THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 831-2009

SUPPLY, INSPECTION OF INSTALLATION, AND COMMISSIONING OF BUTTERFLY VALVES, FLOW METER AND MISCELLANEOUS EQUIPMENT

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B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 4:00 p.m. Winnipeg time, December 8, 2009.

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

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

B3. ENQUIRIES

B3.1 All enquiries shall be directed to the Contract Administrator identified in D4.1.

B3.2 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 promptly notify the Contract Administrator of the error, discrepancy or omission at least five (5) Business Days prior to the Submission Deadline.

B3.3 If the Bidder is unsure of the meaning or intent of any provision therein, the Bidder should request clarification as to the meaning or intent prior to the Submission Deadline.

B3.4 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.

B3.5 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.

B3.6 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B3 unless that response or interpretation is provided by the Contract Administrator in writing.

B4. ADDENDA

B4.1 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.

B4.2 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.

B4.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/bidopp.asp

B4.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

B4.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 9 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B5. SUBSTITUTES

B5.1 The Work is based on the materials, equipment, methods and products specified in the Bid Opportunity.

B5.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

B5.3 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.

B5.4 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 material, equipment, method or product 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 Contract;

(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 Contract.

B5.5 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.

B5.6 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.

B5.6.1 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.

B5.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

B5.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may 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 B13.

B5.9 No later claim by the Contractor for an addition to the price(s) because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B5.10 Notwithstanding B5.2 to B5.9, and in accordance with B6.7, deviations inconsistent with the Bid Opportunity document shall be evaluated in accordance with B13.1(a).

B6. BID SUBMISSION

B6.1 The Bid shall consist of the following components:

(a) Form A: Bid;

(b) Form B: Prices;

B6.2 Further to B6.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B5.

B6.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.

B6.4 The Bid Submission may be submitted by mail, courier or personal delivery, or by facsimile transmission.

B6.5 If the Bid Submission is submitted by mail, courier or personal delivery, it shall be enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address, and shall be submitted to:

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

B6.5.1 Samples or other components of the Bid Submission which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder’s Bid Submission.

B6.6 Bidders are advised not to include any information/literature except as requested in accordance with B6.1.

B6.7 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B13.1(a).

B6.8 If the Bid Submission is submitted by facsimile transmission, it shall be submitted to (204) 949-1178.

B6.8.1 The Bidder is advised that the City cannot take responsibility for the availability of the facsimile machine at any time.

B6.9 Bids submitted by internet electronic mail (e-mail) will not be accepted.

B7. BID

B7.1 The Bidder shall complete Form A: Bid, making all required entries.

B7.2 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.

B7.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B7.2.

B7.3 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.

B7.4 Paragraph 11 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.

B7.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.

B7.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

B8. PRICES

B8.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.

B8.1.1 Prices on Form B: Prices shall include:

(a) duty;

(b) freight and cartage;

(c) Provincial and Federal taxes [except the Goods and Services Tax (GST) and Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable] and all charges governmental or otherwise paid;

(d) profit and all compensation which shall be due to the Contractor for the Work and all risks and contingencies connected therewith.

B8.2 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.

B8.3 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.

B8.4 Prices from Non-Resident Bidders are subject to a Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B9. QUALIFICATION

B9.1 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, or if the Bidder does not carry on business in Manitoba, in the jurisdiction where the Bidder does carry on business; and

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

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

B9.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

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

B9.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

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

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

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

B9.4 The Bidder shall be prepared to submit, within three (3) business days of a request by the Contract Administrator, the following technical data for determination that all equipment offered complies with the Specifications described in Part E. The Bidder shall also provide the following specific information:

(a) The name and model number for all butterfly valves, actuators, flow meter and air valves listed in Form B: Prices and also listed in further detail in Specifications Part E.

B9.5 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B9.6 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B10. OPENING OF BIDS AND RELEASE OF INFORMATION

B10.1 Bids will not be opened publicly.

B10.2 Following the Submission Deadline, the names of the Bidders and their Total Bid Prices (unevaluated, and pending review and verification of conformance with requirements or evaluated prices) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt

B10.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract Amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt

B10.4 The Bidder is advised that any information contained in any Bid may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B11. IRREVOCABLE BID

B11.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 10 of Form A: Bid.

B11.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work for the time period specified in Paragraph 10 of Form A: Bid.

B12. WITHDRAWAL OF BIDS

B12.1 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.

B12.1.1 Notwithstanding C21, 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.

B12.1.2 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 11 of Form A: Bid, and only such person, has authority to give notice of withdrawal.

B12.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:

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

(b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 11 of Form A: Bid; and

(c) if the notice has been given by any one of the persons specified in B12.1.3(b), declare the Bid withdrawn.

B12.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B11.2 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.

B13. EVALUATION OF BIDS

B13.1 Award of the Contract shall be based on the following bid evaluation criteria:

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

(b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B9 (pass/fail);

(c) Bid Price;

(d) economic analysis of any approved alternative pursuant to B5;

B13.2 Further to B13.1(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 or minor informalities or irregularities if the interests of the City so require.

B13.3 Further to B13.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid or in other information required to be submitted, that he is responsible and qualified.

B13.4 Further to B13.1(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.

B13.4.1 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.

B13.4.2 Further to B13.1(a), in the event that a unit price is not provided on Form B: Prices, the City will determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

B14. AWARD OF CONTRACT

B14.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B14.2 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.

B14.2.1 Without limiting the generality of B14.2, 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.

B14.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B13.

B14.3.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his Bid upon written request to the Contract Administrator.

B14.4 Notwithstanding C4 and Paragraph 6 of Form A: Bid, the City will issue a purchase order to the successful Bidder in lieu of the execution of a Contract.

B14.5 The Contract Documents, as defined in C1.1(n) (ii), in their entirety shall be deemed to be incorporated in and to form a part of the purchase order notwithstanding that they are not necessarily attached to or accompany said purchase order.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

C0.1 The *General Conditions for the Supply and Delivery of Goods* (Revision 2008 05 26) are applicable to the Work of the Contract.

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

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

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

D1.1 In addition to the *General Conditions for the Supply and Delivery of Goods*, these Supplemental Conditions are applicable to the Work of the Contract.

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of the supply and delivery of AWWA C504 butterfly valve, complete with electronic actuators, Electromagnetic flow meter, and combination air valve, and assistance in field testing and commissioning of the equipment.

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

(a) Supply and delivery of one (1) 1050 mm AWWA C504 Butterfly valve and electronic actuator.

(b) Supply and delivery of one (1) 900 mm AWWA C504 Butterfly valve and electronic actuator.

(c) Supply and delivery of one (1) 1050 mm Electromagnetic flow meter.

(d) Supply and delivery of one (1) 100 millimetre and one (1) 150 mm AWWA C512 Combination Air valve.

(e) Instruction to the Installation Contractor as to the proper installation methods for the equipment.

(f) Inspection of the equipment installation.

(g) Provision of equipment training to City staff.

(h) Supervision of Commissioning.

(i) Provision of Operating and Maintenance Manuals (in English).

D3. DEFINITIONS

D3.1 When used in this Bid Opportunity:

(a) **ANSI** means American National Standards Institute.

(b) **ASME** means American Society of Mechanical Engineers.

(c) **ASTM** means American Society for Testing and Materials.

(d) **AWWA** means American Water Works Association.

(e) **CSA** means Canadian Standards Association.

(f) **IEC** means International Electrotechnical Commission.

(g) **ISO** means International Organization for Standardization.

(h) **NACE** means National Association of Corrosion Engineers.

(i) **NEMA** means National Electrical Manufacturers Association.

(j) **NSF** means National Sanitation Foundation.

(k) **SAE** means Society of Automotive Engineers.

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

(a) "**Installation Contractor or Installer**" means the General Contractor retained by the Owner, under a separate contract, to install the equipment supplied under this contract.

D4. CONTRACT ADMINISTRATOR

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

Marvin McDonald, C.E.T.
Project Manager
99 Commerce Drive
Winnipeg, MB R3P 0Y7

Telephone No.: (204) 284-0580
Facsimile No.: (204) 475-3646

D5. NOTICES

D5.1 Notwithstanding C21.3, 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 Financial Officer
Administration Building, 3rd Floor
510 Main Street
Winnipeg MB R3B 1B9

Facsimile No.: (204) 949-1174

SUBMISSIONS

D6. AUTHORITY TO CARRY ON BUSINESS

D6.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

D7. INSURANCE

D7.1 The Contractor shall provide and maintain the following insurance coverage:

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

(b) if required, 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), to remain in place at all times during the performance of the Work;

D7.2 Deductibles shall be borne by the Contractor.

D7.3 The Contractor shall provide the Contract Administrator with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in C4 for the return of the executed Contract.

D7.4 The Contractor shall not cancel, materially alter, or cause the policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

SCHEDULE OF WORK

D8. COMMENCEMENT

D8.1 The Contractor shall not commence any Work until he is in receipt of a notice of award from the City authorizing the commencement of the Work.

D8.2 The Contractor shall not commence any Work until:

(a) the Contract Administrator has confirmed receipt and approval of:

(i) evidence of authority to carry on business specified in D6;

(ii) evidence of the workers compensation coverage specified in C6.16, and

(iii) evidence of the insurance specified in D7;

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

D9. DELIVERY

D9.1 Goods shall be delivered by the delivery schedule noted below, f.o.b. destination, freight prepaid to 360 McPhillips Street, Winnipeg, Manitoba by April 23, 2010:

D9.2 The City intends to issue a notice of Award or purchase order no later than December 22, 2009. In the event that the notice of Award is not issued by this date, the dates specified in D9.1 will be adjusted by an equivalent number of Calendar Days until such a time as the notice of Award is issued.

D9.3 The Contractor shall confirm each delivery with the Contract Administrator or his/her designate, at least two (2) Business Days before delivery.

D9.4 Goods shall be delivered between 8:30 a.m. and 4:30 p.m. on Business Days.

D9.5 The Contractor shall off-load goods as directed at the delivery location.

D10. LIQUIDATED DAMAGES

D10.1 If the Contractor fails to achieve delivery of the goods within the time specified in D9.1 Delivery, the Contractor shall pay the City five hundred dollars ($500.00) per Calendar Day for each and every Calendar Day until the goods have been delivered.

D10.2 The amount specified for liquidated damages in D10.1 is based on a genuine pre-estimate of the City's damages in the event that the Contractor does not achieve Delivery by the day fixed herein for same.

D10.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

MEASUREMENT AND PAYMENT

D11. PAYMENT

D11.1 Further to C10, the City may at its option pay the Contractor by direct deposit to the Contractor’s banking institution.

D12. PAYMENT SCHEDULE

D12.1 Further to C10, payment shall be in accordance with the following payment schedule:

(a) Supply and Delivery in accordance to D9, seventy-five percent (75%) of Bid Price for each specific Supply and Delivery item (Items 1 to 3 in Form B: Prices). Note that the Form 200 - Certificate of Equipment Delivery must be executed for each actuator by the Contractor prior to issuance of payment.

(b) Upon satisfactory on-site testing and commissioning, twenty-five percent (25%) of Bid Price for each specific Supply and Delivery item (Items 1 to 3 in Form B: Prices). Note that the Form 203 - Certificate of Equipment Satisfactory Performance must be executed for each actuator by the Contractor prior to issuance of payment.

(c) In the event that the equipment supplied under this Bid Opportunity is not installed by others within sixty (60) Calendar Days of the date set out in D9, through no fault of the Contractor, fifteen percent (15%) of the Bid Price for each specific Supply and Delivery item (Items 1 to 3 in Form B: Prices) will be paid out to the Contractor. The balance of payment (Items 1 and 2 on Form B: Prices) will be made upon successful testing and commissioning of the equipment in accordance with the Specifications.

(d) Payment for site inspection and commissioning services (Item 4 on Form B: Prices) will be paid within thirty (30) days of successful provision of site inspection and commissioning services, and shall be compensation in full for inspection of installation of butterfly valve actuators, operation and maintenance manuals and training in accordance with the Specifications. Provision of additional site inspection services will only be made upon request and approval of the Contract Administrator in accordance with the Specifications.

WARRANTY

D13. WARRANTY

D13.1 Warranty is as stated in C11.

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

E1.1 These Specifications shall apply to the Work.

E1.2 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B5.

E2. GOODS

E2.1 The Contractor shall supply the following equipment in accordance with the requirements hereinafter specified.

(a) One (1) 1050 millimetre and one(1) 900 millimetre AWWA C504 butterfly c/w electric actuators.

(b) One (1) 1050 millimetre electromagnetic flowmeter.

(c) One (1) 100 millimetre and one 150 millimetre AWWA C512 Combination Air Valve.

E2.2 Electric actuators shall be in accordance with the latest version of AWWA Standard C540 or as specified herein.

E2.3 Equipment is intended for installation in a proposed valve chamber and meter pit, located on Logan Avenue near Yeoman's Street.

E2.4 Inspection of installation in accordance with the requirements hereinafter specified.

E3. EXPEDITED SHOP DRAWINGS

E3.1 Further to E4 – Shop Drawings, in order to expedite Shop Drawings with critical timelines, the lowest responsive Bidder, as outlined in B13, will be permitted, after receiving written approval from the Contract Administrator, to arrange for the preparation of Shop Drawings for the following items with critical timelines:

(a) Butterfly Valve and Electric Valve Actuators as per E5.

(b) Electromagnetic Flowmeter as per E7

E3.2 If Award is made to the Lowest Responsive Bidder, then as per E4.1(a)(iii), no payment for the preparation of Shop Drawings will be made.

E3.3 If no contract is awarded, then the City of Winnipeg will pay the requested Bidder up to a maximum of five hundred dollars ($500.00) for each of the requested submissions noted above, for the preparation and delivery of Shop Drawings. Delivery of the Shop Drawings to the City of Winnipeg and payment of the above amounts will constitute full and final consideration of each party to the other, and neither party will have any further liability to the other with respect to this tender.

E4. SHOP DRAWINGS

E4.1 Description

(a) This Specification shall revise, amend, and supplement the requirements of CW 1100 of the City of Winnipeg's Standard Construction Specifications.

(i) The term “Shop Drawings: means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, which are to be provided by the Contractor to illustrate details of a portion of the Work.

(ii) The Contractor shall submit specified Shop Drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be shown on all submissions for Engineering review.

(iii) Provision of Shop Drawings will be considered incidental to the price for supply and delivery of equipment.

(b) Shop Drawings

(i) Original drawings are to be prepared by the Contractor, Subcontractor, Supplier, Distributor, or Manufacturer, which illustrate the appropriate portion of Work; showing fabrication, layout, setting, or erection details as specified in appropriate sections.

(c) Contractor’s Responsibilities

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

(ii) Verify:

(a) Field measurements

(b) Field construction criteria

(c) Catalogue numbers and similar data

(iii) Coordinate each shop drawing submission with the requirements of the Work and Contract Documents. Shop drawings of separate components of a larger system will not be reviewed until all related drawings are available.

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

(v) Responsibility for deviations in Shop Drawing submission from requirements of Contract Documents is not relieved by the Contract Administrator’s review of submission, unless the Contract Administrator gives written acceptance of specified deviations.

(vi) Responsibility for errors and omissions in the Shop Drawing submission is not relieved by the Contract Administrator’s review of the submittals.

(vii) The Contractor shall make any corrections required by the Contract Administrator and shall resubmit the required number of corrected copies of Shop Drawings. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Contract Administrator on the previous submission.

(viii) After the Contract Administrator has reviewed and returned the copies, distribute the copies to sub-trades as appropriate.

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

(d) Submission Requirements

(i) Schedule to submit Shop Drawing submissions is within seven (7) Calendar days of a request as indicated in E3 or receipt of Notice of Award in accordance with B14, which ever is earlier, and allow for a seven (7) Calendar day period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.

(ii) Submit five (5) paper prints of Shop Drawings. The Contractor is advised that the Contract Administrator will retain three (3) copies of all submittals and return two (2) copies to the Contractor.

(iii) Accompany shop drawing submissions with a transmittal letter containing:

(a) Date

(b) Project title and Bid Opportunity number

(c) Contractor's name and address

(d) Number of each shop drawing, product data, and sample submitted

(e) Specification Section, Title, Number, and Clause

(f) Drawing Number and Detail/Section Number

(g) Other pertinent data

(iv) Shop drawing submissions shall include:

(a) Date and revision dates.

(b) Project title and Bid Opportunity number.

(c) Name of:

(i) Contractor

(ii) Subcontractor

(iii) Supplier

(iv) Manufacturer

(v) Separate detailer when pertinent

(d) Identification of product of material.

(e) Relation to adjacent structure or materials.

(f) Field dimensions, clearly identified as such.

(g) Specification section name, number and clause number or drawing number and detail/section number.

(h) Applicable standards, such as CSA or CGSB numbers.

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

(e) Other Considerations

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

(ii) Material and equipment delivered to the Site will not be paid for until pertinent shop drawings have been submitted and reviewed.

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

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

E5. BUTTERFLY VALVES

E5.1 Description

(a) This Specification shall cover the design and manufacture of butterfly valves to be supplied under this Contract. This Specification is supplementary to and shall be read together with the latest revision of AWWA Standard C504, "Rubber Seated Butterfly Valves".

(b) All butterfly valves to be supplied under this Contract shall be designed and manufactured by a company having at least five (5) years prior experience in manufacturing these types of products in the sizes and to the pressure ratings as those specified herein.

E5.2 Design Requirements

(a) General

(i) Design, materials and construction of all valves shall conform to the latest version of AWWA Standard C504.

(ii) Further to AWWA C504, products and coatings in contact with potable water shall be certified as suitable for contact with drinking water by an accredited certification organization in accordance with ANSI/NSF 61 “Drinking Water System Components – Health Effects”

(iii) Design torques shall be calculated using procedures outlined in AWWA Manual of Water Supply Practices – Butterfly Valves: Torque, Headloss and Cavitation Analysis – M49.

(b) Design Parameters

(i)	Service	Potable Drinking Water
(ii)	Chemical Resistance	1 % Hypochlorite
(iii)	Installation	Submerged Service
(iv)	Operating service	-40°C to +70°C
(v)	Water Temperature Service	0°C to 20°C
(vi)	Normal System Operating Head	27 metres Static Head
(vii)	Normal System Operating Pressure	275 kPa (40 psi)
(viii)	Design System Flow Rate	240 Megalitres per day (MLd)
(ix)	Valve Test Pressure (2 times Operating)	2000 KPa (300 p.s.i)
(x)	Type of Body (All)	Flanged Short Body
(xi)	Maximum Non-Shock Shut-Off Pressure (All)	1000 Kilopascals (150 p.s.i.)
(xii)	Body (All)	Cast Iron
(xiii)	Headloss	Maximum K value 0.5

(xiv) Valve torques and safety factors shall be based upon the design pressure of 415 Kilopascals (60 psi).

(xv) Maximum Velocity 4.88 metres per second (m/s)

NOMINAL PIPE SIZE (MM)	QUANTITY	ACTUATOR TYPE	VALVE CLASS	PRIMARY SERVICE FUNCTION
900	1	Electric	150B	Isolation (Open/Close)
1050	1	Electric	150B	Isolation (Open/Close)

E5.3 Materials

(a) General

(i) Materials for butterfly valves shall meet or exceed the latest revision requirements of AWWA Standard C504 and shall meet or exceed the requirements of this Specification.

(ii) Materials throughout shall be the best of their respective kinds. The equipment shall be designed for the very highest class of service, shall include the highest degree of strength, durability and reliability for continuous operation and for most convenient maintenance.

(iii) Liberal factors of safety (minimum of fifty percent (50%) shall be used throughout especially for all parts subject to alternating stresses or shock.

(iv) All joints shall be machined and all castings shall be spot-faced for nuts. All rods shall be finished. All mating faces shall be drilled and tapped, peened, or finished as subsequently specified.

(v) The mechanical features of the equipment covered by these Specifications shall conform to the appropriate standards of the ASME.

(vi) Threads on all screws, bolts, studs, and nuts shall be American Standard. Tapped holes in flanges shall be standard unified national threads of the coarse-thread series.

(b) Stainless Steel Components

(i) All components specified in the latest revision of AWWA Standard C504 as stainless steel and the valve shaft, pins, clamps and retaining rings for the rubber seats shall be Type 304 stainless steel. No alternative materials will be accepted in this regard.

(c) Workmanship

(i) All foundry and machine work shall be in accordance with the best modern practice for the class of work involved.

(ii) All parts shall conform accurately to the required dimensions and shall be free from injurious defects. All machine parts shall be made to template or gauge.

(iii) No repairs to metal such as welding, plugging, peening or stitching will be permitted. Any valve or actuator exhibiting such repairs will be rejected.

(iv) All joints shall be faced true and shall be watertight where subject to water pressure.

(v) The bolt holes of all cast iron flanges and flanged fittings shall be spot faced to the specified thickness of flange with a plus tolerance of 3 millimetres (1/8 inch).

(vi) All iron parts receiving bronze mounting shall be finished to fit. Such hand work shall be done in finishing as is required to produce a neat, workmanlike, well fitting, and smooth operating job throughout.

(vii) All parts of the same size and same make shall be interchangeable.

(d) Ferrous Castings

(i) All castings shall be true to pattern, of workmanlike finish and of uniform fine grain quality and condition, free from blowholes, porosity, hard spots, shrinkage defects, cracks, or other injurious defects and shall be smooth and well cleaned before inspection. Castings shall be readily machinable. Castings shall not be repaired, plugged, or welded.

(e) Valve Bodies

(i) Valve bodies shall be short body and constructed of either cast iron confirming to ASTM Standard A126, Class B or ASTM A48, Class 40; of ductile iron conforming to ASTM A536, Grade 65-45-12; or of alloy cast iron conforming to ASTM A436, Type 1 and 2, or ASTM A439, Type D-2 with a maximum lead content of 0.003 percent.

(f) Valve Ends

(i) The ends of the valves shall be flanged and drilled to ANSI B16.1 standard for cast iron flanges, Class 125.

(g) Valve Discs

(i) The design and materials of valve discs shall conform to the requirements of Section 4.5 of the latest revision of AWWA Standard C504.

(ii) Discs shall be offset to provide an uninterrupted 360 degree seating edge and shall be cast iron per ASTM A48, Class 40 or ductile iron per ASTM A536 (65-45-12).

(iii) The disc seating edge, if applicable, shall be solid type 316 stainless steel.

(iv) The disc shall be securely attached to the valve shaft using type 304 stainless steel taper fasteners.

(v) Disc structures containing hollow cavities are not acceptable.

(h) Valve Shaft

(i) Valve shaft shall be constructed of type 304 stainless steel.

(i) Valve Seats

(i) Valve seats shall be reinforced natural or synthetic rubber reinforced with high resiliency fabric inserts. The mating seat shall be of type 304 stainless steel. Seats shall be of a design that permits adjustment, removal or replacement of the seat at the site of the installation without removal of the valve from the line. Seats that are clamped or mechanically secured are preferred over epoxy retained seats.

(ii) Valve seats shall be manufactured from a solid mass rather than layers of rubber bonded together.

(iii) Valves with a rubber seat mounted on the valve disc shall meet the following conditions:

a) The disc seats shall be offset from the centre line of the shafts so that the rubber seat forms a continuous uninterrupted ring.

b) An insert of stainless steel shall be provided in the body to provide a smooth seating surface for the rubber disc seat.

(iv) Mechanically retained rubber seats shall be held in position on the disc or body by a segmented retaining ring secured by type 316 stainless steel nuts and bolts which by tightening will slightly deform the rubber seat to maintain proper contact with the seat face throughout the entire circumference.

(j) Bearings

(i) Bearings in the valve body for shaft ends shall be of the sleeve type made of self-lubricating material such as Teflon filled acetal or approved equal.

(ii) Each valve shall be equipped with one or two thrust bearings of corrosion resistant material on the shaft, outboard of the shaft seal or in the actuator housing.

(k) Shaft Seals

(i) Shaft seals shall be designed for the use of standard split-V type packing, standard O-ring seals or pull down packing as described in Section 4.5.7 of the latest revision of AWWA Standard C504.

(l) Bolts

(i) Bolts for testing of butterfly valves shall be ASTM A307 grade B. Bolt size, type and diameter shall be in accordance to AWWA C207-01. Provide one (1) complete set of bolts (1 flange) for each valve size provided. Bolt length suitable for coupling AWWA C207 Class D flange.

(m) Painting and Coating

(i) Interior surfaces shall be coated with a protective system in accordance to AWWA Standard C550 – Protective Interior Coatings of Valves and Hydrants, which can be used in a potable water system.

(ii) Interior coatings shall comply with ANSI/NSF 61 “Drinking Water System Components – Heath Effects”

(iii) 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. Application as per manufacturer’s recommendations.

(iv) Coatings shall be holiday free as defined in Section 5.2.3 of AWWA Standard C550.

(v) Exterior surfaces shall be painted consistent with interior surfaces.

(vi) Surfaces shall be prepared to NACE SSPC-SP10- Near-White Metal Blast Cleaning

(vii) All machined surfaces shall be protected with an approved coating, prior to assembly to prevent rusting. Machined surfaces for valve seats shall have particular attention paid to, as this area if untreated, has proven to support "barnacle growth" which can prevent watertight closure of the valve.

(n) Acceptable Products

(i) DeZurik

(ii) K-Flo 47 Series

(iii) Mueller

(iv) Pratt

(v) Rodney Hunt

(vi) Val-Matic

(vii) Or Approved Equal

E5.4 Submittals

(a) Shop Drawings

(i) Submit Shop Drawings in accordance to E4.

(ii) Shop Drawings shall state all performance and design criteria.

(iii) Allow one (1) calendar weeks in delivery schedule for review of Shop Drawings, commencing at the date of receipt by the Contract Administrator.

(iv) At the time of submission, the Contractor shall inform the Contract Administrator in writing of any deviation in the Shop Drawings from the requirements of the contract documents. The Shop Drawings shall include a copy of the Specifications attached in Part E and marked by the Contractor as either in “compliance” or “deviation” with comment.

(v) Provide valve torque calculations for operating conditions listed.

(b) Affidavit of Compliance

(i) Provide Affidavit of Compliance stating that valves meet requirements of the latest revision of ANSI/AWWA Standard C504 and terms of this specification.

(c) Testing

(i) Provide all factory pressure test reports.

(ii) Provide protective coating thickness measurements as specified in ANSI/AWWA Standard C550.

(iii) Provide recent coating qualification testing results as specified in ANSI/AWWA Standard C550 Section 5.2.1.

E5.5 Valve Testing and Acceptance

E5.5.1 Factory Tests

(a) General

(i) All acceptance testing shall be completed in the presence of the Contract Administrator or his appointed representative, unless the Contract Administrator waives this requirement. Provide a minimum of two (2) weeks notice of testing schedule to the Contract Administrator.

(ii) Testing of valves and actuators, including pressure tests, paint and coatings and electrical tests shall be coordinated to minimize number of plant visits.

(iii) If the Contract Administrator waives witnessing of testing as indicated in E5.5.1(a)(i), provide all testing results to the Contract Administrator for review prior to shipping valves.

(b) Butterfly Valves

(i) All valves shall be tested with mated actuators mounted and adjusted.

(ii) All valves shall be tested with valves mounted in the vertical operating orientation.

(iii) Each valve shall be subjected to hydrostatic tests under a pressure (1000 kPa for class 150B valves) by the manufacturer at their facilities prior to shipping. The tests shall be conducted in the following manner, in accordance with the latest revision of AWWA Standard C504.

- A hydrostatic pressure of (1000 kPa for class 150B valves) shall be applied through bulkheads, alternately to the two sides of the closed disc with the opposite side open to inspection. Under this pressure, the valve seat shall be perfectly watertight.
- A hydrostatic pressure of (2000 kPa for class 150B valves) shall be applied to the body of the valve with bulkheads closing both flanges and the disc open. Under this pressure there shall be no leakage through the metal or joints, no permanent deformation of the castings, and no other defects.

(iv) The following information shall be supplied by the Contractor prior to delivery of the valves:

- A certified copy of the chemical and physical analysis on all materials used in the manufacturer of the valve(s) or certification that the materials used are in strict accordance with this specification.
- Copies of the test reports for Performance, Leakage and Hydrostatic Tests performed in accordance with AWWA Standard C504. Included in the report shall be the signature of the official who is responsible for the valve assembly and testing.

(c) Protective Coatings

(i) Conduct non-destructive film thickness testing, in accordance to NACE SSPC PA 2, on both interior and exterior surfaces and provide comparison to qualification standard, as per AWWA Standard C550.

(ii) Conduct low voltage holiday testing as specified in AWWA Standard C550 section 5.2.3. Completed coating shall be holiday-free.

(iii) The Contract Administrator will conduct holiday testing to NACE RP01188-88.

(iv) The Contract Administrator will conduct disbondment testing in accordance to ASTM D 4541. Tensile adhesion shall be acceptable if a minimum tensile adhesion rating of 3447 kPa (500 psi) is achieved.

E5.5.2 Field Tests

(a) Butterfly Valves

(i) The Contractor shall perform a hydrostatic leak test, in the presence of the Contract Administrator, on all valves once they arrive at the City warehouse.

(ii) The City will provide a suitable blind flange for testing.

(iii) The Contractor shall provide 3 millimetre SBR gasket, bolts, and testing equipment, suitable to conduct tests.

(iv) The test shall be performed as follows:

- The valve shall be orientated in the vertical position.

- A gasketed, steel blind flange with a tapped fitting suitable for introduction of compressed water shall be bolted in place.
- The space between the blind flange and valve disc shall be filled through the center port, and air bled off through the top port. Once all air has been expelled, the top test port shall be closed.
- A pressure of 1000 kPa for class 150B valves shall be applied through the fitting and maintained for 10 minutes. Under this pressure the valve seat shall be perfectly watertight.
- The test shall be repeated for the opposite side.

E5.5.3 The Contractor shall ensure a qualified representative of the valve manufacturer is present for the testing of the valves to correct any deficiencies found.

E6. ELECTRIC VALVE ACTUATORS

E6.1 Description

(a) This specification shall cover the design and manufacture of electric actuators for butterfly valves to be supplied under this Contract. This specification is supplementary to and shall be read together with the latest revision of AWWA Standard C540, "Power-Actuating Devices for Valves and Sluice Gates".

(b) All electric actuators to be supplied under this Contract shall be designed and manufactured by a company having at least five (5) years prior experience in manufacturing these types of products in the size and to the pressure ratings as those specified herein.

(c) All technologies and devices used in the actuator shall have a minimum of five (5) years of commercial operating experience for that specific manufacturer. This is to include torque and position sensing, lubrication, and electrical compartment design.

E6.2 Acceptable Products

(a) Electric valve actuators shall be:
  (i) Solid State Type - Rotork IQ Range
  (ii) Solid state Type – Limitorque MX series
  (iii) Or Approved Equal in accordance with B5.

(b) Quarter Turn gearbox;
  (i) Rotork IW range
  (ii) Limitorque HBC series
  (iii) Or Approved Equal in accordance with B5

E6.3 Design Requirements

E6.3.1 Design Parameters

(a)	Opening	Quarter Turn, Counter Clockwise to open
(b)	Service Condition	On/Off Service
(c)	Service Temperature	-40°C to +70°C (-22°F to +158°F)
(d)	Opening/ Closing Time	5 minutes
(e)	Power Supply	600 V/3 ph/60 Hz
(f)	Actuator Mounting	Remote floor stand

E6.3.2 Actuator Sizing

(a) The electric actuators shall be sized to provide the torque required to close or open the valve for full bi-directional flow at a differential pressure equal to the AWWA numerical class designation of the valve. The maximum thrust output of the actuator shall not exceed the valve shaft torque capability as indicated in the latest revision of AWWA Standard C504.

E6.3.3 Mounting

(a) Electric actuator shall be designed and constructed for remote mounting on a floor stand, coupled to quarter turn gear actuator with a connection shaft. Connection shafts shall be type 304 stainless steel. Floor stands shall be designed and constructed such that the centre of the handwheel is 900 millimetres above the operating floor. The length of the extension shafts shall be confirmed by field measurement prior to manufacture. Approximate length of shaft shall be based on distance of 3.3 metres from center line ¼ turn gear box to operating floor.

(b) Connection shaft shall be designed to accommodate actuator torque for the length of connection shaft required.

E6.3.4 Motor

(a) Motors shall be CSA approved, of the totally-enclosed, reversing, squirrel cage induction type with Class 'F' insulated windings and suitable for operation at 10% above and below normal specified power supply. Motor duty rating shall be sufficient for one complete operating cycle (open-close-open) without exceeding its temperature rating. Motor bearings shall be amply proportioned of the anti-friction type and permanently lubricated.

(b) The motor shall be of a design that allows for electrical and mechanical disconnection without disturbing the gear case or valve position. Electrical and mechanical disconnection of the motor should be possible without draining the lubricant from the actuator gear case. Plugs and sockets shall not be acceptable as a means of electrical connection for the motor.

(c) The actuator shall include circuitry to ensure the motor runs with the correct rotation for the required direction of operation with either phase sequence of the 3-phase power supply.

E6.3.5 Motor Protection

(a) Protection shall be provided for the motor as follows:

(i) The motor shall be de-energized in the event of a stall, when attempting to unseat a jammed valve.

(ii) Motor temperature shall be sensed by a thermostat to protect against overheating.

(iii) Single phasing protection for 3 phase motors only.

(iv) Instantaneous reversal protection whereby an automatic time delay circuit limits the current surges when the actuator is signalled to instantaneously reverse direction – for solid state type actuators only.

E6.3.6 Integral Starter and Transformer

(a) The reversing starter, control transformer, and local controls shall be integral with the valve actuator, suitably housed to prevent breathing and condensation built-up. For ON/Off service, the starter shall be a solid state type suitable for sixty (60) starts per hour, and of rating appropriate to motor size. The controls supply transformer shall be fed from two (2) of the incoming three (3) phases. It shall have the necessary tappings and be adequately rated to provide power for the following functions:

(i) 120V AC energization of the contactor coils

(ii) 24V DC output where required for remote controls

(iii) Supply for all the internal electrical circuits

(b) The primary and secondary windings shall be protected by easily replaceable fuses.

(c) The reversing motor controller shall consist of separate contactors for controlling valve movement in either the opening or closing direction. Each contactor shall be either magnetic or solid state, full voltage across-the-line type, sized to suit the motor power rating. The contactors shall be of robust construction with double break contacts, requiring a minimum of maintenance and being easily replaceable. Mechanical and electrical interlocks shall be provided.

E6.3.7 Gearing

(a) The actuator gearing shall be totally encased in an oil filled or sealed gear case complete with fill and drain taps, suitable for operation at any angle. All gearing shall be of hardened steel alloy and alloy bronze construction with machine cut teeth. Thrust bearings of the ball or roller type shall be provided at the base of the operator. The gear case shall be designed to be opened for inspection or repair without releasing the stem thrust or taking the valve out of service.

E6.3.8 Manual Operation

(a) Motorized actuators shall be provided with a handwheel, which shall not rotate during motor operation. The handwheel shall be made of cast iron or aluminum with the word "OPEN" and a directional arrow cast in relief on the rim. Spinners shall be provided on the handwheels. The handwheel operation shall be accomplished by a declutch lever, capable of lockout by padlock. The handwheel shall disengage automatically from the operating mechanism once the motor is capable of operation. The handwheel shall be located sufficiently away from the valve flanges, housings, etc. such that personnel will not hit their knuckles on any of these obstructions when using the handwheel.

(b) The handwheel shall be positioned on the operating floor as indicated in E6.3.8(a) above.

(c) The handwheel shall be sized to allow one man operation with a maximum rim pull of 356 Newtons (eighty (80) ft. lbs.) at maximum torque conditions.

(d) Clockwise operation of the handwheel shall give closing movement of the valve unless otherwise stated in this specification.

E6.3.9 Drive Bushing

(a) The actuator shall be furnished with an easily detachable drive bushing for machining to suit the valve stem or gearbox input shaft. The drive bushing shall be positioned in the base of the actuator to facilitate the valve stem extensions.

(b) Thrust bearings, when housed in a separate thrust base, should be of the sealed-for-life type.

E6.3.10 Turns Limit and Torque Limit Switches for Solid State Type

(a) Torque and turns limitation to be adjustable as follows:

(i) Position setting range: 2.5 to 100,000 turns, with resolution to 15° of actuator output.

(ii) Torque setting: 40% to 100% rated torque.

(iii) Torque sensing shall be by purely electrically or electronically methods. Extrapolation of torque from mechanically measured motor speed will not be acceptable due to response time.

(iv) “Latching" shall be provided for the torque sensing system to inhibit torque off during unseating or during starting in mid-travel against high inertia loads.

E6.3.11 Remote Valve Position Indication

(a) Four contacts shall be provided to indicate open position, close position, remote selected, and thermostat tripped.

(b) Contacts to be rated at 5A, 250 VAC, 30V DC.

E6.3.12 Local Position Indication

(a) The actuator shall incorporate an illuminated, mechanical dial indicator or digital readout to show continuous movement from fully open to fully closed in 1% increments. The digital display shall be maintained even when the power to the actuator is isolated.

(b) The local display shall be large enough to be viewed from a distance of 1.83 metres when the actuator is powered up.

E6.3.13 Push Buttons and Selector Switches

(a) Each actuator shall be complete with a local Open-Stop-Close push-button station with external Red-Open, Green-Closed indicating lights and a Local-Off-Remote selector switch padlockable in any one of the following three positions:

(i) Local Control Only

(ii) Off (No Electrical Operation)

(iii) Remote Control

(b) It shall be possible to select maintained or non-maintained local control.

(c) The local controls shall be arranged so that the direction of valve travel can be reversed without the necessity of stopping the actuator.

E6.3.14 Controls

(a) The internal control and monitoring circuits shall operate at nominal 24 VDC or 120 VAC. Customer control interface shall operate at 120 VAC. All necessary transformers shall be provided.

(b) The necessary wiring and terminals shall be provided in the actuator for the following control functions:

(c) Removable links for substitution by external interlocks to inhibit valve opening and/or closing.

(d) Control Method:

(i) Open and Close maintained contact closure.

(e) Selection of maintained or push-to-run control for modes a) and b) above shall be provided by links.

(f) The internal circuits associated with the control and monitoring functions shall be designed to withstand simulated lightning impulses of up to 1 kilovolt.

E6.3.15 Monitoring Facilities

(a) Facilities shall be provided for monitoring actuator operation and availability as follows:

(i) Motor (availability) relay, having one normally open contact, the relay being energized from the control transformer only when the Local/Off/Remote selector switch is in the remote position to indicate that the actuator is available for remote (control room) operation.

(ii) Where required, it shall be possible to provide indication of thermostat trip and "Remote" selected as discrete signals.

(b) Solid State type only:

(i) Provision shall be made for the addition of diagnostic module which will store and enable download of historical actuator data to permit analysis of changes in actuator or valve performance.

(ii) Diagnostic status screens shall be provided to show multiple functions simultaneously so troubleshooting can be affected rapidly and efficiently. All diagnostic information shall be contained on no more than seven or eight (7 or 8) screens so multiple functions can be checked simultaneously.

(iii) One (1) copy of the actuator diagnostic/programming software, in a Microsoft Windows based portable computer format, shall be included with "Supply and Delivery of Modulating Valve Complete With Electric Valve Actuator" in Form B: Prices. The actuator diagnostic/programming software shall be supplied with one data communications cable for connection between the portable computer and the electric actuator.

E6.3.16 Wiring and Terminals

(a) Internal wiring shall be of CSA approved insulated stranded cable of appropriate size for the control and 3-phase power. Each wire shall be clearly identified at each end. Permanent heat shrunk labelling shall be used.

(b) The terminals shall be embedded in terminal block of high tracking-resistance compound.

(c) The terminal compartment shall be separated from the inner electrical components of the actuator by means of a watertight 'O' ring seal.

(d) The terminal compartment of the actuator shall be provided with a minimum of two (2) threaded cable entries.

(e) All wiring supplied as part of the actuator shall be contained within the main enclosure for physical and environmental protection. External conduit connections between components will not be acceptable.

(f) Control logic circuit boards and relay boards shall be mounted on plastic mounts to comply with double insulated standards. No more than a single primary size fuse shall be provided to minimize the need to remove single covers for replacement.

(g) A durable terminal identification card showing plan of terminals shall be attached to the inside of the terminal box cover indicating:

(i) Serial number

(ii) External voltage values

(iii) Wiring diagram number

(iv) Terminal layout

(h) The identification card shall be suitable to inscribe cable core identification alongside terminal numbers.

E6.3.17 Enclosure

(a) Actuators shall be O-ring sealed, watertight to NEMA 6/IP68 as well as have an inner watertight and dustproof O-ring seal between the terminal compartment and the internal electrical elements of the actuator, fully protecting the switch mechanism, motor and all other internal electrical elements of the actuator from ingress of moisture and dust when the terminal cover is removed on site for cabling.

(b) Actuators shall be provided with an internal motor and compartment heater.

(c) All external fasteners shall be of stainless steel.

E6.4 Quarter turn Gearbox

(a) Quarter turn, geared actuators shall be of worm gear drive type.

(b) Gearing and Enclosure

(i) Actuators shall be geared with a ball bearing mounted worm gear drive, machine cut gear teeth, and be totally enclosed in a sealed housing sufficient to permit normal operation even when totally submerged in water. Travelling nut type of mechanisms will not be accepted. Gear lubricant shall be of the bulk grease type; synthetic lubricants will not be accepted.

(ii) Number of actuator turns to open or close the valve shall be kept to as few as possible to avoid overtorquing and damage to the actuator.

(iii) Submersible rating shall be adequate for 7.5 metres water submergence for forty-eight hours.

(iv) Accessible parts of the actuator requiring lubrication shall be provided with button-head alemite grease fittings.

(c) Input Limit Stops

(i) Adjustable, external stop-limiting devices shall be provided on the actuators to prevent over-travel of the valve disc in the open and closed position.

(ii) Under circumstances where spur gear attachments are installed on the input side of the actuator to facilitate the maximum input operating torque of 356 Newtons (80 ft. pounds), input limit stops shall be installed on the input side of the spur gear attachment.

(iii) A shear pin or other torque regulating device shall be provided on the actuator or handwheel/operating nut as an extra precaution against actuators being over-torqued.

(d) Valve Position Indicator

(i) A mechanical, valve position indicator shall be provided and mounted on the outside of each valve actuator. The dial or scale plate shall be 316 stainless steel and shall be clearly graduated and marked. A 316 stainless steel pointer shall be aligned to show the exact position of the valve disc in the valve body. The fastener for the indicator dial shall be made of 316SS stainless steel.

(ii) There shall also be a visible indication on the valve shaft end showing the position of the valve disc in relation to the shaft to ensure proper relation of the disc and indicating mechanism in the event an actuator has to be removed and replaced on a valve.

(e) Protective Coatings

(i) All external ferrous components including adaptor and mounting plates, shall be painted and tested in accordance with AWWA C550 and E6.7.

E6.5 Installation

(a) The actuators will be installed by the Installation Contractor, in a weatherproof superstructure. The power supply, valves and controls will be installed Spring 2010.

E6.6 Start-up Kit

(a) Each actuator shall be supplied with a start-up kit comprising installation instruction, electrical wiring diagram, and sufficient spare cover screws and seals to make good any site losses during the commissioning period.

E6.7 Protective Coatings

(a) All external ferrous components including floor stands, adaptors and mounting plates, shall be painted with two coats of polyamide epoxy paint, Amerlock 400 or approved equal in accordance to B5.

(b) Any touch-up paintwork required during installation shall be undertaken by the Installation Contractor. The touch-up paint shall be of the same colour and specifications used in the above clauses and shall be supplied by the Contractor. The Contractor shall provide a minimum of one (1) litre of paint product for this purpose.

E6.8 Testing

(a) Each electric motorized actuator shall be performance tested by the manufacturer at their facilities prior to shipping. The test shall simulate a typical valve torque load from full-open to full-close and full-close to full-open. The following information shall be recorded:
  (i) Torque at Maximum Torque Setting
  (ii) Current at Maximum Torque Setting
  (iii) Test Voltage and Frequency
  (iv) Flash Test Voltage
  (v) Actuator Output Speed and Operating Time for Full-Open to Full-Close
  (vi) Amperage draw on motors at breakaway and normal operation.

(b) Copies of the test reports for the above performance tests signed by the official who is responsible for the actuator assembly and testing shall be forwarded to the Contract Administrator as soon as completed.

(c) In addition, the test reports shall include details of specification such as gear ratios for both manual and automatic drive, closing direction, wiring diagram code number, etc.

(d) Actuators
  (i) Electric actuators shall be tested in accordance with the latest revision of AWWA Standard C540.
  (ii) In addition to factory inspection and the witness of tests by the Contract Administrator, the Contractor shall provide copies of the following test reports prior to delivery of the actuators:
    a) proof-of-design test as per AWWA C540, and
    b) performance tests.

(e) Electric Actuators
  (i) The City shall perform voltage, current draw, cycle speed and whatever other tests are deemed appropriate, once the actuators have been delivered to the City of Winnipeg warehouse location.

E7. ELECTROMAGNETIC FLOW METER

E7.1 Description

(a) This Specification shall cover the design and manufacture of magnetic flow meters to be supplied under this Contract.

E7.2 Design Requirements

(a) General
  (i) Magnetic flow meter shall consist of flow tube with remote mounted transmitter.
  (ii) Products and coatings in contact with potable water shall be certified as suitable for contact with drinking water by an accredited certification organization in accordance with ANSI/NSF 61 “Drinking Water System Components – Health Effects”

(b) Design Parameters

(i)	Service	Potable Drinking Water
(ii)	Chemical Resistance	1 % Hypochlorite
(iii)	Installation	Submerged Service
(iv)	Operating service	-40°C to +70°C
(v)	Water Temperature Service	0°C to 20°C
(vi)	Normal System Operating Head	27 metres Static Head
(vii)	Normal System Operating Pressure	275 kPa (40 psi)
(viii)	Design System Flow Rate	60 Megalitres per day (MLd)
(ix)	Maximum System Flow Rate	240 Megalitres per day (MLd)
(x)	Minimum System Flow Rate	30 Megalitres per day (MLd)
(xi)	Maximum Velocity	3.2 metres per second (m/s)
(xii)	Minimum Flow Velocity	0.4 metres per second (m/s)
(xiii)	Line size	1050 mm (42 inch)

E7.3 Materials

(a) Flow Tube

(i) Accuracy: +/- 0.5% of rate from Design Flow Rate to Maximum Flow Rate

(ii) Stainless steel (316L) electrodes

(iii)	Housing	Carbon Steel
(iv)	Flow Tube	Stainless Steel
(v)	Type of Body (All)	Flanged
(vi)	Flanges	AWWA C207 Class D Flanges

(vii) Rubber Liner

(viii) DC coil

(ix) 316L Stainless steel grounding rings

(x) Empty pipe detection

(xi) IP68 to 10m, factory potted 15m cable

(b) Transmitter

(i) Power supply: 120 VAC

(ii) Analog Output: 4-20mA into 500 ohm load, selectable between active and passive

(iii) Pulse Output: external power 24VDC pulse output for totalized flow

(iv) Digital Outputs: external powered 24 VDC transmitter fault output

(v) Adjustable low flow cuttoff

(vi) Local indication of flow rate and totalized flow

(vii) Nema 4X wall mounted enclosure

(viii) Diagnostics:

(i) Self test

(ii) Transmitter fault

(iii) Analog output test

(iv) Pulse output test

(v) Tunable empty pipe

(vi) Reverse flow

(vii) Coil circuit fault
(viii) Electronics temperatue
(ix) Ground/wiring fault
(x) High process noise
(xi) Meter verification

(c) Acceptable Manufactures
(i) Endress & Hauser
(ii) ABB
(iii) Or Approved Equal in accordance with B5

E7.4 Submittals

(a) Shop Drawings
(i) Submit Shop Drawings in accordance to E4.
(ii) Shop Drawings shall state all performance and design criteria.
(iii) Allow one (1) calendar weeks in delivery schedule for review of Shop Drawings, commencing at the date of receipt by the Contract Administrator.
(iv) At the time of submission, the Contractor shall inform the Contract Administrator in writing of any deviation in the Shop Drawings from the requirements of the contract documents. The Shop Drawings shall include a copy of the Specifications attached in Part E and marked by the Contractor as either in “compliance” or “deviation” with comment.

E7.5 Flow Meter Testing and Acceptance

E7.5.1 Factory Tests

(a) General
(i) All acceptance testing shall be completed in the presence of the Contract Administrator or his appointed representative, unless the Contract Administrator waives this requirement. Provide a minimum of two (2) weeks notice of testing schedule to the Contract Administrator.
(ii) If the Contract Administrator waives witnessing of testing as indicated in E5.5.1(a)(i), provide all testing results to the Contract Administrator for review prior to shipping valves.

(b) Magnetic Flow Meter
(i) Flow tube and transmitter shall be tested together.
(ii) Perform calibration of flow tube and record results
(iii) The following information shall be supplied by the Contractor prior to delivery of the valves:

- Copies of the test reports. Included in the report shall be the signature of the official who is responsible for the testing.

E7.5.2 Field Verification

(a) The Contractor shall provide a qualified representative of the magnetic flow meter manufacturer to verify installation in accordance with manufacture’s recommendations, program transmitter parameters and commissioning

E8. COMBINATION AIR VALVE

E8.1 Combination Air Valves

(a) Combination air/vacuum valve shall conform to the latest revision of AWWA C 512, and the following requirements;

(i) 100mm and 150mm ANSI Class 125 flanged inlet
(ii) Dual body design
(iii) Suitable for 50 to 300 KPa (7-40 psi) operating pressure
(iv) Minimum 4.75mm orifice
(v) Cast Iron body, cover and Baffle
(vi) Stainless steel float and trim
(vii) Interior and exterior coatings conforming to AWWA C550
(viii) Buna-N seat
(ix) Certified under NSF/ANSI 61, Drinking Water System Components—Health Effects

(b) Acceptable manufacturers:

(i) Val-Matic 104/38, 106/38,
(ii) APCO 1800/200
(iii) Or approved equal

E9. INSPECTION OF INSTALLATION OF EQIUIPMENT

E9.1 General

(a) The equipment will be installed by the Installation Contractor forces at a later date (Spring 2010) and the Contractor will be required to provide a qualified technical representative to:

(i) Provide training for the installation of the equipment
(ii) Inspect the installation of the equipment.
(iii) Be present during the field testing of the equipment.
(iv) Provide training to City personnel in the operation and maintenance of the equipment.
(v) Supervise commissioning.

E9.2 The Contractor shall attend a turn over inspection with the Contract Administrator and the Installation Contractor, at which time the care and control of the equipment will be assumed by the Installation Contractor. The Contractor shall sign Form 200 Certificate of Equipment Delivery, attached in Part F, indicating equipment has been turned over in satisfactory condition.

E9.3 Unless otherwise specifically stated in the Specifications, the Contractor shall provide, and shall allow for in his Bid, a factory-trained representative who, in conjunction with the Contract Administrator, shall give instructions regarding the installation of the equipment. The Contractor's representative shall complete Form 201 Certificate of Instruction, attached in Part F, when he is satisfied that the Installation Contractor has received adequate instruction in the installation of the Contractor's equipment. The completed Form 201 shall be submitted to the Contract Administrator prior to the commencement of equipment installation.

E9.4 The Contractor's factory-trained representative shall visit the site as required to ensure that the installation work is being performed in a proper and workmanlike manner. The Contractor's representative shall complete Form 202 Certificate of Satisfactory Installation, attached in Part F, following installation of the equipment. The completed Form 202 shall be submitted to the Contract Administrator prior to the commencement of functional testing. The Contractor shall

allow for a minimum of one (1) full working day at each worksite. Additional days beyond time noted above shall be approved by Contract Administrator.

E9.5 The Contractor's representative shall be present to supervise the commissioning, initial operation, and functional testing of the equipment. The Contractor shall be required to complete Form 203 Certificate of Equipment Satisfactory Performance, attached in Part F, stating that his qualified representative has checked the installed equipment and found the equipment to be satisfactorily installed and in specified working operation. The completed Form 203 shall be received by the Contract Administrator prior to commencement of the Warranty period. The scheduling of the Contractor's factory-trained representative's visits to the site shall be to the mutual satisfaction of the Contractor and the Installation Contractor, and shall be agreed upon before the work of installing the equipment begins. The Contractor shall allow for a minimum of one (1) full working day at each worksite for commissioning, testing, and training services.

E9.6 If the Contractor is requested by the Installation Contractor or the Contract Administrator to send a representative to the jobsite to investigate or rectify a suspected fault in the equipment furnished by the Contractor but it is found that the said equipment or Contractor is not at fault, the Contractor shall be entitled to be reimbursed for all reasonable costs and expenses incurred by him in sending his representative to the jobsite, at the per diem rate listed in Form B Prices.

E9.7 Operating equipment and systems shall be performance tested by the Contractor in the presence of the Contract Administrator to demonstrate compliance with the specified operating requirements. Functional testing shall be conducted under the specified design operating conditions or under such simulated operating conditions as recommended or approved by the Contract Administrator.

E9.8 The Contractor shall provide training to City staff in accordance with Clause E11. Form 204 shall not be issued until after training has been provided to the satisfaction of the City.

E9.9 Immediately following issuance of Form 204, the City reserves the right to operate this equipment to suit system requirements.

E10. OPERATION AND MAINTENANCE MANUALS INCLUDING SPARE PARTS LISTS

E10.1 For each type of equipment, five (5) sets of Operation and Maintenance Manuals shall be submitted to the Contract Administrator for review. The Contractor shall provide these manuals ten (10) Calendar Days in advance before commencement of equipment startup and commissioning. Provision of Operation and Maintenance Manuals shall be considered incidental to the price paid for supply of equipment.

E10.2 All instructions in these manuals shall be in the English language to guide the City in the proper operation and maintenance of the equipment.

E10.3 Bind contents in a three (3)-"D-Ring", hard-covered, plastic-jacketed binder with full cover and spine insert. Organize contents into applicable sections of work, parallel to Specifications breakdown.

E10.4 Provide all required data in electronic format. Text documents shall be Microsoft Word or Adobe format. Drawings, scanned documents, parts lists, test forms shall be in Adobe format. If possible, documents shall be an original electronic format. Documents that require scanning shall be high quality scans and fully legible. Documents shall be submitted on a high quality compact disk. Compact disk and case shall be labeled in type, with the following;

(a) Bid opportunity number.

(b) Job Title.

(c) Description of Equipment.

E10.5 In addition to information called for in the Specifications, the following shall be included:

(a) Title sheet, labeled “Operation and Maintenance Instructions”, containing project name and date.

(b) List of contents.

(c) Reviewed shop drawings of all equipment.

(d) Certified factory test results.

(e) Full description of entire mechanical system, operation, and control. Provide “as programmed” parameter list for each electric valve actuator.

(f) Names, addresses, and telephone numbers of all major sub-contractors and suppliers.

(g) Detailed specification and operating and maintenance instructions for all items of equipment provided including a preventative maintenance program.

(h) An itemized list of spare parts recommended for five years of service, particularly those components failure of which will render the equipment supplied inoperative. Any special tools or other ancillary items necessary for commissioning and/or proper operation and maintenance shall also be listed. These prices shall be available to the City at any time prior to the issuance of the Certificate of Acceptance.

(i) Part books that illustrate and list all assemblies, sub-assemblies, and components.

(j) Routine test procedures for all electronic and electrical circuits.

(k) Troubleshooting chart covering the complete controls/electrical power systems, showing description of trouble, probable cause, and suggested remedy.

E10.6 The Contractor shall modify and supplement the manual as required by the Contract Administrator. When accepted, six (6) additional copies, including electronic versions, shall be provided by the Contractor for distribution purposes. The City’s staff shall be in receipt of these manuals prior to the date set out for Substantial Performance. The Contract shall not be considered complete, for the purpose of issuing a Certificate of Substantial Performance, until the above manuals have been completed and submitted to the satisfaction of the Contract Administrator.

E11. TRAINING

E11.1 The Contractor shall include costs for providing training to City staff by a factory-trained representative on the operation and maintenance of the equipment.

E11.2 Training for the equipment shall be conducted before the operation period as described in Form 203. The training session shall be conducted on site, in conjunction with commissioning. The Contractor shall provide a qualified instructor as well as the necessary course materials.

E11.3 Training shall be provided in one session for operation and maintenance staff. The training shall cover operation and maintenance.

E11.4 Training shall be completed in conjunction with commissioning of the equipment. The Contract shall not be considered complete until the training has been provided and Form 204 has been signed.

PART F

FORMS

PART F - FORMS

INDEX TO FORMS

FORM 200:
CERTIFICATE OF EQUIPMENT DELIVERY

We certify that the equipment listed below has been delivered into the care of the Installation Contractor. The equipment has been found to be in satisfactory condition and meets its Basic Design Criteria. No defects in the equipment were found.

Project: _____

Item of Equipment: _____

Tag No.: _____

Reference Specification: _____

_____

(Authorized Signing Representative of the Installation Contractor) (Date)

_____

(Authorized Signing Representative of the Contractor) (Date)

_____

(Authorized Signing Representative of the Contract Administrator) (Date)

FORM 201:
CERTIFICATE OF INSTRUCTION

I have completed instruction of the installation of the equipment listed below:

Project: _____

Item of Equipment: _____

Tag No.: _____

Reference Specification: _____

_____

(Authorized Signing Representative of the Contractor) (Date)

I certify that the party responsible for the installation of the equipment listed below has received satisfactory instructions from the Contractor.

_____

(Authorized Signing Representative of the Installation Contractor) (Date)

FORM 202:
CERTIFICATE OF SATISFACTORY INSTALLATION

I have completed my check and inspection of the installation listed below and confirm that it is satisfactory and that defects have been remedied to my satisfaction except any as noted below:

Project: _____

Item of Equipment: _____

Tag No.: _____

Reference Specification: _____

Outstanding Defects: _____

_____

(Authorized Signing Representative of the Contractor) (Date)

FORM 203:
CERTIFICATE OF EQUIPMENT SATISFACTORY PERFORMANCE

We certify that the equipment listed below has been validated and has been operated for at least seven (7) consecutive days and that the equipment operates satisfactory and meets its Basic Design Criteria. No defects in the equipment were found. The equipment is therefore classed as "conforming".

Project: _____

Item of Equipment: _____

Tag No.: _____

Reference Specification: _____

_____

(Authorized Signing Representative of the Contractor) (Date)

_____

(Authorized Signing Representative of the Installation Contractor) (Date)

_____

(Authorized Signing Representative of the Contract Administrator) (Date)

FORM 204:
CERTIFICATE OF TRAINING

We certify that we have received the appropriate training in the operation and maintenance of the supplied equipment in accordance with these Specifications.

Project: _____

Item of Equipment: _____

Tag No.: _____

Reference Specification: _____

_____

(Authorized Signing Representative of the Contractor) (Date)

_____

(Authorized Signing Representative of the City) (Date)

_____

(Authorized Signing Representative of the Contract Administrator) (Date)