reference to the laying schedule specified. The point of maximum bevel shall be marked on the end of the spigot on each piece of bevelled pipe. All bends shall be marked on the ends with the angle of deflection. The manufacturer's proposed marking system shall be included with the "Data to be Supplied by Contractor" in E4.4. Colour coded markings shall be required when there is more than one pipe classification.
- (f) Closures
- (i) Buried pipe closures shall be welded split steel sleeve closures.
 - (ii) The plain steel end of each closure piece shall extend 150mm longer than the required length of the piece to provide an overlap in order to compensate for any correction required when installed.
 - (iii) The Contractor shall be responsible for any interior or exterior mortar coating damage.
 - (iv) Each pipe run shall be designed with a minimum of one (1) closure section. The closure section location will be left to the Contractor, subject to approval of the Contract Administrator, to best suit proposed installation sequencing.

E4.3 Design Requirements

(a) Pipe Design

- (i) The Contractor shall submit details of the pipe design for approval of the Contract Administrator prior to manufacture. Where pipe runs contains more than one pipe class, pipe marking system shall clearly indicate different pipe classes.

- (ii) All pipe and fittings shall be design and constructed to withstand maximum design working pressure of 700 kilopascals, a test pressure of 1000 kilopascals, and all external pressures caused by overburden, traffic or other loads to which the pipe might be subjected, all in accordance with the applicable requirements of AWWA Standard C301 and C304.
 - (iii) Trench loadings shall be calculated and based on a trench width equal to pipe outside diameter (O.D.) width plus 600 millimetres, a soil weight of 1925 kilograms per cubic metre, a trench bedding factor of 1.5, earth cover as indicated on the drawings (minimum earth cover of 2750 millimetres) and a $KU = 0.110$ in Marston's formula. Depth of cover requirements shall use the maximum of proposed final grades or original ground grades. Live loading under proposed roadways shall allow for HSS-25 highway loading.
 - (iv) The steel cylinder shall be a minimum of 1.6 millimetre thickness (No. 16 gauge) and the minimum thickness of the high tensile reinforcing wire shall be 4.2 millimetres thick (No. 8 gauge). Mortar coating shall be a minimum of 24 millimetres thick measured from the outside of the high tensile wire.
- (b) Laying Schedule
- (i) Pipe laying schedule shall incorporate a short pipe length of approximately 1.5 times the diameter, immediately outside of valve chamber piping.
 - (ii) Minor adjustments to pipe design plans to suit standard pipe lengths, may be allowed on approval of the Contract Administrator.
 - (iii) Pipe closures shall be field measured prior to fabrication.
 - (iv) For 600 millimetre and 900 millimetre pipelines, laying schedule shall incorporate sufficient person access points to safely facilitate pipe access for joint grouting and inspection.
 - (v) For 600 millimetre and 900 millimetre pipelines, a minimum of one (1) access point must be installed at the low point of the pipe line at plan station 1+184 on Kenaston Boulevard, to facilitate pipeline dewatering during construction.
- (c) Fitting Design
- (i) Fittings shall be designed to accommodate the horizontal and vertical deflections shown on the Drawings. Where combination horizontal and vertical bends are used, fitting orientation shall be clearly marked on the fitting to aide in installed alignment.

E4.4 Data to be Supplied by Contractor

- (a) Sufficient numbers of copies of all drawings and laying schedules as specified in Specification CW1110, Clause 1.5, shall show full details of reinforcement, concrete and joint dimensions for the straight pipe, specials and connections and shall be furnished by the Contractor for the review by the Contract Administrator. No pipe shall be manufactured until the drawings have been entirely approved.
- (b) The data submitted by the Contractor shall include a tabulated laying schedule with reference to the stationing and grade lines shown on the Drawings. This schedule shall show the locations and length of each class of pipe which the Contractor proposes to furnish, and the point of change from one class to the next shall be clearly indicated by station number. The area of steel per linear metre and such other details as are required shall be listed for each of the pipe classes proposed by the Contractor.
- (c) The Contractor shall be responsible for the accurate details, fabrication and fit of the pipe and specials.
- (d) The Contractor shall submit to the Contract Administrator for review, design calculations for the determination of the details of the pipe reinforcement prior to the manufacture of any pipe. The manufacturer of the pipe shall have sufficient data to verify all design strengths.

- (e) The Contractor shall provide complete Record Drawings for the pipe, including revised laying schedules, closure lengths for field trimmed pieces or other modifications required for the pipe installation.

E4.5 Delivery of Pipe

- (a) Contractor is required to coordinate manufacture and delivery of the pipe with his sub-contractor (the manufacturer) and to meet project scheduling requirements.
- (b) Delivery of the pipe shall be in accordance with AWWA M9 Manual – Concrete Pressure Pipe.

E4.6 Construction Methods

- (a) Pipe Length
 - (i) Standard pipe lengths shall be used, except where special lengths are required by an approved laying schedule.
- (b) Tolerances
 - (i) In addition to the requirements noted in Section 4.5 of AWWA C301-01, the overall length of pipe measured from the end of the spigot to the seat of the bell at any point around the circumference shall not vary more than 3 millimetres +/-.
 - (ii) The Contractor shall accurately measure and confirm pipe bell and spigot tolerances, and ensure pipe mating, prior to shipping pipe. The Contractor shall provide a written report of pipe bell and spigot measurements.

E4.7 Quality Control

- (a) Inspection
 - (i) The Contractor shall afford the Contract Administrator every facility to access and inspect all plant to be provided, work to be performed, materials to be supplied and equipment or machinery to be installed in accordance with the provisions of GC 5.03.
- (b) Testing of Pipe and Materials
 - (i) The Contractor shall provide access to the Contract Administrator or his appointed representative to conduct plant inspections, in accordance to Section 5.1 of AWWA C301-99. The Contractor shall provide a minimum of 7 calendar days notice of commencement of pipe manufacture, for the purposes of scheduling plant inspections.
 - (ii) The Contract Administrator reserves the right to conduct third party quality control testing.
 - (iii) The Contractor shall make, conduct, arrange, make available, obtain and provide for all testing as described in Section 5.2 AWWA Standard C301-99. The following reports shall be made available to the Contract Administrator on request:
 - (iv) Absorption tests shall be carried out by the Contractor on specimens of the exterior coating of the pipe. These tests shall be carried out in accordance with ASTM Standard C497 Method of Testing Concrete Pipe, Sections or Tile, method A.
 - ◆ Notwithstanding AWWA C301-99 4.6.8.3, no individual absorption test may exceed 10%.
 - ◆ Notwithstanding AWWA C301-99 4.6.8.3, mortar tests shall be conducted on a daily basis for the entire production run.
 - ◆ Every effort shall be taken to limit this absorption to 8% as measured in accordance with the ASTM Standard C497. The City will not accept pipe with an absorption rate in excess of 10%. No pipe shall be shipped until the absorption results related to the particular shipment have been provided to the Contract Administrator, and are satisfactory.

- (c) Testing of Fittings and Special Pipe
 - (i) Fittings and special pipe shall be tested in the same manner as pipe except that fittings and special pipe shall be tested for tightness by the dye penetrant method as specified in Section 4.7.2.22 of AWWA Standard C301-99.
- (d) Affidavit of Compliance
 - (i) An affidavit of compliance signed by an officer of the pipe manufacturing company shall be provided stating that the pipe and fittings comply with this Specification, in accordance with Section 6.3 of AWWA C301-99.

E4.8 Method Measurement and Basis of Payment

- (a) Prestressed Concrete Pressure Pipe
 - (i) The supply and delivery of prestressed concrete pressure pipe shall not be measured for payment. It shall be included in the price bid for Main Line Piping - Supply and Install.
- (b) Fittings and Specials
 - (i) The supply and delivery of fittings and specials shall not be measured for payment. They shall be included in the price bid for Supply and Installation of Fittings and Specials.

E5. SUPPLY AND DELIVERY OF POLY-VINYL CHLORIDE PIPE

E5.1 Materials

E5.1.1 Poly-Vinyl Chloride (PVC) Pipe

- (a) Dimension Ration (DR)
 - (i) PVC pipe shall conform to the latest revision of AWWA C905 and CSA B137.3-M86, with the following dimension ratios (DR)
 - ◆ 900 millimetre DR 25
 - ◆ 600 millimetre DR 18
- (b) Fabricated Fittings
 - (i) Fabricated fittings shall be thermally butt welded segments, with overwrapped reinforcement, conforming with AWWA C905 and CSA B137.3-M86. Where non-standard fittings and bend angles are required, fittings shall be constructed in every way to conform to the nearest CSA certified standard fitting.
- (c) Closures
 - (i) Main line closures shall be fabricated PVC slide collars conforming to AWWA C905 and CSA B137.3-M86. Pipe class to be the same as for mainline piping.

E5.1.2 Submittals

- (a) Laying Schedule
 - (i) Submit laying schedule for review by the Contract Administrator. Laying schedule shall show general pipe layout, location of fittings and specials, proposed direction of lay and connection points.
 - (ii) Minor adjustments to pipe design plans to suit standard pipe lengths, may be allowed on approval of the Contract Administrator.
 - (iii) For 600 millimetre and 900 millimetre pipelines, a minimum of one (1) 200 millimetre access tee must be installed at the low point of the pipe line at approximate plan station 1+184 on Kenaston Boulevard, to facilitate pipeline dewatering during construction. Tee shall be installed horizontally.

- (b) Fittings
 - (i) Submit details of all fabricated fittings and specials, including details of proposed connections to existing pipelines.
- (c) Affidavit of Compliance
 - (i) An affidavit of compliance signed by an officer of the pipe manufacturing company shall be provided stating that the pipe and fittings comply with this Specification, in accordance with Section 6.3 of AWWA C905-97.

E5.1.3 Fabrication

E5.1.4 Quality Control

- (a) Inspection
 - (i) The Contractor shall afford the Contract Administrator every facility to access and inspect all plant to be provided, work to be performed, materials to be supplied and equipment or machinery to be installed in accordance with the provisions of GC 5.03.
- (b) Testing of Pipe and Materials
 - (i) The Contractor shall provide access to the Contract Administrator or his appointed representative to conduct plant inspections, in accordance to Section 5.3 of AWWA C905-97. The Contractor shall provide a minimum of 7 calendar days notice of commencement of pipe manufacture, for the purposes of scheduling plant inspections.
 - (ii) The Contract Administrator reserves the right to conduct third party quality control testing.
- (c) Dimensional Checks
 - (i) Notwithstanding AWWA C905, Section 5.1.1, dimensional checks shall be carried out for each and every pipe in the production run.

E5.2 Method Measurement and Basis of Payment

- (a) AWWA C905 Pressure Pipe
 - (i) The supply and delivery of AWWA C905 PVC pipe shall not be measured for payment. It shall be included in the price bid for Supply and Installation of Feeder mains.
- (b) Fittings and Specials
 - (i) The supply and delivery of fittings and specials shall not be measured for payment. They shall be included in the price bid for Main Line Piping - Supply and Install.

E6. SUPPLY AND INSTALLATION OF FEEDERMAINS

E6.1 Description

E6.1.1 This Specification shall cover the preparation of the pipe bed, including the supply of bedding materials and the placement of all pipe and accessories including fittings, as specified or shown on the Drawings.

E6.2 Materials

E6.2.1 Acceptable Feedermain Products

- (a) Prestressed Concrete Pressure Pipe conforming to AWWA C301
- (b) Poly Vinyl Chloride (PVC) conforming to AWWA C905 and CSA B137.3-M86

E6.2.2 Pipe Couplers

- (a) Pipe couplers for pipe connections to chambers shall be to the latest revision of AWWA C-219 for bolted, Sleeve Type Couplers for Plain End Pipe. Minimum requirements are:
 - ◆ Minimum sleeve length 250 mm
 - ◆ Minimum centre sleeve thickness 12.7 mm
 - ◆ Couplings capable of accommodating up to 2 degrees deflection
 - ◆ Bolts and nuts to be 316 Stainless Steel.
 - ◆ Design pressure 150 psi
- (b) Buried pipe couplers shall be protected against corrosion by wrapping with Denso Tape system, consisting of Denso Profiling Mastic, Denso Paste and Densyl Tape, or approved equal.
- (c) Couplings to be supplied with two di-electric insulating boots
- (d) Couplings to be fusion bonded epoxy coated to AWWA C213, and meeting the requirements of ANSI/NSF 61 "Standard for Drinking Water System Components – Health Effects"

E6.2.3 Paint

- (a) Paint for exposed metal surfaces shall be in accordance to AWWA C213.
- (b) Interior coatings shall comply with ANSI/NSF 61 "Drinking Water System Components – Health Effects"
- (c) Coating shall be two (2) or more layers (5 mils minimum each coat) Polyamide Epoxy, Amerlock 400, Tnemec Series 140F Pota-Pox Plus or approved equal.

E6.3 Construction Methods

E6.3.1 Excavation

- (a) Excavation shall be in accordance with Specification CW2030, "Excavation, Bedding and Backfill". Over-excavated material shall be replaced with compacted, well-graded crushed limestone having a maximum aggregate size of 20mm, conforming to CW 2030 Type 2 granular material.

E6.3.2 Pipe Installation – AWWA C301 Pipe

- (a) Installation of Pipe
 - (i) The pipe shall be laid and fitted together so that when complete, the pipe will have a smooth and uniform invert. The trench shall be free of water while the pipe is being installed. The excavation of the trench shall be fully completed a sufficient distance in advance so as not to interfere with the laying of the pipe.
 - (ii) All pipe shall be installed on a 150 millimetre thick bed of sand placed in the bottom of the trench prior to the installation of the pipe in accordance with AWWA M9 Manual, Type R5 Bedding. The sand bedding shall be levelled such that it forms a continuous solid bedding for the full length of the pipe except at the midpoint of each pipe and at the joints. A small groove shall be left at the midpoint to facilitate the removal of the sling after the pipe has been laid. Another groove shall be provided at each joint to facilitate placing of a "diaper" band around the joint. Both grooves shall be filled with compacted sand after the removal of the sling and after placing of the diaper band.
 - (iii) Compacted sand backfill shall be placed above the pipe to a depth of 200 millimetres above the top of the pipe, for the full trench width. Backfill shall be compacted to 90% SPMDD. The Contractor shall ensure that disturbance of

- the pipe or damage to the pipe coating does not occur during sand bedding and backfilling operations.
- (iv) Pipe shall be installed utilizing trench methods. Coring, augering or jacking methods shall not be undertaken without approval of the Contract Administrator.
 - (v) The exposed end of the pipe shall be fully protected with an approved stopper to prevent foreign matter from entering the pipe. The interior of the pipe shall be kept free of all dirt, concrete or superfluous material as the Work proceeds.
- (b) Jointing
- (i) Immediately prior to connecting two lengths of pipe, the spigot end of the pipe shall be thoroughly cleaned. Prior to insertion of the rubber gasket in the spigot groove, the spigot groove shall be lubricated with vegetable soap. The gasket shall then be thoroughly cleaned and then lubricated with a vegetable soap approved by the pipe manufacturer, the consistency of which shall be approximately that of soft No. 2 cup grease. In stretching the gasket, care shall be exercised to maintain a uniform tension or volume of rubber around the whole circumference of the spigot. The bell of the pipe already in place shall be carefully cleaned and lubricated with vegetable soap.
 - (ii) The spigot shall then be pushed into the bell and against steel inserts placed between the top of the spigot and the shoulder of the bell to provide a space for inserting the feeler gauge. The entire circumference of the joint shall be gauged to determine that the rubber gasket is in its proper position. If the gasket cannot be felt all around the pipe, the pipe shall be withdrawn and the gasket examined for cuts. If the gasket is undamaged it may be reused, but only after the bell ring and gasket have been lubricated with soap again, as previously specified, before the pipe is re-laid. When it has been determined that the gasket is in its proper position, the steel inserts shall be removed and the pipe pushed completely "home".
 - (iii) Diaper bands to hold grout in place shall be used according to the manufacturer's instructions. Immediately before pouring cement grout, the entire joint shall be thoroughly wetted. A cement grout of one part Sulphate-Resistant cement to two parts sand shall be poured between the diaper and the pipe, to ensure a thorough sealing of the joint around the portion of the pipe covered by the band. Silt, slush, water or polluted mortar grout shall be carefully forced out by the pouring and removed. The upper portion of the joint shall then be filled with mortar and a bead made around the outside of the top half of the pipe joint with a sufficient amount of additional mortar. The completed joints shall immediately be protected from the air, sun or cold with proper coverings and shall be kept protected for such a period as necessary to secure satisfactory curing of the mortar. No backfilling around joints shall be done until the joints have been fully inspected and approved.
 - (iv) The inside joint recess of the concrete pipe, sizes 600 millimetres and larger, shall be completely filled with mortar made from one part cement and one part sand so as to provide a smooth continuous flush surface across the joint. The Contractor shall comply with all requirements and regulations of the Workplace, Safety and Health Division concerning air supply for workers performing operations inside the pipe and any associated costs shall be considered incidental to the installation.
 - (v) Delay grouting and diapering of short pipe joints immediately outside of chambers, until completion of construction and partial backfill of chamber, to allow maximum differential deflection and settlement prior to final backfill.

(c) Steel Split Ring Closures

- (i) Plain end wall pieces shall be accurately trimmed after installed, to accommodate plain end by flange valve adaptors. The pipe shall be accurately marked around the circumference, from the face of the butterfly valve flanges, to accommodate the flange by plain end adaptor, plus gap allowance shown on the drawings.
- (ii) Buried pipe closures shall be accurately measured, cut and installed. Welded Split Sleeve closures shall be installed by a certified welder.
- (iii) Completed field welds shall be inspected by a certified welding inspector, using magna-flux methods 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) Connection to Chamber Piping

- (i) For AWWA C301 pipe, connection to chamber piping of similar pipe materials may be made by means of bell and spigot joints.
- (ii) For AWWA C301 pipe connection to dissimilar chamber piping, connections shall be made by means of steel sleeve typed coupling. Pipe coupling to be protected from corrosion by Denso tape system.

E6.3.3

Pipe Installation - AWWA C905 PVC

(a) Installation of Pipe

- (i) All pipe shall be installed on a 150 millimetre thick bed of sand placed in the bottom of the trench prior to the installation of the pipe. The sand bedding shall be levelled and compacted to 90% SPMDD, such that it forms a continuous solid bedding for the full length of the pipe except at the midpoint of each pipe and at the joints. The middle of the trench bedding for a width of one third of the pipe outside diameter, shall remain uncompacted.
- (ii) A small groove shall be left at the midpoint to facilitate the removal of the sling after the pipe has been laid. Another groove shall be provided at each joint to facilitate placing of the pipe bell. Both grooves shall be filled with compacted sand after the removal of the sling and after placing of the diaper band.
- (iii) Sand bedding shall be placed to 50 millimetres above the haunch of the pipe and thoroughly compacted to 90% SPMDD, to provide adequate lateral support of the pipe wall. Sand initial backfill shall then be placed to a depth above the pipe to a depth of 200 millimetres above the top of the pipe, for the full trench width. The Contractor shall ensure that disturbance of the pipe or damage to the pipe coating does not occur during sand bedding and backfilling operations.
- (iv) The pipe shall be laid and fitted together so that when complete, the pipe will have a smooth and uniform invert. The trench shall be free of water while the pipe is being installed. The excavation of the trench shall be fully completed a sufficient distance in advance so as not to interfere with the laying of the pipe.
- (v) Pipe shall be installed utilizing trench methods. Coring, augering or jacking methods shall not be undertaken without approval of the Contract Administrator.
- (vi) The exposed end of the pipe shall be fully protected with an approved stopper to prevent foreign matter from entering the pipe. The interior of the pipe shall be kept free of all dirt, concrete or superfluous material as the Work proceeds.

(b) Jointing

- (i) Pipe shall be joined in accordance to manufacturers instructions and accepted industry practice. Over-insertion of pipe joints shall not be permitted.

- (c) Connection to Chamber Piping
 - (i) For pipe connection to chamber piping, connections shall be made by means of steel sleeve typed coupling. Pipe coupling to be protected from corrosion by Denso tape system.

E6.3.4 Frost Conditions

- (a) No pipe shall be laid upon a foundation into which frost has penetrated, nor at any time when the Contract Administrator shall deem that there is danger of the formation of ice or the penetration of frost at the bottom of the excavation. Every precaution must be taken to prevent frost from penetrating the ground to depths below the foundations during construction. Any pipe which, in the opinion of the Contract Administrator, shall have been injured through neglect of this provision of the specifications, shall be removed and made good by the Contractor and at the Contractor's expense.
- (b) Heating of the pipe, sand, mortar and gaskets shall commence when the ambient temperature falls below -5 C. The pipe shall be heated throughout with a low heat immediately prior to installation (warm to the touch).
- (c) All mortar for joints shall be heated, and heated sand shall be placed around the pipe for the full height of the specified bedding and initial backfill and to at least 600 millimetres on either side of the joint, all to the satisfaction of the Contract Administrator.

E6.3.5 Thrust Blocks

- (a) Thrust blocks shall be installed at all tees, wyes, elbows, bends, plugs, reducers and crosses and at location shown on the Drawings. Thrust blocks shall consist of concrete as specified in Specification CW2160 and shall be installed as shown on the Drawings. The thrust block shall bear against undisturbed soil and the soil shall be cut smooth and at the proper angle to the pipe. No horizontal struts or braces required for trench bracing shall remain in the concrete thrust block. A bond breaker consisting of 0.20 millimetre (8 mil) polyethylene sheeting shall be installed between fittings, valves or plugs and the concrete of the thrust block to allow future removal of the thrust block without disturbing the fitting, valve or plug. Before any concrete is placed, all thrust block formwork shall be inspected and approved by the Contract Administrator.

E6.3.6 Clay Dikes

- (a) Clay dikes shall be constructed every 200 linear metres, 5 metres on each side of offtake/valve chamber walls, and as directed by the Contract Administrator. Clay dikes shall consist of compacted clay material extending the width of the trench and for a length of 600 millimetres and shall extend from the bottom of the sand bedding, i.e. from undisturbed earth to the top of the sand backfill.

E6.3.7 Connections to Existing Pipes

- (a) Connections to existing pipes shall be made at the locations shown on the Drawings.
- (b) Connections between existing prestressed concrete cylinder pipe and new Prestressed concrete cylinder pipe shall be made by means of bell and spigot joint. The Contractor shall provide a new pipe gasket for this connection.
- (c) Connections between existing prestressed concrete cylinder pipe and AWWA C905 PVC pipe shall be made by means of a bell or spigot plain end adaptor and bolted sleeve coupling as indicated on the drawings. Alternate connection methods for connection of PVC pipe to existing PCCP may be permitted upon review of the Contract Administrator. Design and fabrication of alternate connections will be the responsibility of the Contractor.

- (d) All pipe joints included in connection sections shall be exposed after recommissioning to inspect for leakage.

E6.3.8 Access and Inspection Manholes

- (a) Upon completion of construction, all access and inspection ports shall be secured closed.
 - (i) For AWWA C301 pipe, access manholes shall be blind flanged closed using stainless steel bolts, nuts and hardware. Once closed, a protective coating of 50 millimetres of sulphate resistant grout shall be placed over the flange and bolts.
 - (ii) For AWWA C905 PVC, a cast iron plug shall be inserted into access tee and secured to the fitting with 316 stainless steel bolts. A concrete thrust block shall then be poured on the plug, as shown on the drawings.

E6.3.9 Painting

- (a) All exposed metal surfaces including valves, fittings, anchor bolts, flange bolts etc. where not specified to be copper, brass or galvanized, and all galvanized surfaces exposed by welding connections shall be painted.
- (b) Metal surfaces shall be cleaned thoroughly by wire brushing or abrasive blasting.
- (c) Paint exposed surfaces in accordance to AWWA C213.

E6.3.10 Change in the Laying Schedule

- (a) If the Contractor requests changes in the laying schedule, that is relocation of items such as offtakes, closures, valve chambers or any other alteration of the laying schedule, all costs associated with these changes shall be paid for by the Contractor.

E6.3.11 Demolition, Removal and Abandonment of Existing Pipe, Fittings and Chambers

- (a) Where indicated on the Drawings and directed by the Contract Administrator, remove designated portions of pipe. Removal methods shall be employed that preclude damage to adjacent pipes and joints that are to remain in place.
- (b) Salvage a minimum of one (1) complete length of each type of pipe and return to designated City facility for examination and testing purposes.
- (c) Piping required to be cut and/or demolished to facilitate removal of adjacent pipe shall be a minimum of one complete pipe length away from proposed connection points.
- (d) All gaskets from existing pipes shall be carefully salvaged, cleaned and inspected. Due to changes in gasket design, existing gaskets may require re-use when connecting to existing pipe spigots.
- (e) Abandon valve chambers indicated on the drawings. Remove manhole covers and removable roof slabs as required. Carefully remove all valves, fittings and couplings. Demolition or filling on the chamber is not required. Replace manhole covers and removable slabs.
- (f) All pipe and valves removed shall be salvaged, and returned to a designated City of Winnipeg facility.

E6.4 Quality Control

E6.4.1 Inspection

- (a) The Contractor shall afford the Contract Administrator every facility to access and inspect all plant to be provided, work to be performed, materials to be supplied and equipment or machinery to be installed.

E6.4.2 Line and Grade

- (a) The pipe shall be installed to the line and grade shown on the Drawings and as set in the field by the Contract Administrator. Vertical variance from grade shall not exceed 25 millimetres and horizontal variance from line shall not exceed 100 millimetres. Sharp bends will not be permitted even though the pipe remains within these tolerances. Alignment corrections allowed in main line piping but not at closures. Tees and bends shall be installed to the grades and at the locations shown on the Drawings or where required to connect to existing pipelines.

E6.4.3 Hydrostatic Leakage Testing

- (a) Testing shall be completed in accordance to CW 2125. The Contractor shall slowly fill the feedermain with potable water and ensure all air is expelled from the line.

E6.4.4 Disinfection of Watermains

- (a) Disinfection of watermains and feeder mains shall be completed in accordance with CW2125 except initial flushing will not be required.
- (b) The Contractor shall take every reasonable precaution 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.
- (c) Further to CW 2125, disinfection of segments of watermains not disinfected as noted above, shall be completed by swabbing as outlined in Section 3.3.16 of CW 2125.
- (d) Upon completion of disinfection, chlorinated water shall be pumped from the pipeline at the lowest point(s) in the system. Chlorinated water shall not be directly discharged to the environment. 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 waste water sewer;
 - (ii) be de-chlorinated using Sodium Ascorbate, Vita-D-Chlor™ by Integra Chemical, or approved equal;
 - (iii) contained on Site until chlorine has dissipated to acceptable limits.
- (e) The pipeline shall be refilled with potable water and water samples for health tests taken in accordance to CW 2125, except test samples shall be taken each day at least 24 hours apart for three (3) successive days.

E6.5 Method of Measurement and Basis of Payment

E6.5.1 Supply and Installation of Feeder mains

- (a) Supply and Installation of feeder mains shall be measured and paid on a length basis. The length to be paid for shall be the total number of linear metres acceptably installed as to each size, class, type of backfill and method of installation listed in Form B Prices "Main Line Piping- Supply and Install". Measurement shall be made horizontally, at grade, above the centreline of the pipe, through all fittings and appurtenances, as computed by measurements made by the Contract Administrator, include all accessories, appurtenances. The length measured and paid will be from the first pipe joint outside of the valve chambers, to the connection points on the existing feeder mains. Measurement will be from face of bell to face of bell.

Payment for feeder mains will be made on the following payment schedule;

 - (i) Thirty percent (30%) payment upon delivery of pipe to the jobsite.
 - (ii) Ninety percent (90%) payment upon successful installation of the pipe

- (iii) One hundred percent (100 %) payment upon successful testing, disinfection and recommissioning of the pipe.
- (b) Supply and Installation of fittings and specials shall be made on a unit basis. The units measured and paid shall be the total number of fittings and specials installed, of each size, class and type, as listed in Form B Prices "Supply and Install Fittings and Specials".

Payment for fittings and specials will be made on the following payment schedule:

- (i) Thirty percent (30%) payment upon delivery of fittings and specials to the jobsite.
- (ii) Ninety percent (90%) payment upon successful installation of the fittings and specials
- (iii) One hundred percent (100 %) payment upon successful testing, disinfection and recommissioning of the pipe.

E6.5.2 Connection to Existing Pipes

- (a) Connections to existing pipes will be measured on a unit basis. The price paid for the connection shall be the total number of connections made, in accordance with this specification and shall include all excavations, backfill, removal of existing pipes and bulkheads, patching of concrete where required and provision of new pipe gaskets as listed in Form B Prices "Connect to Existing Feeder mains". Where connections involve installing a tee in an existing line, the price for the connection shall include reconnection of both ends of the tee.

E6.5.3 Construction of Thrust Blocks

- (a) Construction of thrust blocks will be measured on a unit basis. The number of units measured and paid will be the total number of thrust blocks constructed for each size and deflection as listed in Form B Prices "Construction of Thrust Blocks".

E6.5.4 Testing and Disinfection

- (a) Testing and Disinfection of feeder mains will be measured and paid on a unit basis as listed in Form B Prices "Pressure Test and Disinfection". The price paid shall include all main cleaning testing, disinfecting, and disposal of chlorinated water, successfully completed in accordance with this specification.

E6.5.5 Abandonment of Existing Feeder mains

- (a) Abandonment of existing feeder mains shall be measured on a length basis. The length to be paid for shall be the total number of linear metres acceptably removed and disposed for each size of pipe listed in Form B Prices "Abandon Existing Feeder mains".
- (b) Abandonment of Valve Chambers shall be measured on a lump sum basis. The units paid shall be the total number of valve chambers abandon, including removal and salvage of all fittings, and returning salvaged items to a designated City of Winnipeg facility.

E7. CONSTRUCTION OF VALVE CHAMBERS

E7.1 Materials

- (a) Sub Drain Pipe
 - (i) As per City of Winnipeg, Division 4 Approved Products.
 - (ii) Pipe to be PVC SDR 35 products only.
- (b) Formwork, Reinforcing Steel and Concrete
 - (i) As per City of Winnipeg CW 2160.

- (c) Concrete Mix Design
 - (i) Concrete Mix Design as per Table CW 2160.1, Type A mix.
- (d) Water Stops
 - (i) As indicated on the Drawings.
- (e) Rigid Insulation
 - (i) Rigid insulation for below grade applications shall be rigid polystyrene insulation conforming to CAN/ULC S701 Type 4, Styrofoam SM by Dow Chemical, Celfort 300 by Owens Corning, or approved equal.
- (f) Precast Air Valve Chambers
 - (i) Precast chambers shall be in accordance to ASTM C478 or ASTM C76 Class 3 pipe.

E7.2 Submittals

- (a) Submit reinforcing steel shop drawings and concrete mix design in accordance to CW 2160.

E7.3 Construction Methods

- (a) Cast-in-place concrete as per CW 2160.
- (b) Floor Drains
 - (i) Construct Floor drain as detailed on the drawings.
- (c) Pipe, Valves Fittings and Appurtenances
 - (i) As per E8 , E4 and E6.
- (d) Subdrain pipe shall be installed in a geotextile wrapped drainage trench as per City of Winnipeg Standard Detail SD-245.
- (e) Install Precast Air Valve Chambers in accordance with CW 2130 Clause 3.8

E7.4 Method of Measurement and Basis of Payment

- (a) Construction of Valve Chambers shall be measured on a lump sum basis, for each valve chamber constructed in accordance to these specifications, as listed in Form B Prices "Construction of Valve Chambers". The lump sum price shall include excavation, backfill, cast-in-place concrete works, installation of butterfly valves, installation of chamber piping, supply and installation of miscellaneous valves, appurtenances, miscellaneous metals, couplings, sub drains, interior plumbing, miscellaneous materials and bollards. Chamber piping shall be considered all piping within the chamber, to the first joint outside the chamber wall.

E8. INSTALLATION OF BUTTERFLY VALVES, MISCELLANEOUS VALVES AND FITTINGS

E8.1 Supply and Field Testing of 600 Butterfly Valves

- (a) 600 Butterfly valves are being supplied under a separate bid opportunity, City of Winnipeg Bid Opportunity 332-2005. Valves are to be supplied, delivered and tested at the City of Winnipeg, 598 Plinguet Avenue Road, by October 31, 2005
- (b) The Contractor shall attend a delivery inspection, with the Valve Supply Contractor, and Contract Administrator. The 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 B) shall constitute acceptance for installation from the Installation Contractor.

- (c) The Valve Supply Contractor shall perform hydrostatic leakage testing of the valves, after delivery. Any leakage or defects noted during field-testing shall be repaired by the Supply Contractor, prior to the Installation Contractor taking possession.
- (d) The Installation Contractor may leave the valves in storage at the City facility at 598 Plinguet Avenue, until required on-site for preassembly and installation.
- (e) Once removed from storage at the City facility, the Contractor shall transport valves to the jobsite. Once delivered to the Site for preassembly and installation, the valves shall remain stored in a secure, on-site storage compound protected from the weather.
- (f) For the purposes of transportation of the valves from the storage facility to the job site, the Contractor shall ensure the following:
 - (i) Valve flange faces are protected from damage by installation of a minimum of 20 mm plywood cover on both faces of each valve.
 - (ii) Valves be handled only by methods approved by the manufacturer, and properly secured to preclude any damage during transport.

E8.2 Materials

- (a) Chamber Pipe
 - (i) Steel Pipe Conforming to AWWA C200
 - ◆ Minimum steel yield strength of 307 MPa (30,000 psi)
 - ◆ Minimum wall thickness 6.3 millimetres (600 and 300 millimetre size)
 - ◆ Paint for exposed steel surfaces shall be in accordance with AWWA C213.
 - ◆ Interior coatings shall comply with ANSI/NSF 61 “Drinking Water System Components – Health Effects”
 - ◆ Coating shall be two (2) or more layers (5 mils minimum each coat) Polyamide Epoxy, Amerlock 400, Tnemec Series 140F Pota-Pox Plus or approved equal.
 - (ii) Ductile Iron Pipe conforming to AWWA C151
 - ◆ Class 54
 - ◆ Cement Lined as per AWWA C104
 - (iii) Prestressed Concrete Cylinder Pipe conforming to AWWA C301
- (b) Chamber Fittings
 - (i) Fabricated steel fittings conforming to AWWA C208
 - (ii) Ductile Fittings conforming to AWWA C110
- (c) Bolts
 - (i) Bolts shall be ASTM A307 grade B. Bolt size, type and diameter shall be in accordance to AWWA C207-01. Bolt length shall be sufficient to accommodate flanges, gaskets and insulators.
 - (ii) Flange insulator kits shall be Advance Products and Systems or approved equal, including full faced gasket, hole sleeves and washers.
- (d) Flange Gaskets
 - (i) 3mm, full faced, cloth inserted SBR rubber gaskets or Nylon inserted neoprene in accordance with AWWA C207. Gaskets shall be one piece construction where possible. 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.

- (e) Blind Flanges
 - (i) Steel Flanges shall be AWWA C207-01 Class D.
 - (ii) Cast and Ductile flanges shall be ASME/ANSI B16.1 Class 125
- (f) Valve Stem Extensions
 - (i) Schedule 40 Stainless Steel ASTM A-276 Type 304. Size and length as shown on the drawings, fitted with 50mm square operating nut.
- (g) Threaded Valves
 - (i) Small diameter threaded gate valves (75mm diameter and less) shall be all cast bronze, solid wedge disk, rising stem c/w hand wheel rated for minimum 1.0 MPa non-shock cold water service. Direction of opening shall be counter clockwise and shall be indicated on the hand wheel. Bronze material shall conform to ASTM B62. Acceptable product; Crane, Jenkins, Kennedy, Mueller, or approved equal.
- (h) Threaded Piping, Fittings and Flanges
 - (i) Small diameter brass threaded piping, fittings and flanges (75mm diameter and less) shall be cast red brass conforming to ASTM B43 or cast bronze conforming to ASTM B62. Flange dimension and drilling shall be in accordance with ANSI B16.24 - 150#.
 - (ii) Small Diameter steel threaded fittings and flanges (75mm diameter and less) shall accordance with ANSI B16.5 - Class 150.
 - (iii) Small diameter steel pipe nipples shall be Schedule 80 steel.
- (i) Air Release Valves
 - (i) Air Release Valves shall have a minimum of a 50 millimetre threaded inlet, and a 4.76 millimetre orifice, APCO Model S 200A, Val-Matic Series 38 or approved equal.
 - (ii) 316 Stainless Steel trim, levels and floats
 - (iii) Design Pressure 1000 KPa

E8.3 Design

- (a) All Pipe and fittings shall be designed for a operating pressure of 700 kilopascals (100 p.s.i.) and a test pressure of 1000 Kilopascals (150 p.s.i.)

E8.4 Submittals

- (a) Submit shop drawings and data sheets for all valves and pipe specials.
- (b) Submit layout drawings for all chamber pipe.

E8.5 Construction Methods

- (a) Installation of Butterfly Valves
 - (i) Prior to installation of butterfly valves, the Contractor shall receive installation instructions from the Valve Supply Contractor. Upon completion of installation, Form 201: Certificate of Instruction (Appendix B) shall be completed and submitted to the Contract Administrator.
 - (ii) Install butterfly valve as shown on the drawings. Valves shall be installed with the valve shaft in the horizontal position. The Supply Contractor is obligated to provide installation supervision, and will complete Form 202: Certificate of Satisfactory Installation (Appendix B) upon successful installation.
 - (iii) Core 125 mm opening in roof slabs directly above actuator operation nut. Valve box and valve stem extensions shall be installed plumb and aligned directly above the valve actuator operation nut.

- (b) Commissioning of Butterfly Valves
 - (i) The Contractor shall assist in operation of the butterfly valves for the purpose of commissioning. The Supply Contractor is required to complete Form 203 (Appendix B), indicating a qualified representative has checked the installed equipment, and has found the equipment to be installed and operating in accordance to the specifications.
- (c) Threaded Valves and Fittings
 - (i) Install threaded nipples and flanges where indicated. Wrap all threads with a minimum of two wraps of Teflon tape or "pipe dope" containing Teflon. Isolate dissimilar metal flanges with gaskets, insulating bolt sleeves and non metallic washers.
- (d) Valve Chamber Sump Drains
 - (i) Install sump drains, traps and cleanouts as indicated on the drawings.
 - (ii) Install 150 millimetre valve chamber drain to limits shown on drawings. Install timber marker at plug end.

E8.6 Method of Measurement and Basis of Payment

- (a) Installation of Large Diameter Valves
 - (i) Large diameter butterfly valve installation will not be measured for payment. They are to be included in the price bid for "Construction of Valve Chambers".
- (b) Supply and Installation of Small Diameter Valves, Fittings, Nipples and Flanges
 - (i) Supply and Installation of small diameter valves, fittings, nipples and flanges will not be measured for payment. They are to be included in the price for "Construction of Valve Chambers".
- (c) Valve Chamber Sump Drains
 - (i) Supply and Installation of valve chamber sump drains will not be measured for payment. They are to be included in the price for "Construction of Valve Chambers".