



**THE CITY OF WINNIPEG**

# **BID OPPORTUNITY**

**BID OPPORTUNITY NO. 907-2011**

**MONTCALM WASTEWATER PUMPING STATION UPGRADES**

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## **PART B - BIDDING PROCEDURES**

### **B1. CONTRACT TITLE**

B1.1 MONTCALM WASTEWATER PUMPING STATION UPGRADES

### **B2. SUBMISSION DEADLINE**

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, **March 27, 2012**.

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

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

### **B3. SITE INVESTIGATION**

B3.1 Further to C3.1, the Contract Administrator or an authorized representative will be available at the Site at 9:30 am on **Thursday, March 8** to provide Bidders access to the Site.

(a) Bidders must wear CSA approved safety footwear and a hard hat while in the wastewater pumping facility.

B3.2 The Bidder shall not be entitled to rely on any information or interpretation received at the Site investigation unless that information or interpretation is the Bidder's direct observation, or is provided by the Contract Administrator in writing.

### **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 Division website at <http://www.winnipeg.ca/matmgt/bidopp.asp>
- B5.2.2 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.
- 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 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 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.
- B6.10 Notwithstanding B6.2 to B6.9, and in accordance with B7.6 deviations inconsistent with the Bid Opportunity document shall be evaluated in accordance with B15.1(a).

## **B7. BID COMPONENTS**

- B7.1 The Bid shall consist of the following components:
- (a) Form A: Bid;
  - (b) Form B: Prices;
  - (c) Bid Security
    - (i) Form G1: Bid Bond and Agreement to Bond, or Form G2: Irrevocable Standby Letter of Credit and Undertaking, or a certified cheque or draft;
- B7.2 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.
- B7.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.
- B7.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.
- B7.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid.
- B7.5 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.
- B7.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B15.1(a).
- B7.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B7.8 Bids shall be submitted to:
- The City of Winnipeg  
Corporate Finance Department  
Materials Management Division  
185 King Street, Main Floor  
Winnipeg MB R3B 1J1

## **B8. BID**

- B8.1 The Bidder shall complete Form A: Bid, making all required entries.
- B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his 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 should be printed below such signatures.

B8.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

## **B9. PRICES**

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

B9.1.1 Notwithstanding C12.2.3(c), prices on Form B: Prices shall not include the Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable.

B9.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.

B9.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

B9.4 The mark-up factor for additional material, specified on Form B, Item 21, shall be a multiplier of 1.15, that when multiplied by the base cost, shall represent the total price including the Contractor's additional handling charge and profit to supply the material. The total price for the material shall be the base cost multiplied by the mark-up factor.

- (a) The mark-up factor shall be based upon the Contractor's or Subcontractor's base cost. This base cost shall be the Contractor's or Subcontractor's procurement cost, or if the material is manufactured by the Contractor or Subcontractor, the internal wholesale cost.
- (b) The multiplier shall be the same, regardless if the material is supplied by a Subcontractor or directly by the Contractor.

B9.5 The Bidder shall state a labour rate for Form B, Item 22, for additional unforeseen structural labour. The rate shall be inclusive of:

- (a) Concrete or steel work associated with the pumping station repairs or the flowmeter chamber.
- (b) Any potential overtime or night-time work that may be required.

- (c) Additional general requirements including mobilization, safety, ventilation, hoisting equipment, etc.
- B9.6 The Bidder shall state a labour rate for Form B, Item 23, for additional unforeseen mechanical (process) labour. The rate shall be inclusive of:
- (a) Any potential overtime or night-time work that may be required.
  - (b) Additional general requirements including mobilization, safety, ventilation, hoisting equipment, etc.
- B9.7 The Bidder shall state a labour rate for Form B, Item 24, for additional unforeseen mechanical (HVAC) labour. The rate shall be inclusive of:
- (a) Any potential overtime or night-time work that may be required.
  - (b) Additional general requirements including mobilization, safety, ventilation, hoisting equipment, etc.
- B9.8 The Bidder shall state a labour rate for Form B, Item 25, for additional unforeseen electrical labour. The rate shall be inclusive of:
- (a) Any potential overtime or night-time work that may be required.
  - (b) Additional general requirements including mobilization, safety, ventilation, hoisting equipment, etc.
- B9.9 The Bidder shall state a labour rate for Form B, Item 26, for additional unforeseen automation labour. The rate shall be inclusive of:
- (a) Any potential overtime or night-time work that may be required.
  - (b) Additional general requirements including mobilization, safety, ventilation, hoisting equipment, etc.
- B9.9.1 Work typically performed by the electrical subcontractor such as automation conduit and wiring shall be paid as per the Electrical Labour Rate.
- B9.10 The maximum permissible labour rates for unforeseen work are shown on Form B.
- B9.10.1 In the event that the labour rate indicated on Form B, is greater than the specified maximum rate, the maximum rate will be utilized for the purpose of bid evaluation and payment.
- B9.11 The labour rates and specified material mark-up factor specified shall apply to all additional work, including additional work covered under Contract Change Orders.
- B9.12 Escalation shall not apply to the labour rates.
- B9.13 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

## **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; 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.
- B10.2 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>

**B10.3** The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

- (a) have successfully carried out work similar in nature, scope and value to the Work; and
- (b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and
- (c) have a written workplace safety and health program if required pursuant to The Workplace Safety and Health Act (Manitoba);
- (d) have previously carried out confined space entry work of a similar nature to the work specified in a wastewater lift station or facility with similar safety related characteristics; and
- (e) be normally engaged in and fully competent in electrical and instrumentation works of a similar nature and employ qualified journeyman familiar with the equipment and devices being installed.

**B10.4** Further to B10.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

- (a) a valid COR certification number under the Certificate of Recognition (COR) Program administered by the Manitoba Construction Safety Association or by the Manitoba Heavy Construction Association's Safety, Health and Environment Program; or
- (b) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt>)

**B10.5** 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.

**B10.6** 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.

## **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.

- B11.1.2 All signatures on bid securities shall be original.
- B11.1.3 The Bidder shall sign the Bid Bond.
- B11.1.4 The Surety shall sign and affix its corporate seal on the Bid Bond and the Agreement to Bond.
- 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 Bids will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Division, or in such other office as may be designated by the Manager of Materials.
  - B12.1.1 Bidders or their representatives may attend.
- B12.2 Following the Submission Deadline, the names of the Bidders and their Total Bid Prices (unevaluated, and pending review and verification of conformance with requirements) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/default.stm>
- 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 Division website at <http://www.winnipeg.ca/matmgt/default.stm>
- B12.4 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.

## **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 C23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.
- 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 will:
- (a) retain the Bid until after the Submission Deadline has elapsed;
  - (b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid; and
  - (c) if the notice has been given by any one of the persons specified in 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, or acceptable deviation there from (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 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.
- 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 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.
- B15.4.2 Further to B15.1(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.

**B16. AWARD OF CONTRACT**

- B16.1 The City will give notice of the award of the Contract or will give notice that no award will be made.
- B16.2 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.
- B16.2.1 Without limiting the generality of B16.2, 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.
- B16.3 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 B15.
- B16.3.1 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.

## **PART C - GENERAL CONDITIONS**

### **C0. GENERAL CONDITIONS**

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

## **PART D - SUPPLEMENTAL CONDITIONS**

### **GENERAL**

#### **D1. GENERAL CONDITIONS**

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

#### **D2. SCOPE OF WORK**

D2.1 The Work to be done under the Contract shall consist of construction of a below-grade flowmeter chamber at Montcalm Wastewater Pumping Station, installation of wastewater pumping units, and associated modifications and upgrades to the ventilation, electrical, and automation components.

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

- (a) Construction of a below-grade flowmeter chamber.
- (b) Replacement of the existing pumping station roof.
- (c) Structural and architectural upgrades and repairs to the existing pumping station.
- (d) Site restoration and clean up.
- (e) Temporary bypass pumping and flow control.
- (f) Supply and installation of two (2) 750mm (30") gate valves and pipework in the Comminutor Chamber.
- (g) Removal of two (2) existing dry-pit wastewater pumping units and piping.
- (h) Installation of two (2) 100 hp dry-pit wastewater pumping units.
- (i) Supply and installation of three (3) 600mm (24") gate valves in the existing pumping station.
- (j) Supply and installation of two (2) 600mm flowmeters and two 600mm (24") gate valves in flowmeter chamber.
- (k) Supply and installation of suction and discharge piping, gate valves, check valves and other fittings.
- (l) Supply and installation of new HVAC equipment.
- (m) Demolition of significant portions of the entire electrical distribution including lighting.
- (n) Supply and installation of electrical distribution and lighting.
- (o) Supply and installation of an automation control system for the wastewater pumping and ventilation.

#### **D3. DEFINITIONS**

D3.1 When used in this Bid Opportunity:

- (a) "**PLC**" means Programmable Logic Controller;
- (b) "**RTU**" means Remote Terminal Unit;

**D4. CONTRACT ADMINISTRATOR**

D4.1 The Contract Administrator is SNC Lavalin Inc., represented by:

Charles Cong  
Manager, Project and Construction Services  
SNC-Lavalin Inc.  
148 Nature Park Way, Winnipeg, MB, R3P 0X7

Telephone No. (204) 786-8080  
Facsimile No. (204) 786-7934

D4.2 At the pre-construction meeting, Charles Cong 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 C23.2.2, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the Contractor shall be sent to the address or facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid.

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

D6.3 Notwithstanding C21., all notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following facsimile number:

The City of Winnipeg  
Chief Financial Officer  
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  
Legal Services Department  
Attn: Director of Legal Services  
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. AUTHORITY TO CARRY ON BUSINESS**

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

### **D9. SAFE WORK PLAN**

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

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

### **D10. INSURANCE**

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

- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period;
- (b) 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) at all times during the performance of the Work and until the date of Total Performance;
- (c) all risks course of construction insurance in the amount of one hundred percent (100%) of the total Contract Price, written in the name of the Contractor and The City of Winnipeg, at all times during the performance of the Work and until the date of Total Performance.

D10.2 Deductibles shall be borne by the Contractor.

D10.3 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in C4.1 for the return of the executed Contract.

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

### **D11. PERFORMANCE SECURITY**

D11.1 The Contractor shall provide and maintain performance security until the expiration of the warranty period in the form of:

- (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; or
- (b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in



the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or

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

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

D11.2 The Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

## **D12. SUBCONTRACTOR LIST**

D12.1 The Contractor shall provide the Contract Administrator with a complete list of the Subcontractors whom the Contractor proposes to engage (Form J: Subcontractor List) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

## **D13. DETAILED WORK SCHEDULE**

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

## **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 of authority to carry on business specified in D8;
  - (ii) evidence of the workers compensation coverage specified in C6.15;
  - (iii) the Safe Work Plan specified in D9;
  - (iv) evidence of the insurance specified in D10;
  - (v) the performance security specified in D11;
  - (vi) the Subcontractor list specified in D12; and
  - (vii) the detailed work schedule specified in D13.
- (b) the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.

D14.3 The City intends to award this Contract by April 30, 2012.

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

#### **D15. CRITICAL STAGES**

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

- (a) The Contractor must ensure that the Comminutor Chamber gate valves and all related piping, fittings, electrical distribution, etc. must be installed and ready to be put into active service by March 1, 2013. All temporary pumping must be removed by this date.
- (b) The Contractor must ensure that two (2) new pumping units, motors and all related piping, fittings, electrical distribution, etc. must be installed and ready to be put into active service by March 1, 2013. All temporary pumping must be removed by this date.
- (c) The Contractor must ensure that a minimum of one (1) forcemain remains continuously in active service by March 1, 2013. Shutdowns of a single forcemain after this date will be permitted, based upon weather conditions.

#### **D16. SUBSTANTIAL PERFORMANCE**

D16.1 The Contractor shall achieve Substantial Performance by **April 2, 2013**.

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

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

#### **D17. TOTAL PERFORMANCE**

D17.1 The Contractor shall achieve Total Performance by **June 30, 2013**.

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

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

#### **D18. LIQUIDATED DAMAGES**

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

- (a) Critical Stages – one thousand five hundred dollars (\$1500);
- (b) Substantial Performance – one thousand dollars (\$1000);
- (c) Total Performance – two hundred dollars (\$200).

D18.2 The amounts specified for liquidated damages in D18.1 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.

D18.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

#### **D19. SCHEDULED MAINTENANCE**

D19.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

- (a) Landscape Maintenance as specified in CW 3510 of the City of Winnipeg's Standard Construction Specifications

D19.2 Determination of Substantial Performance and Total Performance shall be exclusive of scheduled maintenance identified herein. All scheduled maintenance shall be completed prior to the expiration of the warranty period. Where the scheduled maintenance cannot be completed during the warranty period, the warranty period shall be extended for such period of time as it takes the Contractor to complete the scheduled maintenance.

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

#### **MEASUREMENT AND PAYMENT**

##### **D22. PAYMENT**

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

##### **D23. PAYMENT SCHEDULE**

D23.1 It is expected that the values stated in Form B will form the basis for valuation of the completed work, for the purposes of payment via progress estimates. However, if in the opinion of the Contract Administrator, the values are "front-loaded" such that the Form B prices reflect higher values for work that is sequenced earlier in the construction, the Contract Administrator reserves the right to revise the progress estimates as required to ensure that the total payment does not exceed the true value of the work performed.

## **WARRANTY**

### **D24. WARRANTY**

D24.1 Warranty is as stated in C13.

**FORM H1: PERFORMANCE BOND**  
(See D11)

KNOW ALL MEN BY THESE PRESENTS THAT

\_\_\_\_\_ ,  
(hereinafter called the "Principal"), and

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

\_\_\_\_\_ dollars (\$ \_\_\_\_\_ .\_\_\_\_\_)

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

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

BID OPPORTUNITY NO. 907-2011

MONTCALM WASTEWATER PUMPING STATION UPGRADES

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

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

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

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

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

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

\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ .

**SIGNED AND SEALED**  
in the presence of:

\_\_\_\_\_  
(Witness as to Principal if no seal)

\_\_\_\_\_  
(Name of Principal)

Per: \_\_\_\_\_ (Seal)

Per: \_\_\_\_\_

\_\_\_\_\_  
(Name of Surety)

By: \_\_\_\_\_ (Seal)  
(Attorney-in-Fact)

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

\_\_\_\_\_  
(Date)

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

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 907-2011  
MONTCALM WASTEWATER PUMPING STATION UPGRADES

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

\_\_\_\_\_  
(Name of Contractor)

\_\_\_\_\_  
(Address of Contractor)

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

\_\_\_\_\_ Canadian dollars.

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

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

Partial drawings are permitted.

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

\_\_\_\_\_  
(Address)

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

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

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

\_\_\_\_\_  
(Date)

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

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

This credit is subject to the Uniform Customs and Practice for Documentary Credit (1993 Revision), International Chamber of Commerce Publication Number 500.

\_\_\_\_\_  
(Name of bank or financial institution)

Per: \_\_\_\_\_  
(Authorized Signing Officer)

Per: \_\_\_\_\_  
(Authorized Signing Officer)





## PART E - SPECIFICATIONS

### GENERAL

#### E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

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

<u>Specification No.</u>	<u>Specification Title</u>
01 33 00	Submittal Procedures
01 45 00	Quality Control
01 51 00	Temporary Utilities
01 52 00	Construction Facilities
01 56 00	Temporary Barriers and Enclosures
01 61 00	Common Product Requirements
01 73 03	Execution Requirements
01 74 11	Cleaning
01 78 00	Closeout Submittals
01 89 76	Concrete Pavement
03 05 10	Cast-in-Place Concrete
03 20 00	Concrete Reinforcing
04 04 99	Masonry for Minor Works
05 31 00	Steel Decking
05 50 00	Metal Fabrications
07 26 00	Vapour Retarders
07 53 24	EPDM – Roofing (Fully Adhered)
07 62 00	Sheet Metal Flashing and Trim
07 92 10	Joint Sealing
08 11 14	Metal Doors and Frames
09 22 16	Non-Structural Metal Framing
09 91 23	Painting
10 44 20	Fire Extinguishers
22 10 10	Plumbing Pumps
22 11 18	Domestic Water Piping Copper
22 13 18	Drainage Waste and Vent Piping - Plastic
22 42 01	Plumbing Specialties And Accessories
23 05 00	Common Work Results For HVAC
23 05 13	Common Motor Requirements For HVAC Equipment
23 05 54	Mechanical Identification
23 05 93	Testing, Adjusting And Balancing For HVAC
23 07 13	Duct Insulation
23 11 23	Facility Natural Gas Piping
23 31 14	Metal Ducts - Low Pressure To 500 Pa
23 33 00	Air Duct Accessories
23 33 14	Dampers - Balancing
23 33 15	Dampers - Operating

23 34 00	HVAC Fans
23 37 13	Diffusers, Registers And Grilles
23 37 20	Louvres, Intakes And Vents
23 41 00	Particulate Air Filtration
23 51 00	Breeching, Chimneys And Stacks
23 73 11	Air Handling Units - Packaged
26 05 01	Common Work Results - Electrical
26 05 21	Wire and Cables (0 - 1000V)
26 05 28	Grounding - Secondary
26 05 29	Hangers And Supports For Electrical Systems
26 05 31	Splitters, Junction, Pull Boxes And Cabinets
26 05 32	Outlet Boxes, Conduit Boxes and Fittings
26 05 34	Conduits, Conduit Fastenings And Conduit Fittings
26 05 44	Installation Of Cables In Trenches And In Ducts
26 08 05	Acceptance Testing
26 24 17	Panelboards Breaker Type
26 27 26	Wiring Devices
26 28 21	Moulded Case Circuit Breakers
26 29 01	Contactors
26 29 10	Motor Starters to 600 V
26 29 23	Variable Frequency Drives
26 50 00	Lighting
26 52 01	Unit Equipment For Emergency Lighting
27 30 00	Voice Communications
31 23 10	Excavating, Trenching And Backfilling
40 05 01	Common Work Results - Automation
40 80 08	Factory Acceptance Test
40 80 11	Automation Commissioning
40 90 01	Automation - Field Pushbuttons, Switches, and Indicators
40 91 00	Automation - Process Measurement Devices
40 92 00	Automation - Primary Control Devices
40 94 43	Programmable Logic Controllers (PLCs)
40 95 13	Control Panels
40 95 20	Human Machine Interface (HMI)
40 99 01	Training
40 99 90	Maintenance and Support
41 22 23	Hoists

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
1-0164L-D0001	Cover Sheet
1-0164L-B0001	Floor Plan, Flowmeter Chamber, Base Floor
1-0164L-B0002	Floor Plan, Flowmeter Chamber, Platform Level
1-0164L-B0003	Roof Plan, Flowmeter Chamber, Top
1-0164L-B0004	Flowmeter Chamber, Section A & B
1-0164L-B0005	Flowmeter Chamber, Section C
1-0164L-C0001	Site Plan
1-0164L-S0001	Structural General Notes, Flowmeter Chamber
1-0164L-S0002	Structural Reinforcing, Flowmeter Chamber, Floor
1-0164L-S0003	Structural Reinforcing, Flowmeter Chamber, Roof and Manhole Cover
1-0164L-S0004	Structural Reinforcing, Flowmeter Chamber, South-East Wall Elevation
1-0164L-S0005	Structural Reinforcing, Flowmeter Chamber, North West Wall Elevation
1-0164L-S0006	Structural Reinforcing, Flowmeter Chamber, Wall Elevations and Details
1-0164L-S0007	Structural Reinforcing, Flowmeter Chamber, Wall Section A & B
1-0164L-S0008	Structural Steel, Flowmeter Chamber, Manhole Hatches
1-0164L-S0009	Structural Steel, Flowmeter Chamber, Ladder and Gate Details
1-0164L-S0010	Structural Reinforcing, Flowmeter Chamber, Details
1-0164L-S0013	Plans and Sections, Main Floor Roof Demolition and Repair Work
1-0164L-S0014	Plans and Sections, Main Floor Roof Replacement
1-0164L-S0015	Plan, Elevation, Sections, and Details, Main Floor Repairs

1-0164L-S0016	Plan, Main Floor Wall Penetrations
1-0164L-S0017	Plan, Sections, and Detail, Motor Room and Pump Room Repairs
1-0164L-S0018	Plan, Pump Room Repairs
1-0164L-S0019	Plan, Sections, and Details, Lower Level 1 and Comminutor Chamber Repairs
1-0164L-M0001	HVAC Demolition Plan, Main Floor and Lower Level
1-0164L-M0002	HVAC Demolition Plan, Motor, Comminutor Rooms and Pump Room
1-0164L-M0003	HVAC Equipment Layout Plan, Main Floor and Lower Level
1-0164L-M0004	HVAC Equipment Layout Plan, Motor, Comminutor, and Pump Rooms
1-0164L-M0005	HVAC Section and Schedules
1-0164L-M0006	Station Plan Views
1-0164L-M0007	Station Section View
1-0164L-M0008	Section Views
1-0164L-M0010	Piping Arrangement, Flowmeter Chamber
1-0164L-E0001	Electrical Single Line Diagram, Demolition
1-0164L-E0002	Electrical Single Line Diagram
1-0164L-E0003	Hazardous Location Plan
1-0164L-E0004	Electrical Equipment Plan, Main Floor
1-0164L-E0005	Electrical Equipment Plan, Lower Level 1
1-0164L-E0006	Electrical Equipment Plan, Motor and Comminutor Rooms
1-0164L-E0007	Electrical Equipment Plan, Pump Room
1-0164L-E0008	Electrical Equipment Plan, Flow Meter Chamber
1-0164L-E0009	Lighting Plan, Main Floor
1-0164L-E0010	Lighting Plan, Lower Level 1
1-0164L-E0011	Lighting Plan, Motor and Comminutor Rooms
1-0164L-E0012	Lighting Plan, Pump Room
1-0164L-E0014	PNL-L1 Schedule and Elevation
1-0164L-E0015	MCC Elevation, MCC-L2
1-0164L-E0016	Electrical Schedules
1-0164L-E0017	Motor Starter Schematic, MS-P-L1, Wastewater Lift Pump
1-0164L-E0018	Connection Diagram, MS-P-L1, Wastewater Lift Pump
1-0164L-E0019	Panel Layout, VFD-P-L2 and VFD-P-L3, Wastewater Lift Pumps
1-0164L-E0020-001	Motor Starter Schematic, VFD-P-L2, Wastewater Lift Pump
1-0164L-E0020-002	Motor Starter Schematic, VFD-P-L2, Wastewater Lift Pump
1-0164L-E0021	Connection Diagram, VFD-P-L2, Wastewater Lift Pump
1-0164L-E0022-001	Motor Starter Schematic, VFD-P-L3, Wastewater Lift Pump
1-0164L-E0022-002	Motor Starter Schematic, VFD-P-L3, Wastewater Lift Pump
1-0164L-E0023	Connection Diagram, VFD-P-L3, Wastewater Lift Pump
1-0164L-E0024	Motor Starter Schematic, MS-P-L4, Wastewater Lift Pump
1-0164L-E0025	Connection Diagram, MS-P-L4, Wastewater Lift Pump
1-0164L-E0027	Motor Starter Schematic, MS-SP-L14, Flowmeter Chamber Sump Pump
1-0164L-E0028	Motor Starter Schematic, SF-L2, Ventilation Fan
1-0164L-E0029	Electrical Details
1-0164L-E0030	Details, Telephone Network
1-0164L-E0031	Grounding Installation Details
1-0164L-E0032	Lighting Contactor, LC-10
1-0164L-E0033	Panel Layout, LC-10
1-0164L-A0001	Panel Layout, Control Panel CP-L1
1-0164L-A0002	Power Distribution, Control Panel CP-L1
1-0164L-A0003-001	RTU I/O Wiring Diagram, Control Panel CP-L1, Discrete Inputs
1-0164L-A0003-002	RTU I/O Wiring Diagram, Control Panel CP-L1, Discrete Inputs
1-0164L-A0004	RTU I/O Wiring Diagram, Control Panel CP-L1, Discrete Outputs
1-0164L-A0005-001	RTU I/O Wiring Diagram, Control Panel CP-L1, Analog Inputs
1-0164L-A0005-002	RTU I/O Wiring Diagram, Control Panel CP-L1, Analog Inputs
1-0164L-A0006	RTU I/O Wiring Diagram, Control Panel CP-L1, Analog Outputs
1-0164L-A0007	Control Schematic, Pump Backup Control
1-0164L-A0008	Panel Layout, Power Distribution Panel PDP-L1
1-0164L-A0009	Power Distribution, Power Distribution Panel PDP-L1
1-0164L-A0010	Panel Layout, Ventilation Control Panel CP-L2
1-0164L-A0011	Power Distribution, Ventilation Control Panel CP-L2

1-0164L-A0012	Connection Diagram, PDP-L1 to CP-L1
1-0164L-A0013	Panel Layout, Intrinsically Safe Barrier Junction Box, JBA-L1, JBA-L2 and JBA-L500-A
1-0164L-A0014-001	Panel Layout, Field Device Junction Boxes
1-0164L-A0014-002	Panel Layout, Field Device Junction Boxes
1-0164L-A0015	Automation Conduit Riser Diagram
1-0164L-A0016	Installation Details, Submersible Level Transmitter, L500-LT-A
1-0164L-A0017	Installation Details, Flowmeters and Level Switches
1-0164L-A0018	Network Diagram
1-0164L-A0030	Loop Diagram, Wet Well Submersible Level Sensor, L500-LT-A
1-0164L-A0031	Loop Diagram, Wet Well level Sensor (Bubbler), L500-LIT-B
1-0164L-A0032	Loop Diagram, Wet Well High Level Switch, L500-LSH
1-0164L-A0033	Loop Diagram, North Forcemain Flow Meter, L552-FIT
1-0164L-A0034	Loop Diagram, South Forcemain Flow Meter, L557-FIT
1-0164L-A0035	Loop Diagram, Instrument Air Pressure, L524-PSL
1-0164L-A0036	Loop Diagram, 600 Volt Power Fail, L527-ESL
1-0164L-A0037	Loop Diagram, Comminutor Chamber Flood Switch, L530-LSH
1-0164L-A0038	Loop Diagram, Pump Room Flood Switch, L533-LSH
1-0164L-A0039	Loop Diagram, Flow Meter Chamber Flood Switch, L570-LSHH
1-0164L-A0040	Loop Diagram, TVSS, Loop L538-XA
1-0164L-A0041	Loop Diagram, 120 Volt Power Fail, L544-ESL
1-0164L-A0042	Loop Diagram, Occupancy Switch, L600-YL
1-0164L-A0043	Loop Diagram, Recirculation Damper Control, L601
1-0164L-A0044	Loop Diagram, Supply Air Temperature, L602-TT
1-0164L-A0045	Loop Diagram, AHU-L1, Loop L603
1-0164L-A0046	Loop Diagram, AHU-L1 Discharge Temperature Setpoint, L603-TC
1-0164L-A0047	Loop Diagram, AHU-L1 Air Filters, Loop L603
1-0164L-A0048	Loop Diagram, Mechanical Room Temperature, L604-TT
1-0164L-A0049	Loop Diagram, Electrical Room Temperature, L613-TT
1-0159L-A0008	Marion Wastewater Pumping Station, Installation of Pumping Units & Building Upgrades, Panel Layout, Power Distribution Panel, PDP-L1

<u>Filename</u>	<u>Document Code</u>	<u>Document Name/Title</u>
907-2011_Automation_Forms.pdf		Automation Forms
907-2011_Cable_Schedule.pdf	508042-0000-47EL-0002	Cable Schedule
907-2011_Electrical_Forms.pdf		Electrical Forms
907-2011_FRS.pdf	508042-0000-48ER-0001	Functional Requirements Specification
907-2011_Geotechnical_Report.pdf		Geotechnical Investigation And Foundation Engineering Report For Montcalm Pumping Station Winnipeg, Manitoba
907-2011_Instrument_List.pdf	508042-0000-48EL-0001	Instrument List
907-2011_IO_List.pdf	508042-0000-48EL-0002	I/O List
907-2011_Lamacoid_Schedule.pdf	508042-0000-47EL-0003	Lamacoid Schedule
907-2011_VFD_Settings.pdf	508042-0000-47ED-0002	VFD Settings
907-2011_Soft_Starter_Settings.pdf	508042-0000-47ED-0003	Soft Starter Settings

E1.4 The following are included for reference:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
1541	Electrical Room, Equipment Elevations, Floor Plans
1542	Electrical Room, Single Line Diagram and Misc. Details
05356	Forcemain Replacement
05357	Forcemain Replacement
05358	Forcemain Replacement
05359	Forcemain Replacement Site Plan

## SH-1 Shoring Plan and Details

<u>Filename.</u>	<u>Document Code</u>	<u>Document Name/Title</u>
907-2011_Geotechnical_Report_2004.pdf		Geotechnical Investigation Montcalm Force Main Replacement
907-2011_Geotech_2004_TH1.pdf		Geotechnical Investigation
907-2011_Geotech_2004_TH2.pdf		Montcalm Force Main
907-2011_Geotech_2004_TH3.pdf		Summary Logs
907-2011_Geotech_2004_TH4.pdf		
907-2011_Geotech_2004_TH5.pdf		
907-2011_Geotech_2004_TH6.pdf		
907-2011_Pictures_Forcemain.pdf	-	References Pictures, Forcemain Replacement – 2004

## E2. SOILS INVESTIGATION REPORT

- E2.1 Further to C3.1, document entitled " Montcalm Wastewater Pumping Station Upgrades - Geotechnical Report" dated October, 2011 and prepared by TREK Geotechnical Inc, project reference 0019-005-00., is included with this Bid Opportunity (filename 907-2011\_Geotechnical\_Report.pdf).
- E2.2 Additional geotechnical investigation documents from previous work performed in 2004 prior to replacement of the force main lines with HDPE materials in 2005, is also available. The document is entitled Geotechnical Investigation Montcalm Force Main Replacement, KGS reference file number 03-107-17, and is included with this Bid Opportunity (filename 907-2011\_Geotechnical\_Report\_2004.pdf).

## GENERAL REQUIREMENTS

### E3. HAZARDOUS MATERIALS

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

### E4. SPECIFIC REQUIREMENTS

- E4.1 The Contractor shall provide all materials, fabrications, finishes, temporary installation, documentation, shop drawings, means and methods necessary to fully install all of the new works identified on the contract drawings in a safe manner, fit-for-purpose intended. The description of work provided herein is intended to be a general description of work activities, and is not intended to be an exhaustive listing of all tasks necessary to complete the scope of installations given on the drawings or specifications.
- E4.2 Exercise care where cutting holes in existing concrete elements so as not to damage existing reinforcing.
- (a) For reinforced concrete floors, locate existing reinforcing utilizing a reinforcing bar locator and mark out on the surface of the concrete prior to cutting.
- (i) Mark the location of the proposed hole and all adjacent rebar.
- (ii) Obtain approval from the Contract Administrator prior to cutting.
- E4.3 The Contractor shall exercise care where installing anchors into existing concrete elements so as not to damage existing reinforcing. All anchors shall be installed utilizing carbide tip drill bits. The existing reinforcing shall be located utilizing a reinforcing bar locator and marked out on the surface of the concrete. The drill holes shall be advanced to the required depth for installation of

the anchors. Should reinforcement be encountered while drilling, terminate the hole and reposition to clear the reinforcement. Do not use core bits that can easily intercept and damage/cut the reinforcing during drilling.

E4.4 The Contractor shall abide by the Arc Flash PPE requirements of CSA-Z462, Workplace Electrical Safety, and the arc flash labels on existing facility equipment.

E4.5 Wire nuts

- (a) Wire nuts are not permitted in conduit bodies
- (b) Wire nuts are permitted in junction boxes for lighting and receptacle wiring only. Wire nuts are not permitted for automation wiring.

E4.6 All conduit routes shall be approved by the Contract Administrator prior to installation of new conduit.

## **E5. SCOPE OF WORK**

## **E6. SURVEYING**

E6.1 There are surveying requirements within the Work. All surveying requirements are the responsibility of the Contractor, and will be paid for by the Contractor.

- (a) The Contractor shall provide all survey and layout work necessary to accurately layout and position the new construction to the lines and elevations shown on the drawings. There will be no field survey resources provided by the City or the Contract Administrator at any time to assist with the construction or layout activities. Elevations and dimensions as shown on the current project drawings are considered accurate and should be followed for the field work. The Contract Administrator, at their sole discretion, may undertake a confirmatory survey of the Contractor's work if considered necessary as construction progresses.

## **E7. EQUIPMENT SUPPLIED BY OTHERS**

E7.1 The City will supply the following equipment:

E7.1.1 Montcalm Wastewater Pumping Station

- (a) Two (2) 290 l/s (4597 USgpm) dry-pit pumping units complete with pump supports, for installation as indicated in the Specifications and Drawings.
- (b) Two (2) 100 hp pump motors and driveshaft assemblies, for installation, as indicated in the Specifications and Drawings.

E7.2 Inspection of installation of the pumping units, upon completion, will be performed by a qualified technical representative from the manufacturer of the pumping units. The cost of the initial inspection will be paid for by the City.

E7.3 Inspection of installation of the magnetic flowmeters and transmitters, upon completion, will be performed by a qualified technical representative from the manufacturer of the pumping units. The cost of the initial inspection will be paid for by the City.

E7.4 Provide the Contract Administrator with seven (7) days notice of when pumps will be installed to allow for arrangements to be made with the pump supplier for initial start-up inspection.

E7.5 The Contract Administrator will supply arc flash stickers for the electrical equipment.

## **E8. EQUIPMENT AND MATERIALS**

E8.1 The Contractor shall supply all equipment and materials necessary to execute the work, except for the equipment and material listed in E6.1(a) and as shown on the Drawings to be re-used.

E8.2 Existing equipment and materials may be re-used only as specifically indicated in these specifications, as shown on the Drawings or as approved by the Contract Administrator.

## **E9. SECURITY**

E9.1 The Contractor is responsible for all material and equipment stored on the site.

E9.2 Provide a chain-link fence around the construction site and lock after working hours. Supply five (5) copies of the key to the City.

E9.3 The Contractor is responsible for ensuring the security of the pumping station.

E9.4 Provide and pay for responsible security personnel to guard the site and contents of site after working hours whenever:

- (a) The pumping station or any associated piece of equipment is not locked and fully secure, or
- (b) Temporary bypass pumping is active.

E9.5 Costs for security shall be considered incidental to the Contract Work and shall be done at the Contractor's expense.

## **E10. SALVAGE**

E10.1 All salvaged equipment and materials as determined by the Contract Administrator shall remain property of the City unless specifically noted otherwise. The Contractor shall deliver salvaged equipment and materials to the City of Winnipeg's "Y Yard" outdoor storage compound located at the North East corner of the intersection of Dugald Road and Van Bellegham Avenue, Winnipeg, Manitoba.

E10.2 The Contractor shall notify the Contract Administrator at least 48 hours prior to delivery of salvaged equipment to allow for arrangements to be made to receive the salvaged equipment. All deliveries shall be made between 8:00 am and 3:30 pm on Business days.

E10.3 The Contractor shall remove and haul all rejected salvage from the site and legally dispose of it.

E10.4 Removal and delivery of salvageable and non-salvageable equipment and material shall be considered incidental to the Contract Work and no additional payment will be made for such Work.

## **E11. DANGEROUS WORK CONDITIONS**

E11.1 Further to clause C 6.26 of the General Conditions, the Contractor shall be aware that underground chambers, manholes, and sewers are considered a confined space and shall follow the "Guidelines for confined Entry Work" as published by the Manitoba Workplace Safety and Health Division.

E11.2 The Contractor shall be aware of the potential hazards that can be encountered in underground chambers, manholes and sewers such as explosive gases, toxic gases and oxygen deficiency. The Contractor's Safe Work Plan should address these issues.

E11.3 The air in a confined space must be tested before entry and continuously during the time that personnel are inside the space. Equipment for continuous monitoring of gases must be explosion-proof and equipped with a visible and audible alarm. The principal tests are for oxygen deficiency, explosion range and toxic gases. Testing equipment must be calibrated in accordance with manufacturer's specifications.

- (a) The Contractor is responsible for all testing requirements.

E11.4 The Contractor shall ventilate all confined spaces including underground chambers, tunnels, pipes and shafts as required and approved by the Manitoba Workplace Safety and Health Act



(the "Act"). If no ventilation is supplied, a worker must wear a respirator or supplied air to enter the confined space.

E11.5 Workers must wear a respirator or supplied air at all times when entering an underground chamber, manhole or sewer where live sewage is present.

E11.6 The Contractor shall provide a photo-ionization detector (PID) and toxic gas detector on site at all times to monitor potential hydrocarbon vapours and hydrogen sulphide in the confined spaces. The gas detector and safety equipment conforming to the Act shall be made available to the Contract Administrator for his use during inspections.

E11.7 The Contract Administrator may issue a stop work order to the Contractor if the above guidelines are not being followed. The Contractor shall not resume operations until the Contract Administrator is satisfied the Contractor is following the appropriate procedures. The Contractor shall have no claim for extra time or costs due to the stop work order for not following these safety guidelines.

## **E12. WATERWAY BY-LAW**

E12.1 The Contractor shall note that all Works within 107 metres (350 feet) of a riverbank are within the jurisdiction of the Waterway By-Law. The City of Winnipeg, Water and Waste Department, will apply and pay for any Waterway Permits for the project, as required. The Contractor shall adhere to restrictions imposed on the permit.

E12.2 Under no circumstances will stockpiling of any material be permitted within 107 metres of a riverbank or dike.

(a) The Contractor is responsible for removing excavated materials from the Site immediately.

(b) The Contractor is responsible for utilizing and placing any backfill brought to the Site immediately.

## **E13. PROTECTION OF EXISTING TREES**

E13.1 Do not remove existing trees and take the following precautionary steps to avoid damage from construction activities to existing boulevard trees within the limits of the construction area.

E13.1.1 Do not stockpile materials and soil or park vehicles and equipment on boulevards within 2 metres of trees.

E13.1.2 Strap mature tree trunks with 25 x 150 x 2400 wood planks. Smaller trees shall be similarly protected using appropriately sized wood planks.

E13.1.3 Excavations shall be carried out in a manner to minimize damage to existing root systems. Where roots must be cut to facilitate an excavation they shall be neatly pruned at the face of the excavation.

E13.1.4 Work on site shall be carried out in a manner to minimize damage to existing tree branches. Where damage to tree branches does occur, the Contractor shall neatly prune the damaged branch.

E13.1.5 American elm trees shall not be pruned between April 1<sup>st</sup> and August 1<sup>st</sup> and Siberian elm trees between April 1<sup>st</sup> and July 1<sup>st</sup> of any year under provisions of The Dutch Elm Disease Act.

E13.2 All damage to existing trees due to construction activities shall be repaired to the requirements and satisfaction of the City of Winnipeg, Parks and Recreation Department, Forestry Branch at the Contractor's expense.

E13.3 Costs for protection of trees shall be considered incidental to the Contract Work and shall be done at the Contractor's expense.

#### **E14. TEMPORARY USE OF CITY EQUIPMENT**

E14.1 City facilities, systems and equipment shall not be used during construction without the Contract Administrator's written permission. The Contract Administrator reserves the right to withdraw said permission if, in his opinion, proper care and maintenance are not provided.

#### **E15. EXISTING PUMPING STATION OPERATION DURING CONSTRUCTION**

E15.1 The facility related to the Work is critical to the transport of wastewater for the City of Winnipeg. Under no condition shall the station pumping be shut down without prior permission of the Contract Administrator.

E15.2 The Contractor is advised that the existing Montcalm Wastewater Pumping Station will be allowed to be taken out of operation only after the Contractor's schedule of activities, including provisions for temporary by-pass pumping operations, to complete the Work is approved by the Contract Administrator. The Contractor shall plan his construction activities to allow for the minimum amount of disruption time to normal operating status of the stations.

E15.3 The Contractor shall cooperate with and provide full access at all times for City personnel to carry out maintenance and operational duties.

(a) No additional payments will be made for providing access to City forces on the site or any potential affect City crews might have on the Contractor's work.

#### **E16. TEMPORARY SHUTDOWN OF THE PUMPING STATION**

E16.1 Temporary shutdown of the wastewater pumping stations will be allowed for the following work activities.

(a) Installation of the gate valves and piping in the comminutor chamber.

(b) Removal of existing pumps, suction and discharge piping, valves and fittings inside the station.

(c) Installation of new pumps, suction and discharge piping, valves and fittings inside the station.

(d) Sequence work such that a minimum amount of shut-down time at the Station is used for the above mentioned activities (i.e. replace one pumping unit while the other pumping units are still on-line).

E16.2 Prepare and submit shutdown plans a minimum of 48 hours prior to the proposed shutdown.

E16.3 All gate operation and other control relating to the wastewater process will be by the City.

E16.4 Allowable shutdown times for the Montcalm Station indicated on the Drawings is approximate and the Contractor must monitor the upstream system at all times to ensure the stored level of wastewater will not exceed the critical basement elevation indicated on the Drawings.

E16.5 Subject to unforeseen flow conditions, 4 hours of allowable shutdown time may be available during the night.

E16.6 Schedule work activities requiring station shutdown to be done at night, if required by the Contract Administrator, when flow amounts are generally reduced, to maximize the amount of shutdown time available and reduce the risks associated with station shutdown.

E16.7 Schedule several work activities to be completed in the same shutdown where possible to minimize the number of station shutdowns and amount of temporary by-pass pumping required.

E16.8 Temporary by-pass pumping, as described in E17, must be installed and operational at all times during construction and ready to be put into service if liquid level in the sewer system reaches the critical basement elevation shown on the drawings or as determined by the Contract Administrator.

- E16.9 Temporary shutdown will include closing the sluice gate or installing a sewer plug in upstream of the station, pump turn off, forcemain draining (if required), pump start up and opening the sluice gate or removing the sewer plug.
- E16.10 Water and Waste Department, Collection System personnel will be available to provide assistance to the Contractor for temporary shutdown of the wastewater pumping station to facilitate completion of the Work.
- E16.11 There will be no charge to temporarily shutdown the wastewater pumping station for the work activity listed.
- E16.12 If an unreasonable number of station shutdowns are required to complete the same work activity due to the Contractor's method of operation, a fee of \$300.00 per hour for Collection System personnel may be charged to the Contractor and deducted from future Progress Payments.
- E16.13 The Contract Administrator reserves the right to cancel a planned station shutdown if in his opinion, flow conditions or the weather forecast would not allow for a shutdown of sufficient duration to complete the work activity. The Contractor shall reschedule the work activity to a more suitable time.
- E16.14 Consecutive back-to-back station shutdowns will not be allowed until the sewer system has returned to normal.

## **E17. EXCAVATION**

- E17.1 Remove existing surface installations as shown on the project drawings, as required to allow the excavation work to proceed without damage to existing installations. For installations that are to be reinstalled after completion of the work, store all materials in a secure location, away from the work area.
- E17.2 All excavation work to be in accordance with CW 2030.
- E17.3 Remove excavated materials from the site immediately. Excavated material shall not be stockpiled on-site unless it will be used as backfill the same day it is excavated.
- E17.4 Place a minimum 75 mm thick lean mix concrete slab in the bottom of the excavation to provide a clean working base upon completion of the excavation to the required limits.
- E17.5 Tamp and screed lean mix concrete to give a level working platform for setting up forms and placing reinforcing steel. Allow lean mix concrete to set for twenty-four (24) hours before setting up forms or placing reinforcing steel.
- E17.6 Supply and place lean mix concrete, as direct by the Contract Administrator, as backfill for any portions of the excavation, carried beyond the required limits of excavation. The limits of excavation shall be considered to be the inside-face of the shoring system and the underside of the working base slab.
- E17.7 All working areas below grade shall be kept adequately and securely supported during and after excavation until the shoring and bracing is in place to prevent loss of ground and injury to any person from falling or caving material.

## **E18. PUMP START UP**

- E18.1 New pumps supplied by the City and installed by the Contractor shall not be started up by the Contractor without approval from the Contract Administrator. The Contractor shall provide the Contract Administrator his proposed schedule for each pump start up at least one week in advance in order to allow time for the Contract Administrator to make arrangements with the pump supplier to be present for the start up.

E18.2 If any new pumping equipment (pump, pump controller, motor or drive shaft) fails to operate or perform properly and has to be removed for service as determined by the Contract Administrator, the Contractor shall remove the equipment that fails at no cost to the City and make arrangements with the pump supplier to have the equipment taken to the supplier's shop.

E18.3 The City shall be responsible for the re-installation of the pumping equipment once it has been repaired or replaced.

E18.4 The pumping equipment supplier and contact for this Contract is:

Power and Mine Supply Company Ltd.  
4 – 75 Meridian Drive  
Winnipeg, Manitoba  
Attention: Dan Shamlock, P. Eng.  
Telephone (204) 694-9300

## **E19. WET WEATHER FLOWS IN EXISTING SEWER**

E19.1 In the event the flow in the sewer system is expected to exceed the amount indicated for PDWF due to wet weather runoff, the Contract Administrator may suspend work activities that require temporary by-pass pumping and temporary shutdown of the wastewater pumping station. Suspension of these activities will continue until the high flow diminishes in the sewer system.

E19.2 In the opinion of the Contract Administrator, if suspension of work activities that require temporary by-pass pumping and temporary shutdown of the wastewater pumping station cause a delay in completion of the Work through no fault of the Contractor, the completion date of the Work will be adjusted accordingly.

E19.3 There shall be no claim for additional costs or time due to Station shut-downs from high wet weather flows.

## **E20. WORK PLAN**

E20.1 The Contractor is required to develop a detailed work plan and submit to the City for review. The work plan is to include:

- (a) The proposed construction sequence to be followed including all methods to be employed to ensure that no damage occurs to existing structures or adjacent properties within or adjacent to an excavation.
- (b) Detailed design and installation drawings for the excavation shoring system that is to be used for construction.
- (c) A description of all proposed methods of construction to be implemented.
- (d) Specialized equipment that may be used.
- (e) Any design revisions proposed to accommodate the Contractor's proposed method of construction.
- (f) Water control methods to be utilized during construction, including the Contractor's proposed method for draw down and depressurization of the groundwater till pressures in the area of the excavation and any required surface runoff control measures.
- (g) The Contractor shall respond to any concerns that may be raised by the Contract Administrator's review of the Contractor's construction methods submission.

E20.2 Do not install any electrical or automation equipment within the pumping station until the exposed sewage within the comminutor chamber is enclosed in pipework.

## **E21. MOBILIZATION AND DEMOBILIZATION**

E21.1 Description

E21.1.1 Mobilization and demobilization will include but not be limited to start-up costs, equipment set-up and removal, storage facilities set-up and removal and site cleanup.

E21.2 Measurement and Payment

E21.2.1 A maximum of 50% of Form B, Item 1 or 5% of the Total Bid Price, whichever is less, may be submitted for progress payment upon mobilization. The remaining amount will be paid out upon demobilization.

E21.2.2 The Contractor is eligible for payment of mobilization services when the Contract Administrator is satisfied that:

- (a) The Contractor has met all the Commencement requirements specified D14.
- (b) The contractor has mobilized equipment and initiated work on Site.

E21.2.3 The Contractor is eligible for payment of demobilization services (as per D23) when the Contract Administrator is satisfied that:

- (a) The Contractor has achieved Substantial Performance,
- (b) the Contractor has demobilized, and
- (c) the Contractor has restored and cleaned up the site.

**E22. LANDSCAPING AND FENCING**

E22.1 Description

E22.1.1 This specification shall cover surface restoration and associated items of Work for existing surfaces disturbed by construction activities, as well as fencing.

E22.2 Construction Methods

E22.2.1 Restoration of all existing surface areas disturbed by construction activities including but not limited to; excavation for new station, operation of construction equipment, placement of field office or equipment trailer, snow clearing and where construction materials were stockpiled, shall be restored as follows.

- (a) Grassed areas: sodding using imported topsoil in accordance with CW 3510.
- (b) Gravel surfaces: in accordance with CW 3150.
- (c) Asphalt surfaces: match existing base course and asphalt thickness or provide a minimum of 150 millimetres of base course and 75 millimetres of Type 1A Asphaltic concrete whichever is greater, in accordance with CW 3410.
- (d) Pavement slabs in accordance with CW 3310.
- (e) Miscellaneous concrete slabs (median slab, sidewalk, bullnose: in accordance with CW3235
- (f) Concrete curb and gutter: in accordance with CW 3240.
- (g) Interlocking pavement stones: CW 3330.

E22.3 Measurement and Payment

E22.3.1 Payment will be based on Form B, Item 2, as accepted and measured by the Contract Administrator.

- (a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

## **E23. FLOWMETER CHAMBER CONSTRUCTION**

### **E23.1 Scope of Work**

- (a) Survey and locate all existing services and limits of proposed flow meter chamber excavation relative to existing structures. The contractor shall provide all survey and layout work necessary to accurately layout and position the new construction. The Contract Administrator, at their sole discretion, may undertake a confirmatory survey of the Contractor's work if considered necessary.
- (b) Install groundwater depressurization well and all pumping required to locally draw down the groundwater elevation to the underside elevation of the proposed construction excavation.
- (c) Design, supply and install shoring system necessary for opening the new excavation to the required depth and dimensions necessary to construct the new concrete meter chamber. Ensure that the new excavation is large enough to accommodate the existing shoring lagging and granular fill that was placed with the last excavation undertaken to replace the existing force mains dating from 2005. Consideration also to be given regarding how best to configure the shoring and intermediate cross struts and walers to accommodate construction of the new permanent buried structure once the excavation is open.
- (d) All excavation within 1.5 m of the force mains to be soft dig, either hydro excavated or by hand, as necessary to avoid potentially damaging the existing operational force mains.
- (e) Construct the new reinforced concrete raft slab at the base of the excavation to the lines and dimensions shown on the project drawings.
- (f) Isolate and install the new flow meters, control valves, flanges and fittings necessary to fuse the HDPE pipe and assemble the various component fittings in place at the base of the excavation prior to forming and constructing the concrete pipe supporting saddles.
- (g) Following completion of the piping modifications, all necessary NDT examination of the piping, and construction of the pipe support saddles, the force main piping may resume operation.
- (h) Construct the remainder of the concrete meter chamber, rising collar and interior platforms in accordance with the drawings, including exterior waterproofing.
- (i) Install all post compression link seals and water stopping around existing piping from exterior sides of new walls prior to backfilling.
- (j) Backfill around the entire perimeter of the concrete structure to the height of the lower meter chamber roof, alternating either side of the excavation.
- (k) Provide bedding sand layer over the waterproofing membrane on all horizontal surfaces that are to receive backfill.
- (l) Place weep tile, pea gravel and filter sock around the structure at the elevation shown on the project drawings. Provide interconnecting penetration through the wall of the structure, with integral waterstop flange at two (2) locations to accommodate internal weep tile drain piping.
- (m) Backfill the remainder of the excavation to grade level taking care not to disturb or laterally dislodge the precast pipe sections forming the access collar to the buried meter chamber.
- (n) Provide a clay cap with topsoil around the base of the meter chamber grade level access way, with positive drainage at 5% away from the structure.
- (o) Install all surface hatches, gaskets and pad locks necessary to secure the completed construction.

### **E23.2 Specifications**

#### **E23.2.1 Backfill**

- (a) Place and compact backfill material as indicated on the Drawings in accordance with CW 2030. Do not place backfill material in a frozen state. Supply heating and hoarding in accordance with CW 2160 if required to ensure material does not freeze before compaction is complete.

### E23.2.2 Excavation Security Fence

- (a) Further to Clause 3.1 of CW 1130, completely cover the excavation and provide a security fence to completely surround the excavation when unattended in accordance with the following:
  - (i) Security fence shall be chain link fence or approved equal, a minimum 1.80 metres high with metal support posts embedded far enough into the ground and spaced close enough together so the fence will not sag or collapse.
  - (ii) Attach fencing securely to posts.
  - (iii) Secure the gate or end of the fencing to a post with chain and a padlock.
  - (iv) Provide alternate security fence proposal to Contract Administrator for approval.

E23.2.3 As per NMS Format Specifications.

### E23.3 Measurement and Payment

E23.3.1 Payment will be based on Form B, Item 3, as accepted and measured by the Contract Administrator.

- (a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

## E24. BUILDING ROOF REPLACEMENT

### E24.1 Scope of Work

- (a) Tear off the existing roof of the Main Floor (Electrical and Mechanical rooms) to the supporting steel beams and the bearing brick walls. The existing roof consists of Tar & Gravel, Haydite Panels, Fiber Board, Conc. Cant Strips, and GI Flashing. The drywall ceiling in Electrical room to remain.
- (b) Dispose of all the dismantled waste materials.
- (c) Restore any damaged brickwork to its original condition.
- (d) Commercial blast clean and paint the existing steel roof beams.
- (e) Supply and install a welded channel frame for the 550 mm x 550 mm exhaust opening in the new roof. The frame will be welded to the existing beams.
- (f) Supply and install steel deck on steel beams (intermediate supports) and brick walls (end and side supports) with openings for exhaust and chimney. The steel beams are spaced at 2.134 m o/c.
- (g) Supply and install a new roof on the steel deck.

### E24.2 Specifications

E24.2.1 New Main Floor steel roof deck specification:

- (a) 38 mm x 1.21 mm (1.5 inches x 18 gage) VIC WEST RD 938 – Z 275 minimum two spans – or approved equal steel roof deck.

E24.2.2 New Main Floor roof to consist of:

- (a) 12.7 mm exterior drywall sheathing.
- (b) 0.15 mm (6 mil) Poly vapour barrier.
- (c) 150 mm (minimum) Rigid Extruded Polystyrene Insulation (Styrofoam Deckmate) mechanically fastened to steel deck and tapered to suit roof slope.
- (d) 100 mm fiber cant all around and 100 mm insulation crickets as per plan.
- (e) 1.6 mm (60 mil) EPDM roofing membrane fully adhered to rigid insulation.
- (f) Prefinished metal cap flashing on the concrete coping.

(g) Prefinished metal scuppers and downspouts.

E24.2.3 As per NMS Specifications.

E24.3 Measurement and Payment

E24.3.1 Payment will be based on Form B, Item 4, as accepted and measured by the Contract Administrator.

(a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

## **E25. MAIN FLOOR REFURBISHMENT**

E25.1 Scope of Work

- (a) Clean the walls of the Mechanical room using sand blasting.
- (b) Supply and install 1.0 mm (40 mils) Bakor Blueskin SA Regular self adhesive air/vapour barrier membrane on the walls of the Mechanical Room.
- (c) Construct a new wall interior wall in the Mechanical room.
- (d) Seal four existing openings in the brick walls of the main floor.
- (e) Provide three new openings in the brick walls of the Mechanical Room with galvanized lintel angles / frames and restore any damaged brickwork to its original condition.
- (f) Dismantle the existing 905 mm x 2110 mm steel door and frame in the Mechanical room.
- (g) Demolish the existing 620 mm x 2110 mm (high) wall to make room for a 1524 mm wide double door and frame. Restore any damaged brickwork to its original condition. Plaster and paint the exposed surfaces of the wall for the new double door frame.
- (h) Supply and install a 1524 mm x 2110 mm (high) hollow steel insulated double door and frame paint finished with galvanized lintel angles.
- (i) Dismantle the existing 1220 mm x 2140 mm steel door and frame in the Mechanical room.
- (j) Construct a 350 mm (with 50 mm air gap) x 1300 mm x 1100 (high) mm masonry wall in the Mechanical room.
- (k) Construct a 150 mm x 914 mm x 610 mm reinforced concrete pad next to the existing pad.
- (l) Paint the electric wire rope hoist beam and the stoppers in the Electrical room.
- (m) Repair a crack in the brick wall between the Mechanical and the Electrical rooms.
- (n) Supply and install 7.9 mm galvanized steel checkered cover plate to replace the existing 1920 mm x 1080 mm wooden cover plate for 1840 mm x 1000 mm opening. The plate to be painted, welded to the existing steel frame and to be flush with the floor level.
- (o) Supply and install a fiber glass cover plate with recessed drop handle type lifting handles to replace the existing 990 mm x 1040 mm hinged steel checkered plate for 914 mm x 914 mm opening.
- (p) Paint hatchway opening checkered cover plates, guardrails and handrails.
- (q) Clean and profile the concrete floor surface to CSP-2 in the Mechanical room using a shot blaster. Smooth grind uneven surfaces and repair using grout if required. Paint the concrete floor.
- (r) Create a new 300 mm x 850 mm (nominal) opening in the 150 mm thick concrete slab in the Mechanical room.
- (s) Create a new opening for a 50 mm diameter drain pipe in the 150 mm thick concrete slab in the Mechanical room.
- (t) Seal the existing openings in the Mechanical room 150 mm thick concrete floor slab.



- (u) Construct 89 mm high reinforced housekeeping pads in the Mechanical room for mounting of electrical equipment.

## E25.2 Specifications

### E25.2.1 New interior wall in mechanical room to consist of:

- (a) 92 mm 20 Gage Galvanized steel studs at 400 mm o/c with supporting tracks.
- (b) Proper framing for doors and other openings in the walls.
- (c) ROXUL COMFORTBATT R14 insulation for steel studs.
- (d) 0.15 mm (6 mil) Poly vapour barrier.
- (e) 19 mm thick painted plywood

### E25.2.2 As per NMS Specifications.

## E25.3 Measurement and Payment

### E25.3.1 Payment will based on Form B, Item 5, as accepted and measured by the Contract Administrator.

- (a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

## E26. MISCELLANEOUS STRUCTURAL REPAIRS

### E26.1 Scope of Work

- (a) Dismantle the existing drain pipe in the Mechanical room and the Lower Level 1 room. Seal the resulting holes in the 150 mm thick concrete slabs.
- (b) Repair damaged concrete and exposed steel around hatchway openings in the roof of the Lower Level 1 room.
- (c) Clean and paint the walls and ceiling of the Lower Level 1 room.
- (d) Clean and profile the concrete floor surface to CSP-2 in the Lower Level 1 room using a shot blaster. Smooth grind uneven surfaces and repair using grout if required. Paint the concrete floor and the concrete curb around the hatchway opening.
- (e) Repair the damaged reinforced concrete beam in the floor slab of the Lower Level 1 room.
- (f) Supply and install a new galvanized steel beam assembly in the floor slab of the Lower Level 1 room.
- (g) Paint hatchway opening checkered cover plate, guardrails and handrails in the Lower Level 1 room.
- (h) Create a new 300 mm x 300 mm (nominal) opening in the 150 mm thick concrete slab in the Lower Level 1 room.
- (i) Create a new opening for a 50 mm diameter drain pipe in the 150 mm thick concrete slab in the Lower Level 1 room.
- (j) Clean and seal an opening in the western wall of the Comminutor chamber (below the hatchway opening) with non-shrink grout.
- (k) Plug any holes in the walls of the Stairwell with no-shrink grout, and clean and paint the walls.
- (l) Paint the handrails in the Stairwell.
- (m) Repair damaged concrete surface in the Stairwell outside of the Pump room.
- (n) Weld two new stiffener plates to the shelf angles supporting the trolley beam in the Motor room.
- (o) Clean and paint the ceiling and walls of the Motor room.

- (p) Clean and profile the concrete floor surface to CSP-2 in the Motor room using a shot blaster. Smooth grind uneven surfaces and repair using grout if required. Paint the concrete floor.
- (q) Paint the trolley, trolley beam, supporting brackets and the shelf angles.
- (r) Paint four eye-shaped hooks, and one U-shaped hook and its supporting plate in the roof slab of the Motor room.
- (s) Paint hatchway grating in the Motor room.
- (t) Repair the damaged concrete and replace the corroded steel angles with channels around the hatchway opening in the roof slab of the Pump room.
- (u) Paint the corroding steel surface below a closed opening in the roof slab of the Pump room.
- (v) Clean and paint the ceiling and walls of the Pump room.
- (w) Repair damaged concrete surface (approx 2.7 m x 2.7 m) in the Pump room.
- (x) Paint eye-shaped and U-shaped hooks and the supporting plates in the Pump room.
- (y) Replace two bent and cracked eye-shaped 19.4 mm diameter steel lifting hooks in the roof slab of the Pump room ( Load Rating = 1 Ton)

#### E26.2 Specifications

- (a) As per NMS Specifications.

#### E26.3 Measurement and Payment

E26.3.1 Payment will be based on Form B, Item 6, as accepted and measured by the Contract Administrator.

- (a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

### **E27. FLOW CONTROL AND TEMPORARY BY-PASS PUMPING**

#### E27.1 Description

E27.1.1 This specification covers flow control in existing sewers and temporary by-pass pumping of flow during installation of the wastewater pumping units and station modifications for each of the Baltimore and Ash Wastewater Pumping Stations.

#### E27.2 Materials

##### E27.2.1 Inflatable Rubber Sewer Plugs

- (a) Made of rubber, capable of remaining in place when inflated to the pressure required to withstand the expected sewer levels.
- (b) Provided with an inflation/deflation hose, monitoring pressure valve, removal rope or cable and safety chain, all of sufficient length to reach ground elevation for monitoring and removal.

##### E27.2.2 Temporary By-Pass Pumping Equipment

- (a) Non-clog, submersible pumping units, each sized to meet or exceed the required capacity. Complete with all required piping, fittings, floats and pump controls suitable for temporary installation in a sewer manhole.
- (b) Provide model and capacity curves to the Contract Administrator for approval.
- (c) Power supply to be suitably sized for pumping equipment complete with all required controls. Fuel to be in lockable, tamperproof container, approved by Contract Administrator.

E27.2.3 Fittings and Appurtenances

- (a) Fittings, couplings and appurtenances to be used for repairs to existing forcemains and sewers to be approved products for underground use in the City of Winnipeg.

E27.2.4 Bedding and Backfill

- (a) Bedding and initial backfill material to be sand in accordance with CW 2030.
- (b) Backfill excavations in pavement areas to be Class 3 in accordance with Clause 3.8.3 of CW 2030. Backfill in excavations in boulevard areas to be Class 5 in accordance with Clause 3.8.3 of CW 2030.

E27.3 Construction Methods

E27.3.1 General

- (a) Maintain level of sewage in existing sewers below the critical basement elevation shown on the Drawings at all times. The City will provide a mark at a convenient location for reference.
- (b) Allowable shutdown times shown on the drawings are approximate and the Contractor must monitor the upstream system at all times to ensure the stored level of wastewater does not exceed the critical basement elevation.
- (c) Provide a flow control plan to the Contract Administrator for review before construction starts.
- (d) Diversion of wastewater flow directly or indirectly to the environment, Land Drainage Sewers or Storm Relief Sewers will not be allowed.

E27.3.2 Expected Wastewater Flow to the Montcalm Wastewater Pumping Station

- (a) The expected peak dry weather flow (PDWF) to the Montcalm Wastewater Pumping Station is 365.0 l/s (5785.4 US gpm).
- (b) Critical Basement elevation is 225.552 m.
- (c) Combined sewers can receive flow of an undetermined amount from watermain breaks, snow melt, rain and other unforeseen sources. The Contractor will be responsible to monitor the flow in the sewer and adjust or halt work activities accordingly due to unforeseen flow above the amount identified for PDWF.

E27.3.3 Inflatable Sewer Plugs

- (a) Only inflatable rubber sewer plugs shall be used to plug sewers.
- (b) Clean sewer pipe as required to properly install inflatable sewer plug(s) in accordance with the manufacturer's instructions at the locations shown on the Drawings to isolate the installation location. Installation of inflatable sewer plugs at other locations to be approved by the Contract Administrator before construction starts.
- (c) Secure inflatable sewer plugs at or near the ground surface.
- (d) Continuously monitor air pressure while sewer plug is in place and have proper inflation equipment available at all times.
- (e) Inflatable sewer plugs will be installed in the forcemain outlets, located in a manhole chamber on the west bank of the Red River at the rear of property #1 Point Douglas Avenue to ensure forcemain isolation during shutdown of the forcemains as required during construction.

E27.3.4 Temporary By-Pass Pumping

- (a) For by-pass pumping operations, provide a minimum of two submersible pumps at all times, each with a capacity equal to or greater than the listed PDWF for that station. Both pumps are to be installed and available for operation. A replacement pump with the required capacity shall be immediately provided if one of the two original pumps has to be removed from the site for repairs.

- (i) A combination of smaller sized pumps may be used concurrently if the total discharge flow of the pumps meets the PDWF volumes identified in E27.3.2 and providing replacement pumps are available on-site to maintain the PDWF volume.
- (b) Surface mount, vertical lift suction pumps are not acceptable.
- (c) Temporary by-pass pumping may be installed at the following locations:
  - (i) Manhole "A" on Archibald Street, as shown on the drawings.
- (d) Provide detailed information for pumping equipment to be used including pump capacity and dimensions, depth of submergence, pump controls and installation details to the Contract Administrator for review before construction starts.
- (e) Power supply to be approved by the Contract Administrator before set-up. Locate the power supply where it will not adversely affect local residences. Location to be approved by the Contract Administrator before construction starts.
- (f) Provide suitable traffic ramps approved by the Contract Administrator if the by-pass pumping discharge pipe and power supply cables are laid across vehicle or pedestrian traffic areas.
- (g) Provide a check valve on the by-pass pumping discharge pipe to prevent cycling when the pumping station is activated.
- (h) The Contractor is advised that the pumping station will remain in service while the work is being completed, except for planned temporary shutdowns as described in E16. The Contractor shall cooperate and coordinate with the City to allow full access at all times for City staff to carry out maintenance and operational duties.
- (i) Arrange construction activities and schedule to be able to remove temporary inflatable sewer plug(s) and restore pumping station operation at the end by-pass pumping operations.
- (j) If a temporary pump in use fails, it must be replaced immediately with the standby pump and if the flow level in the sewer rises to the mark established by the Contract Administrator, the inflatable sewer plug shall be deflated and flow allowed to go the pumping station or additional temporary pumping must be provided.
- (k) The Contractor shall ensure temporary by-pass pumping equipment and materials will be properly insulated and heated, if required, to be protected from freezing and to maintain proper functioning during cold weather.
- (l) Temporary by-pass pumping equipment and materials shall remain on-site until station construction is completed as described in these Specifications and to the satisfaction of the Contract Administrator.

#### E27.3.5 Responsibility

- (a) The Contractor will take full responsibility for the temporary bypass pumping, including high water events.
- (b) Provide a 24-hour contact person who can address any issues with the bypass pumping.

#### E27.4 Measurement and Payment

- E27.4.1 Flow control and temporary by- pass pumping will be measured on a unit basis and paid for at the Contract Unit Price for "Flow Control and Temporary By-Pass Pumping" as shown in Form B: Prices, installed in accordance with this specification, accepted and measured by the Contract Administrator.

### **E28. WET WELL CLEAN OUT**

- E28.1 The Contractor shall be responsible for the clean out of the wet well at completion of construction at the end of the project. Clean out shall be done by mechanical or manual

methods and shall remove grit, tallow and other build-ups to the satisfaction of the Contract Administrator.

- E28.2 The current level of accumulation in the wet wells is not known. Higher levels of accumulation, above that anticipated by the Contractor will not be eligible for additional payments.
- E28.3 The Contractor shall also ensure that all construction material and debris are removed from the wet well after completing the works and prior to startup and commissioning of the new pumps.
- E28.4 The Contractor shall be responsible to maintain a clean wet well in the station during construction.
- E28.5 Schedule upstream work that may produce debris prior to wet well cleanout.
- E28.6 Provide evidence of the wet well clean out in the form of photographs, or other suitable means, acceptable to the Contract Administrator.
- E28.7 Under no circumstances will the City pay for more than one clean out of the wet well. In the event that the wet well is not clean at the end of the associated mechanical work, the Contractor is responsible for bearing the cost of re-cleaning the wet well.
- E28.8 Measurement and Payment
- E28.8.1 Payment will based on Form B, Item 8, as accepted and measured by the Contract Administrator.
- (a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

## **E29. PUMPING STATION MECHANICAL WORK**

### **E29.1 Description**

- E29.1.1 This Specification covers the piping, equipment, materials and structural modifications to the existing Montcalm Wastewater Pumping Station.
- E29.1.2 The Contractor shall remove the existing pumping units, motors, piping, equipment and materials as required and install new pumping units, piping, equipment and materials as shown on the drawings or as indicated by the Contract Administrator.
- E29.1.3 All equipment and material shall be supplied by the Contractor except as listed in E7.

### **E29.2 Materials**

#### **E29.2.1 Pumping Units**

- (a) Two (2) pumps shall be supplied by the City as indicated in E7.

#### **E29.2.2 Pump Motors**

- (a) Two (2) pump motors and driveshaft assemblies shall be supplied by the City as indicated in E7.

#### **E29.2.3 Gate Valves**

- (a) Unless noted otherwise, cast iron body with flanged ends equipped with outside rising stem, screw and yoke; bronze trimmed cast iron wedge; bronze stem, double O-ring stem seals and 50 millimetre square operating nut.
- (b) Three (3) 600mm gate valves shall be equipped with no-rising stems and shall be complete with manual pedestal operators.
- (i) These gate valves with non-rising stems will be installed inside the Montcalm Wastewater Pumping Station on the pump room floor which has an approx. floor to ceiling height of 2.16 meters (7.08 feet). The centerline of the of the

- force main pipes which these valves are to be connected to are approx. 762 mm (2.5 feet) above the floor elevation.
- (ii) The gate valve stems will pass through an intermediate floor above with a thickness of 305 mm (1 foot) into the area of the Station known as the motor room floor and the pedestal mounted operators will be installed on this elevation.
- (c) Two 750mm dia. gate valves with non-rising stems and complete with pedestal mounted actuators.
    - (i) The Contractor is responsible for all measurements.
  - (d) The pedestal mounted gate valve operators shall meet the following criteria:
    - (i) Body shall be ductile iron or steel with epoxy coating.
    - (ii) Gate valve operators shall have an indicator gauge with a travelling pointer to show if valve is open, closed or a position in between.
    - (iii) Bushings to be bronze and all bolting hardware to be Type 304 stainless steel.
    - (iv) Contractor to be responsible for confirming all field measurements prior to manufacture to ensure proper function and fit for the pedestal mounted operators.
  - (e) Flanges shall conform in dimension and drilling to ANSI/ASME B16.1, Class 125.
  - (f) Direction of opening shall be counter clockwise and shall be clearly stamped or indicated with raised letters and arrow.
  - (g) Manufacturer's nameplate shall be attached to the valve body with stainless steel fasteners.
  - (h) Gate valves shall be as manufactured by Clow Canada, Crane, Mueller Canada or approved equal.
  - (i) Knife gate valves are not acceptable.
  - (j) Submit shop drawings of gate valves in accordance with Section 01 33 00.

#### E29.2.4 Check Valves

- (a) Ductile iron body with flanged ends and removable inspection cover manufactured and tested in accordance with AWWA C508.
- (b) Flanges shall conform in dimension and drilling to ASME B16.1, Class 125.
- (c) ASTM D2000-BG, Buna - N (NBR) sewage resistant rubber flap and Type 302 stainless steel disc accelerator.
- (d) Attach manufacturer's nameplate to the valve body with stainless steel fasteners.
- (e) Acceptable product: Val-Matic Series 500 or approved equal.
- (f) Submit shop drawings of check valves in accordance with Section 01 33 00.

#### E29.2.5 Piping and Fittings

- (a) All piping shall be Class 52 ductile iron or ASTM Carbon steel Schedule 80 thickness.
- (b) Cast Iron fittings shall conform to AWWA C110.
- (c) Fabricated fittings shall conform to ASTM A53 carbon steel grade B, Schedule 80 wall thickness.
- (d) Steel fittings shall be ASTM A234 grade B carbon steel, Schedule 80 wall thickness. Dimensions shall be to ANSI B16.9.
- (e) All welded steel flanges shall be in conformance with AWWA C207, Class B.
- (f) Submit shop drawings in accordance with Section 01 33 00.

#### E29.2.6 Large Diameter Flanges and Adaptor Flanges

- (a) Thread-on flanges for Ductile Iron Pipe: AWWA C115 or ASME B16.1

- (b) Adaptor flanges: Ductile Iron, Grade 65-45-12, conforming to the current ASTM Standard A536 for Ductile Iron Castings. Bolt holes shall be drilled in accordance with AWWA C115 or ASME B16.1.
- (c) Clamping screws on adaptor flanges shall be zinc-plated, heat treated steel with a minimum tensile strength of 28 Mpa.
- (d) Submit shop drawings in accordance with Section 01 33 00.

E29.2.7 Sump Pumps

- (a) As per Section 22 10 10.

E29.2.8 Backflow Preventer

- (a) As per Section 22 42 01.

E29.2.9 Miscellaneous Metal Fabrications

- (a) See Section 05 50 00

E29.2.10 Pipe Supports and Hangers

- (a) Pipe supports and hangers to be as shown on the Drawings and in accordance with Section 05 50 00.

E29.2.11 Fasteners

- (a) Flange nuts and bolts shall be ASTM A276, Type 316 stainless steel sized to requirements of flange. Thread-on bolts to extend past nut a minimum of 6 millimetres.
- (b) Anchors shall be Kwik-bolt or Rawl Stud ASTM A276, Type 316 stainless steel. Embedment depth and size, where not shown on the Drawings, to be as required for load being carried or resisted.

E29.2.12 Gaskets

- (a) Flange gaskets shall be full faced rubberized cloth gaskets, 3mm in thickness.
- (b) Rubber gaskets for adaptor flanges shall conform to AWWA C111, Standard for Rubber-gasket Joints for Cast Iron and Ductile Iron Pressure Pipe and Fittings.

E29.2.13 Cast-in-Place Concrete

- (a) Concrete to be in accordance with CW 2160 and CSA A23.1.
- (b) Concrete mix design shall be in accordance with performance alternative and shall have the following properties:
  - (i) Class of exposure: S-1
  - (ii) Minimum compressive strength at 28 days: 35 MPa
  - (iii) Maximum slump: 80mm ( $\pm$  20mm)
  - (iv) Air Content: 5% – 8%
  - (v) Maximum Water/Cement Ratio: 0.40
- (c) Lean-Mix concrete design for proportioning of fine aggregate, coarse aggregate, cement, and water shall be as follows:
  - (i) Cement: Type 50
  - (ii) Minimum compressive strength at 28 days: 15 MPa
  - (iii) Slump: 80mm
  - (iv) Air Content: nil
  - (v) Maximum Water/Cement Ratio: 0.49

E29.2.14 Grout

- (a) Grout to be S.P.I. Rapid Repair Grout, Sika Grout 218 or an approved equal.

E29.2.15 Bonding Agent

- (a) Bonding agent to be Acryl-Stix or approved equal.

E29.2.16 Paint

- (a) See Section 09 91 23.

E29.3 Construction Methods

E29.3.1 General

- (a) Install the new station piping and pumping equipment as indicated in this specification and shown on the Drawings. Make no changes, revisions or substitutions to the layout without obtaining written approval from the Contractor Administrator.
- (b) Be aware of and contend with the wastewater in the existing forcemain when preparing to make the required piping modifications.
- (c) Prior to pumping unit installation, provide a portable sewage pump and discharge hose to remove remaining wastewater in the wet well. The wastewater shall be directed to the upstream manhole or to a sewage hauler for disposal.

E29.3.2 Flow Control and Temporary By-Pass Pumping

- (a) Provide flow control measures and temporary by-pass pumping as shown on the Drawings and in accordance with E17 of this Specification.

E29.3.3 Locating Ground Services

- (a) The contractor shall be responsible for locating all services.
- (b) Costs for locating the services shall be considered to incidental to the Contract Work.

E29.3.4 Construction Sequence

- (a) Arrange construction activities and sequence to be able to remove temporary inflatable sewer plug(s) and restore pumping station operation as soon as possible after completion.

E29.3.5 Existing Pump Level Controls and Alarms

- (a) Maintain and protect existing pump controls and float type alarms, located in the wet well or in the other areas of the Station, during the execution of the work until all the new equipment is ready for installation.

E29.3.6 Pumping Unit and Piping Installation

- (a) The existing station pumping setup consists of four (4) pumps (pumps # 1, #2, #3 and #4) with respective piping. **Pumps #2 and #3 are to be replaced** as indicated on the drawings while existing pumps #1 and #4 will remain in service.
- (b) Remove all existing piping as indicated in the Specifications and on the Drawings and replace with new piping.
- (c) Installation to be as follows:
  - (i) Prepare and arrange for temporary shutdown of station in accordance with E16 and have temporary by-pass pumping operations in accordance with E17.
  - (ii) Where steel pipe is used for fittings or filler pipes, it shall be field measured and fitted before fabrication.
  - (iii) Piping and fitting welds shall be full penetration butt type in accordance with ANSI/ASME B31.9. Welders shall be fully qualified and licensed by Provincial Authorities. Welds which do not penetrate fully will not be accepted.
  - (iv) Weld steel flanges on both the inside and the outside in conformance with AWWA Standard C207.
  - (v) All pipe and equipment shall be adequately protected from on-site welding procedures.



(vi) Pumping units shall be installed as per the manufacturer's installation specifications, complete with all required accessories, at the location indicated on the drawing.

(d) After new pumps and piping have been installed; all pipes and pipe welds shall be cleaned and prepared for application of primer and paint in accordance with Section 09 91 23.

#### E29.3.7 Concrete Work

- (a) Make neat openings in walls and floor slabs using concrete coring and cutting equipment and methods.
- (b) Fill openings left in concrete after removal of piping or other equipment with watertight, non-shrink grout. Finish new surfaces flush with the existing surface and match the surrounding surface texture. Primer and paint shall be applied in accordance with Section 09 91 23 if the surrounding surfaces have a paint finish.
- (c) Mix and apply grout in accordance with the manufacturer's instructions.
- (d) Mix and apply bonding agent in accordance with the manufacturer's instructions.
- (e) Neatly grout any concrete surface that has been broken and had the aggregate exposed with a smooth finish similar in texture to that of the surrounding concrete.
- (f) Apply concrete bonding agents between new concrete or grout and existing concrete surfaces. Remove all loose, pitted and scaled concrete and apply bonding agent in accordance with the manufacturer's instructions
- (g) De-scale exposed reinforcing steel and have all rust removed before applying grout.

#### E29.3.8 Miscellaneous Metal Fabrications

(a) See Section 05 50 00.

#### E29.3.9 Paint

(a) See Section 09 91 23.

#### E29.3.10 Cleanup

(a) Cleanup construction debris and materials inside the Station, including the wet-well at the end of each day and before pumping station operation is restored.

#### E29.4 Measurement and Payment

E29.4.1 Pumping station modifications and mechanical work installations will be measured on a unit basis and paid for under Form B, Items 9 as shown in Form B: Prices as supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

(a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

### **E30. FLOWMETER CHAMBER MECHANICAL WORK**

#### E30.1 Scope of Work

E30.1.1 The scope of work shall include, but is not limited to the following items.

E30.1.2 Cut and install (fuse) flanges on each of the two forcemains.

E30.1.3 Supply and install two (2) 600mm (24") gate valves.

E30.1.4 Supply and install two (2) 600mm (24") flowmeters.

E30.1.5 Supply and install two (2) 600mm x 600mm x 200mm tees.

E30.1.6 Supply and install two 200mm (8") gate valves.

E30.1.7 Supply and install spool pieces, fittings and other components.

E30.1.8 Supply and install sump pump P-L14.

E30.1.9 Miscellaneous services for a complete installation.

## E30.2 Materials

### E30.2.1 Gate Valves

- (a) Cast iron body with flanged ends equipped with outside rising stem, screw and yoke; bronze trimmed cast iron wedge; bronze stem, double O-ring stem seals and 50 millimetre square operating nut.
- (b) Two (2) 600mm gate valves shall be equipped with outside rising stems, screws and yokes and complete with handwheels.
  - (i) The handwheels shall be a minimum 450 mm (18") in diameter.
- (c) Flanges shall conform in dimension and drilling to ANSI/ASME B16.1, Class 125.
- (d) Direction of opening shall be counter clockwise and shall be clearly stamped or indicated with raised letters and arrow.
- (e) Manufacturer's nameplate shall be attached to the valve body with stainless steel fasteners.
- (f) Gate valves shall be as manufactured by Clow Canada, Crane, Mueller Canada or approved equal.
- (g) Knife gate valves are not acceptable.
- (h) Submit shop drawings of gate valves in accordance with Section 01 33 00.

E30.2.2 Other materials as per E29.2

## E30.3 Construction Methods

### E30.3.1 General

- (a) Install the new forcemain chamber piping and equipment as indicated in this specification and shown on the Drawings. Make no changes, revisions or substitutions to the layout without obtaining written approval from the Contractor Administrator.
- (b) Be aware of and contend with the wastewater in the existing forcemain when preparing to make the required piping modifications.
- (c) Prior to forcemain modifications, drain the forcemain via a portable sewage pump. The wastewater shall be directed to the upstream manhole or to a sewage hauler for disposal.
- (d) Only one forcemain may be removed from service at any given time.

E30.3.2 Other construction methods as per E29.3.

## E30.4 Measurement and Payment

E30.4.1 Payment will be based on Form B, Item 10, as accepted and measured by the Contract Administrator.

- (a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

## **E31. FLOW METERS**

### E31.1 Description and General

E31.1.1 Supply and deliver two (2) 600mm dia. magnetic flow meters, each consisting of a separate flow tube and remote transmitter, complete with cabling.

E31.1.2 Submit shop drawings in accordance with Section 01 33 00.

E31.1.3 Operation and Maintenance Manuals

(a) Include the following in the Operations and Maintenance Manuals:

- (i) Reviewed shop drawings of all equipment;
- (ii) Certified factory test results;
- (iii) All flowmeter settings.
- (iv) Instructions for maintenance, entering settings, etc.
- (v) Manufacturer operations and maintenance manuals.

E31.2 Materials

E31.2.1 Service:

- (a) Fluid: Wastewater
- (b) Fluid Temperature: -10°C to 50°C
- (c) Ambient Temperature (flowtube): -30°C to 50°C
- (d) Ambient Temperature (transmitter): 0°C to 40°C
- (e) Pressure: 0 to 100 kPa

E31.2.2 Accuracy:

- (a) 0.5% of rate  $\pm 1.0$  mm/sec from 0.01 to 2 m/s
- (b) 0.5% of rate  $\pm 1.5$  mm/sec. above 2 m/s
- (c) Specified accuracy to include flow rate the combined effects of linearity, hysteresis, repeatability, and calibration uncertainty.
- (d) The electronics must be temperature compensated to maintain system accuracy of 0.5% or better across the stated temperature range.

E31.2.3 Flow tube Requirements:

- (a) Size: 600mm
- (b) Flange Material: Carbon Steel
- (c) Flange Type: Class 150
- (d) Junction Box Enclosure: NEMA 4X
- (e) Design: flanged and all welded flanged flow tube bodies must be a fully welded steel design, and must not rely on gaskets to fully protect the coils and electrode wiring
- (f) Electrodes: 316L Stainless Steel or Tantalum
- (g) Electrode Housing: Sealed, welded housing
- (h) Lining: Neoprene or Teflon
- (i) Grounding: Grounding Rings (to be included)
- (j) Hazardous Area Approvals: Class I, Zone 2
- (k) Approvals: CSA or equivalent
- (l) The transition between the flow tube and the junction box must be potted to prevent process fluids from reaching the electronics or conduit in the event of a lining or electrode failure.
- (m) The field termination and electronics must be in separate, fully isolated compartments to prevent moisture or contamination to enter these compartments.
- (n) All flow tubes must be hydrostatically tested to 1.5 times their rated pressure.
- (o) Provide epoxy paint coating for the entire flowtube.

E31.2.4 Transmitter Requirements:

- (a) Mounting: Wall (remote from flow tube)
- (b) Local Display: LCD, capable of indicating flow rates, flow totalizer, etc., and display 2 lines of a minimum of 20 characters.
- (c) Local Control: Keypad
- (d) Programming and configuration:
  - (i) Fully configurable via transmitter keypad
  - (ii) Configurable via HART field communicator on 4 to 20mA output loop
- (e) Units of Operation:
  - (i) Flow Rate: l/s
  - (ii) Flow Totalizer: m<sup>3</sup>
- (f) Power Supply: 120 VAC
- (g) Output:
  - (i) 4 to 20mA (with HART protocol) for flow rate
  - (ii) Pulse output for flow totalization (24VDC), independently scalable
- (h) Enclosure: NEMA 4X rated
- (i) Approvals: CSA or equivalent
- (j) Contain non-volatile memory for all data, including the totalizer.

E31.2.5 Cable Requirements (between flow tube and transmitter):

- (a) The remote mounted transmitter shall utilize readily available Beldon cables between the flow tube and the transmitter.
- (b) Installation: Conduit
- (c) Purpose: Signal and coil drive (between flow tube and transmitter)
- (d) Size: As per manufacturer's recommendations for the length specified.
- (e) Ratings: Wet and dry, Class I, Zone 2 (in conduit)
- (f) Length: 50 meters (per flow meter)

E31.2.6 Acceptable Products

- (a) Rosemount 8705 flow tube with Rosemount 8712E transmitter
- (b) Endress & Hauser Promag 50W with remote transmitter
- (c) Krohne OPTIFLUX 2000 with IFC 100 remote transmitter
- (d) Or approved equal in accordance with B6.

E31.3 Execution

E31.3.1 Provide for a factory-trained representative who shall give instructions regarding the installation of the equipment.

E31.3.2 The factory-trained representative shall visit the site as required to ensure that the installation work is being performed in a proper and workmanlike manner. Allow for a minimum of one (1) full working day.

E31.3.3 The factory-trained representative shall be present to supervise the commissioning, initial operation, and functional testing of the equipment.

E31.4 Training

E31.4.1 Provide the Contract Administrator with a training plan a minimum of two (2) weeks prior to training.

- E31.4.2 The Contractor shall include costs for providing training to City staff by a factory-trained representative on the operation and maintenance of the equipment.
- E31.4.3 Training for the equipment shall be conducted on site, in conjunction with commissioning. The Contractor shall provide a qualified instructor as well as the necessary course materials.
- E31.4.4 Training shall be provided in one (1) session for operation and maintenance staff. And one (1) session for Electrical and Instrumentation staff.
- E31.5 Measurement and Payment
- E31.5.1 Payment will based on Form B, Item 11, as accepted and measured by the Contract Administrator.
- (a) A maximum of 80% may be submitted for progress payments prior to integration and commissioning of the flowmeters into the control system.
  - (b) A maximum of 95% may be submitted for progress payments prior to meeting the training requirements.

## **E32. HOIST REPLACEMENT**

- E32.1 Scope of Work
- (a) Supply and install a 1000 kg rated hoist as per Section 41 22 23.
- E32.2 Measurement and Payment
- E32.2.1 Payment will based on Form B, Item 12, as accepted and measured by the Contract Administrator.
- (a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

## **E33. HVAC**

- E33.1 Scope of Work
- (a) Provide new ventilation and heating system including, but not limited to the following:
    - (i) Demolition of the existing supply fans and associated ductwork
    - (ii) Supply and installation of new natural gas fired air handling unit including fan, motor, indirect fired heat exchanger, filter section, mixing section with dampers and future cooling coil cavity with drain pan.
    - (iii) Supply and installation of one supply fan including motors.
    - (iv) Supply and installation of ductwork, grilles, and louvers.
    - (v) Supply and installation of two dampers controlled by an actuator. (Actuators to be supplied under Automation Scope of Work.)
  - (b) Supply and installation five fire extinguishers as shown on the drawings.
- E33.2 Measurement and Payment
- E33.2.1 Payment will based on Form B, Item 13, as accepted and measured by the Contract Administrator.
- (a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

## **E34. ELECTRICAL – 600V DISTRIBUTION, GROUNDING, AND MISCELLANEOUS**

### **E34.1 Scope of Work**

- E34.1.1 Remove existing direct buried conduit and feeder cables between the CSTE and the existing MCC, MCC-L2.
- E34.1.2 Remove cable and conduit associated with two existing ventilation supply fans.
- E34.1.3 Supply, install, and test the following:
  - (a) A 600V distribution panel, PNL-L1, on the main floor.
  - (b) Direct buried feeder cables from the CSTE to PNL-L1 complete with Roxtec cable seals at wall penetration.
  - (c) Cabling between PNL-L1 and MCC-L2 to provide power to MCC-L2.
  - (d) Motor starter, junction box, and cabling for the flow meter chamber sump pump.
  - (e) Motor starter and associated cabling for the hoist.
  - (f) Cabling between PNL-L1 and the new air handling unit, AHU-L1.
  - (g) A temporary generator junction box and associated cabling, connected to PNL-L1.
  - (h) A dedicated ground bus.
- E34.1.4 Remove existing conduit and cable associated with four (4) wastewater lift pump motors.
- E34.1.5 Remove two existing wastewater lift pump motors (MTR-P-L2 and MTR-P-L3) and turn over to the City, or dispose of, as directed by the Contract Administrator.
- E34.1.6 Supply and install new empty compartment into existing MCC, MCC-L2.
- E34.1.7 Install new grounding as shown on the drawings.
- E34.1.8 Locate and expose the existing ground electrode and all associated connections. Provide opportunity for Contract Administrator to inspect the existing connections.
- E34.1.9 Supply and install temporary electrical provisions as required to complete the work as specified.
- E34.1.10 Install arc flash labels supplied by the Contract Administrator.

### **E34.2 Measurement and Payment**

- E34.2.1 Payment will be based on Form B, Item 14, as accepted and measured by the Contract Administrator.
  - (a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

## **E35. ELECTRICAL – PUMPS P-L2 & P-L3**

### **E35.1 Scope of Work**

- E35.1.1 Supply, install, and test the following:
  - (a) Two new 74.6 kW (100 HP) Variable Frequency Drive units.
  - (b) Cabling between PNL-L1 and the VFD enclosures.
  - (c) Cabling between the VFD enclosures and the pump motors.
  - (d) Automation cabling to the RTU.
- E35.1.2 Install and test two (2) City-supplied wastewater lift pump motors.
- E35.1.3 Install arc flash labels supplied by the Contract Administrator.

## E35.2 Measurement and Payment

E35.2.1 Payment will be based on Form B, Item 16, as accepted and measured by the Contract Administrator.

- (a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

## E36. ELECTRICAL – PUMPS P-L1 & P-L4

### E36.1 Scope of Work

E36.1.1 Supply, install, test, and commission the 120/208V electrical work as per drawings and specifications. Work shall include, but not be limited to the following items.

- (b) Remove four (4) existing soft starting units within MCC-L2. Turn over the existing starters to the City or dispose of, as directed by the Contract Administrator.
- (c) Demolish the four (4) existing capacitor banks above MCC-L2..
- (d) Supply, install, and test the following:
  - (i) Two (2) new 74.6 kW (100 HP) soft starter units into the existing MCC, MCC-L2.
  - (ii) Cabling between the soft starters and the motor loads.
  - (iii) Automation cabling to the RTU.
  - (iv) Two (2) 25 kVAR, 600V power factor correction capacitor banks.
- (e) Install arc flash labels supplied by the Contract Administrator.

### E36.2 Measurement and Payment

E36.2.1 Payment will be based on Form B, Item 16, as accepted and measured by the Contract Administrator.

- (a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

## E37. ELECTRICAL – 120/208V WORK

### E37.1 Scope of Work

E37.1.1 Supply, install, test, and commission the 120/208V electrical work as per drawings and specifications. Work shall include, but not be limited to the following items.

E37.1.2 Remove the following existing equipment:

- (a) Lighting
- (b) Switches
- (c) Receptacles
- (d) Pull boxes
- (e) Conduit, junction boxes, wiring, and any other component of the existing electrical distribution within the station. The existing 600:120/208V transformer and 120/208V panelboard shall remain.

E37.1.3 Supply, install, and connect as required for a complete installation:

- (a) Lighting fixtures
- (b) Switches
- (c) Lighting contactors
- (d) Receptacles

- (e) Pull boxes
- (f) Field device junction boxes
- (g) Conduit

E37.1.4 Supply, install, connect and test the following:

- (a) Lighting contactor panel and switches.
- (b) Ventilation motor starters.
- (c) Emergency lighting systems

E37.1.5 Install arc flash labels supplied by the Contract Administrator.

E37.2 Measurement and Payment

E37.2.1 Payment will be based on Form B, Item 17, as accepted and measured by the Contract Administrator.

- (a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

## **E38. AUTOMATION – GENERAL**

E38.1 Scope of Work

E38.1.1 Supply, install, test, and commission the complete automation system as per drawings and specifications. Work shall include, but not be limited to the following items.

E38.1.2 Connect, wire, setup, calibrate, and commission all existing and new instrumentation.

E38.1.3 Supply and install the following control panels:

- (a) CP-L1
- (b) CP-L2

E38.1.4 Supply and install power distribution panel PDP-L1.

E38.1.5 Supply and install telephone network termination panel, JBN-L1.

E38.1.6 Supply and install automation field junction boxes as indicated in the drawings.

E38.1.7 Install automation wiring to the VFDs and soft starters. Test and commission.

E38.1.8 Install automation wiring to the air handling unit, AHU-L1. Test and commission.

E38.1.9 Install automation wiring to the ventilation motor starters. Test and commission.

E38.1.10 Install automation wiring to the flow meter chamber sump pump starter. Test and commission.

E38.1.11 Supply, install, and commission all instruments.

E38.1.12 The following instrumentation is existing:

- (a) Contractor to maintain and use existing bubbler-based wet well level transmitter system (L500-LT-B), and associated instrument air pressure switch (L524-PSL). Test and commission level transmitter and instrument air pressure switch on new RTU.

E38.1.13 Supply and install equipment identification lamacoids per the Lamacoid Schedule.

E38.2 Measurement and Payment

E38.2.1 Payment will be based on Form B, Item 18, as accepted and measured by the Contract Administrator.



- (a) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

### **E39. AUTOMATION – PROGRAMMING, TRAINING AND COMMISSIONING**

#### **E39.1 Scope of Work**

- (a) Program, test, and commission the Remote Terminal Unit (RTU) and touch-panel Human-Machine Interface (HMI).
- (b) Demonstrate all aspects of the automation programming at a Factory Acceptance Test.
- (c) Provide a commissioning plan including detailed commissioning checklists. Submit to the Contract Administrator for review.
- (d) Provide training sessions for City personnel.
- (e) Provide on-site commissioning of the RTU/PLC, HMI, and all associated equipment and instrumentation.
- (f) Complete commissioning forms.
- (g) Provide a commissioning report.

#### **E39.2 Measurement and Payment**

**E39.2.1** Payment will be based on Form B, Item 19, as accepted and measured by the Contract Administrator.

- (a) No payment will be made prior to the Factory Acceptance Test.
- (b) A maximum of 50% may be submitted for progress payments upon successful completion of the Factory Acceptance Test.
- (c) A maximum of 90% may be submitted for progress payments prior to successful completion of the training requirements.
- (d) A maximum of 95% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups and O&M manuals.

### **E40. MARION WASTEWATER PUMPING STATION – PANEL MODIFICATION**

#### **E40.1 Scope of Work**

**E40.1.1** A 120-24VDC power distribution panel, PDP-L1, was installed at Marion Pumping Station in the spring of 2011. The panel requires installation of ventilation openings. Modify the panel as shown on drawing 1-0159L-A0008. Protect the existing components from any construction debris.

**E40.1.2** Coordinate with the Contract Administrator regarding access to the facility.

#### **E40.2 Specifications**

- (a) As per NMS Specifications and drawings.

#### **E40.3 Measurement and Payment**

**E40.3.1** Payment will be based on Form B, Item 20, as accepted and measured by the Contract Administrator.

- (a) A maximum of 99% may be submitted for progress payments prior to the total completion of the associated services, including the provision of as-built drawing mark-ups.

## **E41. ADDITIONAL WORK**

- E41.1 Additional work may be necessitated due to unforeseen circumstances that may arise during the course of the project due to:
- (a) Additions to the scope of Work by the Contract Administrator, beyond that defined herein.
  - (b) Other issues that occur on site, which require significant Contractor time to address.
- E41.2 Additional services will not be initiated for:
- (a) Reasons of lack of performance or errors in execution.
  - (b) Scheduling changes initiated by the City, where at least 24 hours notice is given prior to the Contractor's scheduled time to be on site.
- E41.3 Should it be determined that additional material or services are required, the Contract Administrator shall approve the work, prior to commencement of the additional work.
- E41.4 The Contract Administrator may also request a written quotation for the additional work. For any work, where a written quotation is provided, and subsequently authorized, the valuation of the work shall be as per the quotation, regardless of the actual cost to the Contractor.
- (a) Quotations shall indicate the labour hours and base cost of material, as well as mark-up factors.
  - (b) Rates and Mark-up factors shall correspond to Form B, unless specifically authorized by the Contract Administrator.
- E41.5 Measurement and Payment
- E41.5.1 Additional material will be reimbursed by the actual base cost of the material, multiplied by a mark-up factor of 1.15, as indicated on Form B: Item 21.
- (a) The base cost is to be the wholesale cost of the material, regardless of the Contractor or Subcontractor supplying the material. In the event that a Subcontractor(s) is/are supplying the material, the Contractor is responsible for coordinating the split of the 1.15 mark-up between the Contractor and Subcontractor(s).
- E41.5.2 Additional labour will be reimbursed at the rate specified on Form B: Items 22 through 26. The rate will not be adjusted for Subcontractors or individuals with specialized skills, without specific approval of the Contract Administrator.