THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 475-2018

UPGRADES TO THE METRO ROUTE 20 AND METRO ROUTE 90 UNDERPASS PUMPING STATIONS

Note to Bidders: Please be aware of revisions to B14.4

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 UPGRADES TO THE METRO ROUTE 20 AND METRO ROUTE 90 UNDERPASS PUMPING STATIONS

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, June 14, 2018.

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 Metro Route 20 Underpass Pumping Station at 10:00 am on May 29, 2018 to provide Bidders access to the Site.

B3.2 Further to C3.1, the Contract Administrator or an authorized representative will be available at the Metro Route 90 Underpass Pumping Station at 10:00 am on May 30, 2018 to provide Bidders access to the Site.

B3.3 The Bidder is advised that they are responsible for providing their own safety equipment for the site visit. At minimum, a hard hat, safety boots, and safety glasses are required for access on the main floor of each Station. Entry into each Station wetwell is only permitted by the Contractor wearing fall arrest equipment in addition to the aforementioned safety equipment. The City will provide the lifting davit, but the Contractor is responsible for providing their own fall arrest harness(es). The City will provide portable gas detection equipment to analyze the atmosphere in the wetwell prior to entry.

B3.4 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. CONFIDENTIALITY

B5.1 Information provided to a Bidder by the City or acquired by a Bidder by way of further enquiries or through investigation is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator. The use and disclosure of the confidential information shall not apply to information which:

(a) was known to the Bidder before receipt hereof; or

(b) becomes publicly known other than through the Bidder; or

(c) is disclosed pursuant to the requirements of a governmental authority or judicial order.

B5.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Bid Opportunity to the media or any member of the public without the prior written authorization of the Contract Administrator.

B6. ADDENDA

B6.1 The Contract Administrator may, at any time prior to the Submission Deadline, issue addenda correcting errors, discrepancies or omissions in the Bid Opportunity, or clarifying the meaning or intent of any provision therein.

B6.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.

B6.3 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/bidopp.asp

B6.4 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

B6.5 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B7. SUBSTITUTES

B7.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.

B7.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

B7.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.

B7.4 The Bidder shall ensure that any and all requests for approval of a substitute:

(a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;

(b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;

(c) identify any anticipated cost or time savings that may be associated with the substitute;

(d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;

(e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.

B7.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his/her sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.

B7.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, to the Bidder who requested approval of the substitute.

B7.6.1 The Contract Administrator will issue an Addendum, disclosing the approved materials, equipment, methods and products to all potential Bidders. The Bidder requesting and obtaining the approval of a substitute shall be responsible for disseminating information regarding the approval to any person or persons he/she wishes to inform.

B7.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

B7.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/her Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B17.

B7.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B8. BID COMPONENTS

B8.1 The Bid shall consist of the following components:

(a) Form A: Bid;

(b) Form B: Prices;

(c) Bid Security

(i) Form G1: Bid Bond and Agreement to Bond, or
Form G2: Irrevocable Standby Letter of Credit and Undertaking, or
a certified cheque or draft;

B8.2 Further to B8.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B7.

B8.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely.

B8.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.

B8.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder’s Bid.

B8.5 Bidders are advised not to include any information/literature except as requested in accordance with B8.1.

B8.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B17.1(a).

B8.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.

B8.8 Bids shall be submitted to:

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

B9. BID

B9.1 The Bidder shall complete Form A: Bid, making all required entries.

B9.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:

(a) if the Bidder is a sole proprietor carrying on business in his/her own name, his/her name shall be inserted;

(b) if the Bidder is a partnership, the full name of the partnership shall be inserted;

(c) if the Bidder is a corporation, the full name of the corporation shall be inserted;

(d) if the Bidder is carrying on business under a name other than his/her own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.

B9.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B9.2.

B9.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.

B9.4 Paragraph 13 of Form A: Bid shall be signed in accordance with the following requirements:

(a) if the Bidder is a sole proprietor carrying on business in his/her own name, it shall be signed by the Bidder;

(b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;

(c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, should be affixed;

(d) if the Bidder is carrying on business under a name other than his/her own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.

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

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

B10. PRICES

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

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

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

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

B11. DISCLOSURE

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

B11.2 The Persons are:

(a) N/A.

B12. QUALIFICATION

B12.1 The Bidder shall:

(a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba; and

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

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

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

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

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

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

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

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

B12.4 Further to B12.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

(a) Written confirmation of a safety and health certification meeting SAFE Work Manitoba's SAFE Work Certified Standard (e.g., COR™ and SECOR™) or

(i) a copy of their valid Manitoba COR certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Certificate of Recognition (COR) Program administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or

(ii) a copy of their valid Manitoba SECOR™ certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Small Employer Certificate of Recognition Program (SECOR™) administered by the Construction Safety

Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program or

(b) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/.

B12.5 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B12.6 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B13. BID SECURITY

B13.1 The Bidder shall provide bid security in the form of:

(a) a bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in the form included in the Bid Submission (Form G1: Bid Bond and Agreement to Bond); or

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

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

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

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

B13.1.3 The Bidder shall sign the Bid Bond.

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

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

B13.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B13.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.

B13.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.

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

B14. OPENING OF BIDS AND RELEASE OF INFORMATION

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

B14.1.1 Bidders or their representatives may attend.

B14.2 Following the Submission Deadline, the names of the Bidders and their Total Bid Prices (unevaluated, and pending review and verification of conformance with requirements) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/default.stm

B14.3 After award of Contract, the name(s) of the successful Bidder(s), their address(es) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/default.stm

B14.4 The Bidder is advised that any information contained in any Bid may be released if required by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law or by City policy or procedures (which may include access by members of City Council).

B14.4.1 To the extent permitted, the City shall treat as confidential information, those aspects of a Bid Submission identified by the Bidder as such in accordance with and by reference to Part 2, Section 17 or Section 18 or Section 26 of The Freedom of Information and Protection of Privacy Act (Manitoba), as amended.

B15. IRREVOCABLE BID

B15.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.

B15.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly executed and the performance security furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid.

B16. WITHDRAWAL OF BIDS

B16.1 A Bidder may withdraw his/her Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B16.1.1 Notwithstanding C23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.

B16.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 13 of Form A: Bid, and only such person, has authority to give notice of withdrawal.

B16.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:

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

(b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 13 of Form A: Bid; and

(c) if the notice has been given by any one of the persons specified in B16.1.3(b), declare the Bid withdrawn.

B16.2 A Bidder who withdraws his/her Bid after the Submission Deadline but before his/her Bid has been released or has lapsed as provided for in B15.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

B17. EVALUATION OF BIDS

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

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

(b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B12 (pass/fail);

(c) Total Bid Price;

(d) economic analysis of any approved alternative pursuant to B7.

B17.2 Further to B17.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements or minor informalities or irregularities, if the interests of the City so require.

B17.3 Further to B17.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his/her Bid or in other information required to be submitted, that he/she is responsible and qualified.

B17.4 Further to B17.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.

B17.4.1 Further to B17.1(a), in the event that a unit price is not provided on Form B: Prices, the City will determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

B18. AWARD OF CONTRACT

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

B18.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.

B18.2.1 Without limiting the generality of B18.2, the City will have no obligation to award a Contract where:

(a) the prices exceed the available City funds for the Work;

(b) the prices are materially in excess of the prices received for similar work in the past;

(c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;

(d) only one Bid is received; or

(e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.

B18.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B17.

B18.3.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his/her Bid upon written request to the Contract Administrator.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

C0.1 The *General Conditions for Construction* (Revision 2006 12 15) are applicable to the Work of the Contract.

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

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

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of upgrades to the Metro Route 20 Underpass Pumping station including structural and architectural improvements to mitigate water infiltration into the building, replacement of the two (2) station pumps and associated discharge check valves and butterfly valves, replacement of the electrical distribution, lighting, and receptacles, replacement of the automation control panel, installation of new level instruments, removal of the existing natural gas engine, installation of a new natural gas generator, and modifications to the electrical and natural gas services which includes relocation of the meters. The Work to be done under the Contract also consists of upgrades to the Metro Route 90 Underpass Pumping Station including replacement of the two (2) station pumps and associated discharge piping and modifications to the oil lubricators.

D3. DEFINITIONS

D3.1 When used in this Bid Opportunity:

(a) "**HVAC**" means Heating, Ventilation, and Air Conditioning;

(b) "**MCC**" means Motor Control Centre;

(c) "**PLC**" means Programmable Logic Controller;

(d) "**SCADA**" means Supervisory Control and Data Acquisition.

D4. CONTRACT ADMINISTRATOR

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

Brian Cleven, P. Eng.
Project Manager, Electrical and Automation Engineer

Telephone No. 204 786-8080
Email Address brian.cleven@snclavalin.com

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

D5. CONTRACTOR'S SUPERVISOR

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

D6. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

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

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

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

(a) information provided to the Contractor by the City or acquired by the Contractor during the course of the Work;

(b) the Contract, all deliverables produced or developed; and

(c) any statement of fact or opinion regarding any aspect of the Contract.

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

D7. NOTICES

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

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

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

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

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

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

Facsimile No.: 204 947-9155

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

D8. FURNISHING OF DOCUMENTS

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

SUBMISSIONS

D9. AUTHORITY TO CARRY ON BUSINESS

D9.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on

business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

D10. SAFE WORK PLAN

D10.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D10.2 The Safe Work Plan should be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/Safety/default.stm

D10.3 Notwithstanding B12.4 at any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require an updated COR Certificate or Annual Letter of good Standing. A Contractor, who fails to provide a satisfactory COR Certificate or Annual Letter of good Standing, will not be permitted to continue to perform any Work.

D11. INSURANCE

D11.1 The Contractor shall provide and maintain the following insurance coverage:

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

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

(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.

D11.2 Deductibles shall be borne by the Contractor.

D11.3 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in C4.1 for the return of the executed Contract.

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

D12. PERFORMANCE SECURITY

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

(a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; or

(b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in

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

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

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

D12.2 If the bid security provided in his/her Bid was not a certified cheque or draft pursuant to B13.1(c), the Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D13. SUBCONTRACTOR LIST

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

D14. DETAILED WORK SCHEDULE

D14.1 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.

D14.2 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.

D14.3 Further to D14.2(a), the C.P.M. schedule shall clearly identify the start and completion dates of all of the activities/tasks making up the Work as well as showing those activities/tasks on the critical path, including but not limited to:

D14.3.1 Metro Route 20 Underpass Pumping Station:

(a) Product submittals,

(b) Order date for new pumping units and valves,

(c) Order date for natural gas generator and transfer switch,

(d) Date of Station shutdown and start of demolition,

(e) Replacement of built-up roofing system,

(f) Exterior excavation and installation of building wrap and weeping tile,

(g) Replacement of the pumping units,

(h) Replacement of electrical service cable,

(i) Modification of the natural gas service,

(j) Installation of the motor control centres and transfer switch,

(k) Installation of the HVAC system and associated controls,

(l) Installation of the control panel (CP-U81),

(m) Installation of the natural gas generator,

(n) In-service date for new Station pumps under automatic control,

(o) Site restoration and clean-up, and

(p) Submission of O&M Manuals, As-Built drawing markups, and final documentation.

D14.3.2 Metro Route 90 Undperass Pumping Station:

(a) Product submittals,

(b) Order date for new pumping units and piping,

(c) Replacement of the pumping units and piping,

(d) In-service date for new Station pumps,

(e) Submission of O&M Manuals, As-Built drawing markups, and final documentation.

D14.4 Further to D14.2(b), the Gantt chart shall show the time on a weekly basis, required to carry out the Work of each trade, or specification division. The time shall be on the horizontal axis, and the type of trade shall be on the vertical axis.

SCHEDULE OF WORK

D15. COMMENCEMENT

D15.1 The Contractor shall not commence any Work until he/she is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.

D15.2 The Contractor shall not commence any Work on the Site until:

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

(i) evidence of authority to carry on business specified in D9;

(ii) evidence of the workers compensation coverage specified in C6.15;

(iii) the Safe Work Plan specified in D10;

(iv) evidence of the insurance specified in D11;

(v) the performance security specified in D12;

(vi) the Subcontractor list specified in D13;

(vii) the detailed work schedule specified in D14.

(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.

D15.3 The Contractor shall not commence any Work affecting the operation of the Station pumps before November 15, 2018 or as otherwise indicated by the Contract Administrator.

D16. WORKING DAYS

D16.1 Further to C1.1(jj), the Contract Administrator's determination of whether or not atmospheric and Site conditions are such that a Working Day is deemed to have elapsed may be based at one time on one type of work while at another time a Working Day may be based on another type of work. When more than one type of major work is involved, the quantity of equipment that must be able to work in order to meet the requirements of a Working Day may vary considerably from that specified in the General Conditions.

D16.2 In the event that incidental work is behind schedule which, in the opinion of the Contract Administrator, should have been or could have been carried out by the Contractor in conjunction with or immediately following work of a major type, the City hereby reserves the right to charge Working Days on the incidental work until such time as it is up to schedule.

D16.3 When the major type of work involves restoration of the site to the condition it was prior to rainfall, Working Days shall not be charged.

D16.4 The Contract Administrator will furnish the Contractor with a daily record for each major type of work showing various information concerning the equipment, the time it worked, could have worked and Working Days charged. This report is to be signed each day by an authorized representative of the Contractor.

D17. CRITICAL STAGES

D17.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

D17.1.1 Metro Route 20 Underpass Pumping Station:

(a) Two (2) new pumping units, powered by motor control centre MCC-U72E, and under automatic control from control panel CP-U81 by February 28, 2019.

(b) The new standby natural gas generator, GEN-U72, and transfer switch ATS-U72, must be put into active service by April 17, 2019.

D17.1.2 Metro Route 90 Underpass Pumping Station:

(a) Two (2) new pumping units, powered by the existing electrical distribution nand controls, by February 28, 2019.

D18. SUBSTANTIAL PERFORMANCE

D18.1 The Contractor shall achieve Substantial Performance by April 19, 2019.

D18.2 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.

D18.3 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.

D19. TOTAL PERFORMANCE

D19.1 The Contractor shall achieve Total Performance by May 17, 2019.

D19.2 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.

D19.3 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.

D20. LIQUIDATED DAMAGES

D20.1 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 – Three hundred dollars ($300).

D20.2 The amounts specified for liquidated damages in D20.1 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.

D20.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D21. SCHEDULED MAINTENANCE

D21.1 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.

D21.2 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

D22. JOB MEETINGS

D22.1 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.

D22.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

D23. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D23.1 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).

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

D24.1 Further to B12.4, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety and Health Act (Manitoba). At any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require updated proof of compliance, as set out in B12.4.

MEASUREMENT AND PAYMENT

D25. PAYMENT

D25.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D26. WARRANTY

D26.1 Warranty is as stated in C13.

FORM H1: PERFORMANCE BOND
(See D12)

KNOW ALL MEN BY THESE PRESENTS THAT

_____
(hereinafter called the "Principal"), and

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

_____

_____ dollars ($_____.____)

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

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

BID OPPORTUNITY NO. 475-2018

UPGRADES TO THE METRO ROUTE 20 AND METRO ROUTE 90 UNDERPASS PUMPING STATIONS

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

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

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

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

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

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

_____ day of _____ , 20____ .

SIGNED AND SEALED
in the presence of:

_____
(Witness as to Principal if no seal)

_____
(Name of Principal)

Per: _____ (Seal)

Per: _____

_____
(Name of Surety)

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

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

_____
(Date)

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

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 475-2018

UPGRADES TO THE METRO ROUTE 20 AND METRO ROUTE 90 UNDERPASS PUMPING STATIONS

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

_____ ,
(Name of Contractor)

_____
(Address of Contractor)

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

_____

_____ Canadian dollars.

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

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

Partial drawings are permitted.

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

_____
(Address)

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

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

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

_____ .
(Date)

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

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

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

_____
(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

FORM J: SUBCONTRACTOR LIST
(See D13)

UPGRADES TO THE METRO ROUTE 20 AND METRO ROUTE 90 UNDERPASS PUMPING STATIONS

Name	Address

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:

Specification No.		Specification Title
Division 01	**-**	**General Conditions**
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
Division 03	**-**	**Concrete**
03 05 10		Cast-In-Place Concrete
03 20 00		Concrete Reinforcing
Division 05	**-**	**Metals**
05 50 00		Metal Fabrications
Division 07	**-**	**Thermal and Moisture Protection**
07 21 13		Board Insulation
07 26 00		Vapour Retarders
07 92 10		Joint Sealing
Division 08	**-**	**Openings**
08 11 14		Metal Doors and Frames
Division 09	**-**	**Finishes**
09 91 23		Painting

Division 23 - HVAC

23 05 00	Common Work Results for HVAC
23 05 54	Mechanical Identification
23 05 93	Testing, Adjusting, and Balancing For HVAC
23 07 13	Duct Insulation
23 09 33	Electric and Electronic Control System for HVAC
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	Louvers
23 37 14	Diffusers, Registers and Grilles
23 38 18	PVC Ducts – Low Pressure to 500 Pa
23 41 00	Particulate Air Filtration
23 55 01	Duct Heaters
23 82 40	Unit Heaters – Electric

Division 26 - Electrical

26 05 01	Common Work Results - Electrical
26 05 21	Wires And Cables (0-1000 V)
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 01	Service Equipment
26 24 17	Panelboards Breaker Type
26 24 19	Motor Control Centres
26 27 26	Wiring Devices
26 28 21	Moulded Case Circuit Breakers
26 28 23	Disconnect Switches – Fused and Non-Fused
26 29 10	Motor Starters to 600 V
26 32 10	Natural Gas Generator
26 50 00	Lighting
26 52 01	Unit Equipment for Emergency Lighting

Division 27 - Communications

27 30 00	Voice Communications

Division 31 - Earthwork

31 23 10	Excavating, Trenching and Backfilling

Division 40 - Automation

40 05 01	Common Work Results - Automation
40 80 08	Factory Acceptance Test
40 80 11	Automation Commissioning
40 91 00	Automation - Process Measurement Devices
40 92 00	Automation - Primary Control Devices
40 94 43	Programmable Logic Controllers
40 95 13	Control Panels

40 99 01 Training
40 99 90 Maintenance and Support

Drawing No.	Drawing Name/Title
1-0309U-D0001	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES COVER SHEET
1-0309U-D0002	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, DRAWING INDEX
1-0309U-A0001-001	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, PANEL LAYOUT, CONTROL PANEL CP-U81
1-0309U-A0001-002	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, PANEL LAYOUT, CONTROL PANEL CP-U81
1-0309U-A0002	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, POWER DISTRIBUTION, CONTROL PANEL CP-U81
1-0309U-A0003-001	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, WIRING DIAGRAM, CONTROL PANEL CP-U81, DISCRETE INPUTS
1-0309U-A0003-002	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, WIRING DIAGRAM, CONTROL PANEL CP-U81, DISCRETE INPUTS
1-0309U-A0004-001	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, WIRING DIAGRAM, CONTROL PANEL CP-U81, DISCRETE OUTPUTS
1-0309U-A0004-002	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, WIRING DIAGRAM, CONTROL PANEL CP-U81, DISCRETE OUTPUTS
1-0309U-A0005	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, WIRING DIAGRAM, CONTROL PANEL CP-U81, ANALOG INPUTS
1-0309U-A0006-001	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, WIRING DIAGRAM, CONTROL PANEL CP-U81, MISCELLANEOUS WIRING
1-0309U-A0006-002	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, WIRING DIAGRAM, CONTROL PANEL CP-U81, MISCELLANEOUS WIRING
1-0309U-A0007	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, NETWORK DIAGRAM, CONTROL PANEL CP-U81, NETWORK WIRING
1-0309U-A0008	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, WET WELL LEVEL TRANSMITTER, LIC-U500, YAF-U500
1-0309U-A0009-001	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, WET WELL HIGH LEVEL SWITCHES, LSH-U500, LSHH-U500, LSLL-U500
1-0309U-A0009-002	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, WET WELL HIGH LEVEL SWITCHES, LSH-U500, LSHH-U500, LSLL-U500
1-0309U-A0010	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, TVSS ALARM, XS-U711
1-0309U-A0011	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, 600 VOLT POWER STATUS, ESL-U721
1-0309U-A0012	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, GENERATOR TRANSFER SWITCH, ATS-U72
1-0309U-A0013	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, GENERATOR GEN-U72 RUNNING AND ALARM STATUS
1-0309U-A0014	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, SUPPLY FAN AIR FILTER PLUGGED SWITCH, PDSH-U611
1-0309U-A0015	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, WET WELL SUPPLY FAN AIR FILTER PLUGGED SWITCH, PDSH-U621
1-0309U-A0016	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, ROOM LOW TEMP. SWITCH AND HIGH TEMP. SWITCH, TSL-U603, TSH-U603
1-0309U-A0017	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, GAS DETECTOR, AIT-U550
1-0309U-A0018	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, INTRINSICALLY SAFE JUNCTION BOX JBA-U82

1-0309U-A0019	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, PANEL LAYOUT, VENTILATION PANEL JBA-U86
1-0309U-A0020	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, POWER DISTRIBUTION, VENTILATION PANEL JBA-U86
1-0309U-A0021	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, STATION OCCUPANCY SWITCH, HS-U601
1-0309U-A0022	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, WET WELL OCCUPANCY SWITCH, HS-U602
1-0309U-A0023	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, MAIN FLOOR DUCT TEMPERATURE SENSOR AND DUCT HEATER, TE-U612, HCE-U61
1-0309U-A0024	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, HVAC DAMPERS AND SUPPLY FAN, FV-U613, FV-U614, FV-U615, SF-U61
1-0309U-A0025	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, WET WELL DUCT TEMPERATURE SENSOR AND DUCT HEATER, TE-U661, HCE-U62
1-0309U-A0026	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, ROOM TEMPERATURE SENSOR, TE-U665
1-0309U-A0027	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, GENERATOR COOLING DAMPERS XV-U662, TV-U663, TV-U664
1-0309U-A0028	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, GENERATOR COMBUSTION AIR DAMPER XV-U661
1-0309U-A0029	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LOOP DIAGRAM, OIL RESERVOIR LEVEL SWITCHES, LSL-U012 AND LSL-U022
1-0309U-B0001	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, BUILDING REMOVALS AND REPAIRS - PLAN, SECTIONS AND DETAILS
1-0309U-C0001	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, GROUND WORKS - EXCAVATION, EXTERIOR PLAN AND ELEVATIONS
1-0309U-E0001	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, ELECTRICAL SINGLE LINE DIAGRAM, NEW WORK
1-0309U-E0002	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, GROUNDING INSTALLATION DETAILS
1-0309U-E0003	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, ELECTRICAL AND LIGHTING PLAN LAYOUT, MAIN FLOOR, DEMOLITION
1-0309U-E0004	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, ELECTRICAL AND AUTOMATION PLAN LAYOUT, MAIN FLOOR, NEW WORK
1-0309U-E0005	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, ELECTRICAL AND AUTOMATION PLAN LAYOUT, WET WELL
1-0309U-E0006	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, HAZARDOUS AND WET LOCATION PLAN
1-0309U-E0007	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, MOTOR STARTER SCHEMATIC, MS-U01, UNDERPASS PUMP
1-0309U-E0008	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, CONNECTION DIAGRAM, MS-U01, UNDERPASS PUMP
1-0309U-E0009	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, MOTOR STARTER SCHEMATIC, MS-U02, UNDERPASS PUMP
1-0309U-E0010	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, CONNECTION DIAGRAM, MS-U02, UNDERPASS PUMP
1-0309U-E0011	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, MCC ELEVATIONS AND DETAILS, MCC-U71 AND MCC-U72E
1-0309U-E0012	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, ELECTRICAL SCHEDULES
1-0309U-E0013	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, MOTOR STARTER SCHEMATIC, SF-U62, WET WELL SUPPLY FAN

1-0309U-E0014	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, MOTOR STARTER SCHEMATIC, EF-U63, WET WELL EXHAUST FAN
1-0309U-E0015	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, MOTOR STARTER SCHEMATIC, EF-U64, MAIN FLOOR ROOF EXHAUST FAN
1-0309U-E0016	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, CONNECTION DIAGRAM, AUTOMATIC TRANSFER SWITCH ATS-U72
1-0309U-M0001	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, PLAN & SECTIONS - HVAC - REMOVALS
1-0309U-M0002	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, PLAN & SECTIONS - HVAC - NEW WORK
1-0309U-M0003	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, SECTIONS - HVAC - NEW WORK
1-0309U-M0004	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, PLAN & SECTIONS - MECHANICAL - REMOVALS
1-0309U-M0005	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, PLAN & SECTIONS - MECHANICAL - NEW WORK
1-0309U-S0001	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, PLANS, ELEVATION & GENERAL NOTES - STRUCTURAL MODIFICATIONS
1-0309U-S0002	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, PLAN, DETAILS AND STRUCTURAL NOTES - HATCH COVER
1-0309U-S0003	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, PLAN, ELEVATIONS AND DETAILS - HATCH COVER AND GUARDRAIL ASSEMBLY
1-0309U-S0004	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, LADDER, SIGN AND LIFTING LUG - PLAN, ELEVATIONS AND DETAILS
1-0309U-S0005	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, GUARDRAIL DETAILS - PLAN, ELEVATIONS AND DETAILS
1-0309U-P0001	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, PROCESS & INSTRUMENTATION DIAGRAM, UNDERPASS PUMPING
1-0309U-P0002	METRO ROUTE 20 UNDERPASS PUMPING STATION, 2018 UPGRADES, PROCESS & INSTRUMENTATION DIAGRAM, HVAC & MISCELLANEOUS
1-0310U-A0034	METRO ROUTE 90 UNDERPASS PUMPING STATION, 2016 UPGRADES, LOOP DIAGRAM, ENGINE ENG-U03 STATUS AND CONTROL
1-0310U-A0037	METRO ROUTE 90 UNDERPASS PUMPING STATION, 2016 UPGRADES, LOOP DIAGRAM, PUMP 2 OIL LUBRICATOR 12VDC SOLENOID, XV-U021-B

Reference Drawings:

785-G217	Relocation of Route 20 – Pumping Station – Control Room layout
785-G218	Relocation of Route 20 – Alternative No. 1 – Wet Well Layout – Reinforced Concrete
785-G219	Relocation of Route 20 – Alternative No. 2 – Wet Well Layout – Steel Sheet Piles
785-G220	Relocation of Route 20 – Pumping Station – Mechanical Layout
U228-83-P07	Route 90 Underpass – Pump Station – Sections

Appendices:

Appendix A	Metro Route 20 Underpass Pumping Station – Functional Requirements Specification
Appendix B	Metro Route 20 Underpass Pumping Station – I/O List – PLC-U81
Appendix C	Sewage Treatment Plant Tag Naming Standard
Appendix D	Metro Route 20 Underpass Pumping Station – Lamacoid Schedule
Appendix E	Metro Route 90 Underpass Pumping Station – Pump Photos

GENERAL REQUIREMENTS

E2. CONSTRUCTION

E2.1 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.

E2.2 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.

E2.3 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 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.

E2.4 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.

E2.5 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, and

(c) Wire nuts are not permitted for any automation or HVAC wiring.

E2.6 All conduit routes shall be approved by the Contract Administrator prior to installation of new conduit.

E3. SURVEYING

E3.1 There are no specific surveying requirements within the Work. However, 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.

E4. EQUIPMENT SUPPLIED BY OTHERS

E4.1 The City will supply the cellular modem and associated antenna for installation into control panel CP-U81 at the Metro Route 20 Underpass Pumping Station. The Contractor is responsible for installation and commissioning.

E4.2 Manitoba Hydro may elect to provide and install a new electrical meter at the Metro Route 20 Underpass Pumping Station. Note that supply and installation of the meter socket is by the Contractor.

E4.3 Manitoba Hydro may elect to provide and install a new natural gas regulator and meter at the Metro Route 20 Underpass Pumping Station.

E4.4 The Contract Administrator will supply arc flash stickers for the electrical equipment at the Metro Route 20 Underpass Pumping Station.

E5. EQUIPMENT AND MATERIALS

E5.1 The Contractor shall supply all equipment and materials necessary to execute the work, except for the equipment and material listed in E4 and as shown on the Drawings to be re-used.

E5.2 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.

E6. EXISTING PUMPING STATION OPERATION DURING CONSTRUCTION

E6.1 The facilities related to the Work are critical to dewatering public roadway underpasses for the City of Winnipeg. Under no condition shall the Stations' pumping be shut down without prior permission from the Contract Administrator.

E6.2 The Contractor is advised that the Stations' pumps will only be allowed to be taken out of operation after approximately November 15, 2018, once the weather is consistently below freezing, and after the Contractor's schedule of activities 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.

(a) Work at the sites may begin prior to November 15, 2018 as long as the operation of the underpass pumps is not affected.

E6.3 The pumping equipment at the Station shall be put back into service on or prior February 28, 2019. Under no circumstance shall the Station pumps be allowed to remain out of service after this date as an early snow melt or rainfall presents the risk of flooding the underpasses.

E6.4 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.

E7. SHUTDOWN OF THE PUMPING STATION

E7.1 All shutdowns must be reviewed and approved by the Contract Administrator prior to the shutdowns. Prepare and submit shutdown plans to the Contract Administrator a minimum of 48 hours prior to each proposed shutdown.

E7.2 Sequence work such that a minimum amount of shut-down time at each Station is used.

E7.3 Operation of all City-owned equipment will be by the City unless prior approval is given to the Contractor.

E7.4 The Contractor shall visually monitor for the presence of water at the underpasses and immediately inform the Contract Administrator if water is seen pooling up at an underpass.

E7.5 Water and Waste Department personnel will be available to provide assistance to the Contractor for temporary shutdown of the pumping operations to facilitate completion of the Work.

E7.6 There will be no charge to shutdown the pumping stations to facilitate completion of the Work.

E7.7 If an unreasonable number of station shutdowns are required to complete the Work 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.

E7.8 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.

E8. WETWELL MONITORING AND DEWATERING

E8.1 Dewatering of the wetwell at the Metro Route 20 and Metro Route 90 Underpass Pumping Stations will be required to facilitate the pump replacement or other work activities. The Contractor is fully responsible for providing all equipment to dewater the wetwells. The City will not be assisting with dewatering activities. The Contractor is required to submit a dewatering plan, for review and approval, to the Contract Administrator prior to the commencement of construction.

E8.2 The existing Metro Route 20 and Metro Route 90 Underpass Pumping Station both have a remote terminal unit (RTU) that monitor the wetwell level. The RTU panels are equipped with communications devices (cellular and/or dialup modems) so that the City is able to remotely monitor the wetwell level from their Wastewater Collections Control Centre.

E8.2.1 Since the scope of work for the Metro Route 20 Underpass Pumping Station includes demolition of the existing electrical distribution and controls, the Contractor is required to provide temporary 120V distribution to power the RTU panel for monitoring the wetwell level. The RTU panel may be relocated so that it is not in the way of construction activities. The level at Metro Route 20 is monitored by several float switches, that will need to be reconnected to the RTU panel if the RTU panel is relocated.

E8.2.2 Since the scope of work for the Metro Route 90 Underpass Pumping Station does not include demolition of the existing electrical distribution and controls, the Contractor is not required to provide temporary 120V power for the RTU panel, as the existing electrical supply will be available. Additionally, there is no need to move the RTU panel to facilitate construction activities and therefore reconnection of the level transmitter and float switches will not be required at this station.

E8.3 Due to the possibility of a mid-winter rainstorm or a watermain break only one (1) pump at each Station shall be allowed to be taken out of service at a time so that the other pump can be used to dewater the wetwell.

(a) Since the electrical distribution and controls at the Metro Route 20 Underpass Pumping Station will be out of service during the winter months, the Contractor is responsible for providing temporary 600V distribution, fed from the existing 600V service, and utilize the existing pump starter(s), to operate one of the pumps when required. The Contractor will be required to relocate the existing pump starter panel to make room for the new motor control centres, therefore temporary cabling from the existing starters to the new pump motors will be required.

(b) It is anticipated that cranes will be required to remove and install the station pumps. The Contractor is advised to include costs for multiple craning operations since only one pump will be allowed to be taken out of service at a time at each Station.

E8.4 The Contractor is responsible for providing a means for dewatering the wetwell to facilitate work activities such as installing the new pumps. Only one station pump is permitted to be taken out of service at a time, therefore the other station pump may be used for dewatering. Due to the inherent limitations of the station pumps they cannot fully dewater the wetwell, therefore approximately 0.5 to 1.0 meters of water will still remain in the wetwell. The Contractor is responsible for providing a dewatering pump to remove the remaining volume. Note that a pond or sewer system is not in the vicinity of the Station to discharge water therefore the Contractor will be responsible to find an appropriate means of disposal of the dewatering volume. The

discharge piping at Metro Route 20 is outfitted with a small (approximately 38 mm) drainage connection, which may be utilized by the contractor for connection of a dewatering pump. The Contractor is encouraged to investigate the suitability of this connection during the site investigation. Should this drainage connection be unsuitable the Contractor is responsible for providing an alternate means for dewatering. No additional payment will be made for wetwell dewatering due to any assumptions made by the Contractor, or issues that arise during construction, since dewatering is solely the Contractor's responsibility.

E8.5 The Metro Route 20 Underpass Pumping Station is not equipped with an influent sluice gate to shut-off incoming flow and it is therefore expected that influent will enter the wetwell, even during the winter months. The Contractor's dewatering plan must take this issue into account.

E8.6 The Metro Route 90 Underpass Pumping Station is equipped with an influent sluice gate to shut-off incoming flow. However, the City may not permit closure of this gate for periods longer than 8 hours due to risk of a watermain break flooding the underpass. The Contractor shall provide continuous monitoring of the underpass while the influent sluice gate is closed.

E8.7 The Contractor shall provide periodic visual monitoring of the underpasses to monitor for flooding conditions, and advise the Contract Administrator and City of Winnipeg immediately upon observance of a flooded underpass.

E9. SECURITY

E9.1 The Contractor is responsible for all material and equipment stored on the sites, including equipment and material listed in E4 once that material has been received by the Contractor.

E9.2 Provide a chain-link fence around the Metro Route 20 Underpass Pumping Station 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 stations.

E9.4 Provide and pay for responsible security personnel to guard the sites 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 that is active and not contained within the Contractor's chain-link fence around the construction site.

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 Contactor 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 C6.26 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 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.

E11.6 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.

E11.7 Scaffolding will be required to work at high elevations.

E12. TEMPORARY USE OF CITY EQUIPMENT

E12.1 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.

E13. EXCAVATION

E13.1 Excavation is required for the west, north, and south sides around the building to expose the buried concrete walls to permit installation of damp-proofing and drainage system. Backfilling and drainage stone shall only be placed once work completed has been inspected and approved

E13.2 All excavation work to be in accordance with CW 2030 and 3170.

E13.3 Back slope shall be 1:1 or 1:3 as required, suitable for the soil type and stability encountered. All excavation works shall be in accordance with City of Winnipeg and Province of Manitoba guidelines and regulations.

E13.4 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.

E13.5 Place bedding and fill in accordance with CW 2030.

E13.6 Hydrovac excavation is required for the removal of material in the vicinity of existing sewers and building services.

E13.7 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.

E14. MOBILIZATION AND DEMOBILIZATION

E14.1 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, at both the Metro Route 20 and Metro Route 90 Underpass Pumping Stations.

E14.2 Refer to Specification 01 52 00 Construction Facilities, and all other specifications that may apply.

E14.3 Measurement and Payment

E14.3.1 A maximum of 40% of Form B, “Mobilization and Demobilization”, or 4% of the Total Bid Price, whichever is less, may be submitted for progress payment upon mobilization to the Metro Route 20 Underpass Pumping Station. A maximum of 10% of Form B, “Mobilization and Demobilization”, or 1% of the Total Bid Price, whichever is less, may be submitted for progress payment upon mobilization to the Metro Route 90 Underpass Pumping Station. The remaining amount will be paid out upon demobilization from both the Metro Route 20 and Metro Route 90 Underpass Pumping Stations.

E14.3.2 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 in D15.

(b) The Contractor has mobilized equipment and initiated work on the Sites.

E14.3.3 The Contractor is eligible for payment of demobilization services 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 sites.

E15. METRO ROUTE 20 UNDERPASS PUMPING STATION CIVIL AND LANDSCAPING WORK

E15.1 Site Grading

E15.1.1 Site shall be graded after completing damp-proofing and drainage works to restore original slope on all sides, however there shall be additional 2-5% northward and southward slopes added to assist directing surface draining water on the west side slope towards the north and south around the building.

E15.2 Chain Link Fencing

E15.2.1 Remove existing chain link fence, to permit work to proceed. Dispose of as directed by the contract administrator.

E15.2.2 Once site final grade is complete, install new fence per old layout, c/w single lockable gate. Fencing shall be as per CW3550.

E15.3 Site Restoration

E15.3.1 Restoration of all existing surface areas disturbed by construction activities including but not limited to; excavation for new installations, 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: seeded, using imported topsoil in accordance with CW 3520 and 3540.

(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) Interlocking pavement stones: CW 3330.

(f) All private property adjacent the site disturbed by construction activities relating to the work to be restored to its pre-construction condition to the satisfaction of the Contract Administrator.

E15.4 Measurement and Payment:

E15.4.1 Payment will be based on Form B, “Metro Route 20 Underpass Pumping Station Civil and Landscaping Work”, 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.

E16. METRO ROUTE 20 UNDERPASS PUMPING STATION STRUCTURAL AND ARCHITECTURAL WORK

E16.1 Exterior damp-proofing and drainage

E16.1.1 Install exterior foundation water barrier on north, south, and west walls. Top elevation to follow grade elevation, to below main floor slab elevation as detailed on drawings. Fasten per manufacturer’s instructions, seal edges and joints, and top edge. Seal to all wall penetrations.

E16.1.2 Install weeping tile drainage, c/w stone bedding. Drain into wet well through wall, on west elevation as indicated. Pipe shall be capped at ends, and be sloped to direct all water through west wall drain point (do not discharge out ends onto roadway).

E16.2 Exterior roof

E16.2.1 Remove existing roof gravel, roof membrane, and insulation.

E16.2.2 Install new insulation, roof membrane, and gravel (built up roof system), to match original. Ensure all penetrations, curbs, joints, and edges are sealed against water penetration.

E16.3 Interior walls and ceiling

E16.3.1 Remove existing plywood wall covering and wall insulation on main floor.

E16.3.2 Install new rock-wool insulation & plywood cover sheets. Upper 8’ (2434mm) to be standard good-one-side plywood, lower remainder (approx 2’ (610mm)) to be pressure treated plywood. Prime and paint finish standard plywood as indicated.

E16.3.3 Ceiling to be cleaned and repainted.

E16.4 Access ladders, hatches, davit base

E16.4.1 Main floor access hatch grating in southwest corner to be replaced with new checker plate hinged lid, c/w additional openable sections for hoisting.

E16.4.2 Debris basket access grating in the northeast corner to be replaced with new checker plate c/w ductwork access hole.

E16.4.3 The existing two-part main access ladder in southwest corner (from main floor EL 228.478 to wet well balcony EL 226.039 and balcony to wet well floor EL 21.385) to be removed and replaced with one continuous new ladder. Remove old ladder & brackets, cut-off and

grind flush concrete anchors. Install new, maintaining minimum 150 distance between old anchor locations and new.

E16.4.4 Install new guard rail c/w safety gate around main floor access hatch.

E16.4.5 Remove old davit hoist socket near main access hatch, against west wall. Grind flush old anchors. Install new davit hoist socket in new location.

E16.5 Wet well guards and hoist

E16.5.1 Remove and replace wet well balcony handrail/guards with new guards and fence system, as per drawings.

E16.5.2 Remove and replace existing ceiling hoist anchor with new as per drawings.

E16.6 Miscellaneous works

E16.6.1 Cut new openings for mechanical ducts. Locate all rebar in floor and walls for review by contract administrator prior to cutting.

E16.6.2 Remove existing double door and frame. Install new insulated steel double doors and frame. Mullion style doors not permitted (full width useable). Painted finish, colour as directed by the contract administrator. Complete with all hardware and locks keyed as directed by the contract administrator.

E16.7 Measurement and Payment:

E16.7.1 Payment will be based on Form B, “Metro Route 20 Underpass Pumping Station Structural and Architectural Work”, 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.

E17. METRO ROUTE 20 UNDERPASS PUMPING STATION PROCESS MECHANICAL WORK

E17.1 Scope:

E17.1.1 Replacement of the existing pumps and associated discharge check valves and butterfly valves. The existing motors may be replaced but replacement is not mandatory if the existing motors are able to be properly utilized with the new pumps. The existing pump motors are 60 HP, 1760 rpm.

E17.2 Column Pumps complete with strainer, bowl assembly, column, lineshaft, below grade discharge elbow, and accessories:

E17.2.1 Pumps will be used to pump surface water collected from the underpass drainage system having a temperature range of 0ºC to 30ºC and will operate under conditions of flooded suction.

E17.2.2 Each pump shall be a single stage, non-clogging, vertical turbine or mixed flow type, product lubricated open lineshaft pump. Each unit shall include a bowl assembly, suction strainer, column and open lineshaft, motor pedestal and sole plate, underground discharge elbow, and sealing assembly supplied by a single manufacturer. Pumps shall be compatible with a hollow shaft type electric motor driver.

E17.2.3 Durable metal nameplates shall be securely attached to each pumping unit supplied. Pump nameplates shall indicate the serial number, capacity, head, rpm, and other pertinent data. Motor nameplates shall indicate the serial number, voltage, phase, hertz, rpm, horsepower, service factor, NEMA Design, insulation class and any other pertinent data.

E17.2.4 Pumps

(a) General Requirements

(i) Duty point: 252 l/sec @ 12.8 m head (4000 GPM @ 42 ft head)

(ii)	Maximum speed:	1800 rpm
(iii)	Rotation (viewed from above):	CW
(iv)	Size of sphere impeller shall pass:	42 mm dia. (minimum)
(v)	Diameter of pump bowl:	350 mm (14”)
(vi)	Diameter of pump discharge:	350 mm (14”)
(vii)	Pump efficiency at duty point:	75% minimum
(viii)	Pump Driver Power	44.7 kW (60 hp; maximum)

E17.2.5 All unspecified materials shall be selected specifically for their suitability considering their duty.

E17.2.6 The pump shall consist of the following components: cast iron bowl complete with inlet screen, suction bell, stainless steel impeller/propeller and replaceable bowl liner and impeller wear rings.

E17.2.7 The impeller/propeller drive shaft shall be 416 stainless steel (A582), supported by bronze bearings on each side of impeller/propeller. Shaft coupling shall be stainless steel.

E17.2.8 Lineshaft to be of ample size to transmit the torque and operate the pump without distortion or vibration. Lineshaft to be 416 stainless steel (A582) with stainless steel journals at the bearings.

E17.2.9 Lineshafting shall be coupled with extra-strong threaded 416 stainless steel couplings machined from solid bar steel. Shaft couplings shall accurately align the adjacent line shaft sections. Column sections shall have flanged connections fastened together with stainless steel nuts and studs.

E17.2.10 Lineshafting shall be fitted with stainless steel replaceable sleeves at each bearing and shall conform to AISI 304 material.

E17.2.11 Lineshaft bearings shall be of neoprene material construction.

E17.2.12 Lineshaft bearings shall be retained in bronze guides that are fitted into the column coupling and secured in place by the butted column pipe ends..

E17.2.13 The pump discharge shall be of the below ground type and consist of a motor mounting-base, underground elbow and riser pipe.

E17.2.14 The motor mounting-base shall be of sufficient design to support the entire weight of the pump and driver.

E17.2.15 The underground elbow shall be of fabricated steel and have a 350 mm (14”) ANSI 150# discharge flange.

E17.2.16 The drive shaft shall be made of 416 stainless steel conforming to ASTM A582 and shall extend through the sealing assembly of the driver-mounting base and be coupled to a vertical hollow shaft driver.

E17.2.17 The shaft sealing assembly shall consist of a cast iron packing box, cast iron packing gland, bronze packing box bushing, stainless steel packing gland nuts and bolts and synthetic packing.

E17.2.18 Packing box shall be rated for 150 PSI.

E17.2.19 Driver mounting-base shall be fitted with stainless steel guards to prevent injury from the rotating shaft and/or coupling.

E17.2.20 Each pump assembly shall be provided with lifting lugs.

E17.2.21 All wetted parts of the pump body shall be epoxy coated as per manufacturer’s factory standard coating system and colour.

E17.2.22 The design of the pumps, and selection of materials, shall be such that galvanic corrosion is avoided. Using dissimilar metals in contact that may result in galvanic corrosion is not permitted.

E17.2.23 Shop drawing submittals:

(a) Submit shop drawings of the pumps in accordance with 01 33 00.

E17.2.24 Approved Manufacturers:

(a) Flowserve

(b) Pentair (Fairbanks)

(c) KSB

(d) Goulds

(e) Process Systems / Deming Vertical Turbines

(f) Or approved equal in accordance with B7.

E17.3 Motor (if providing new motor and not re-using existing motor):

(a) The pump motor shall be a hollow shaft motor. Totally enclosed, fan cooled vertical squirrel cage induction type, rated for continuous operation, 575 V, 3-phase, 60 Hz.

(b) The motor shall meet the performance and test requirements of NEMA Standard MG1for Premium Efficiency.

(c) The motor shall be of NEMA B torque design and shall have Class F insulation made of non-hygroscopic and moisture resistant materials.

(d) The motor shall be equipped with regreaseable anti-friction bearings capable of withstanding the full thrust of the motor and pump in operation.

(e) Each motor shall be provided with a non-reversing ratchet.

E17.4 Butterfly Valves

E17.4.1 Application: Pump discharge valves.

E17.4.2 Size: 350 mm

E17.4.3 Wafer/lugged type butterfly valve with ductile cast iron body (ASTM A536); bronze trimmed, ductile iron disk; NBR rubber seat, stainless steel shaft(s), double O-ring stem seals and fifty (50) millimetre square operating nut. Valve to be bubble tight to 150 psi.

E17.4.4 Butterfly valves to be equipped with 90 degree geared operator and handwheel.

E17.4.5 The handwheels shall be a minimum 406 mm (16”) in diameter.

E17.4.6 Lugs shall conform in dimension and drilling to ANSI/ASME B16.1, Class 150 with holes straddling centreline.

E17.4.7 Direction of opening shall be counter clockwise and shall be clearly stamped or indicated with raised letters and arrow.

E17.4.8 Manufacturer’s nameplate shall be attached to the valve body with stainless steel fasteners.

E17.4.9 All valves shall be hydrostatically tested and seat tested to demonstrate zero leakage. The manufacturer shall provide test certificates, dimensional drawings, parts list drawings, and operation and maintenance manuals.

E17.4.10 Submit shop drawings of gate valves in accordance with 01 33 00.

E17.4.11 Approved gate valve manufacturers:

(a) Dezurik,

(b) Mueller,

(c) Or approved equal in accordance with B7.

E17.5 Silent Check Valves

E17.5.1 Application: Pump discharge check valves.

E17.5.2 Size: 350 mm

E17.5.3 Spring assisted, axial flow, centre guided, in-line, flanged, silent check valve. Minimum cross sectional area of valve shall exceed that of the pipe.

E17.5.4 Cracking Pressure: 0.5 psi ; Full open pressure: 1 psi

E17.5.5 One piece ductile iron body (A536), 316 SS disc/stem assembly, seat, spring and bushing.

E17.5.6 The valves shall have flanges with drilling to ANSI B16.1, Class 150 with holes straddling centreline.

E17.5.7 All valves shall be hydrostatically tested and seat tested to demonstrate zero leakage. The manufacturer shall provide test certificates, dimensional drawings, parts list drawings, and operation and maintenance manuals.

E17.5.8 Submit shop drawings of check valves in accordance with 01 33 00.

E17.5.9 Approved check valve manufacturers:

(i) DFT Valves,

(ii) Dezurik,

(iii) Or approved equal in accordance with B7.

E17.6 Tools and Spare Parts

E17.6.1 Provide special tools or accessories required for maintenance, adjustment, assembly or disassembly of the pumping equipment supplied.

E17.6.1 Provide the following spare parts:

(a) Qty 1 set of wear rings;

(b) Qty 1 set of bowl liners;

(c) Qty 1 set of bearings;

(d) Qty 1 impeller/propeller (trimmed to size); and

(e) Qty 1 set of volute and casing gaskets.

E17.6.2 Properly package spare parts to resist damage.

E17.6.3 Clearly identify package as to its contents.

E17.6.4 Spare parts shall be identical to those supplied in the pumps.

E17.7 Pump and Motor Testing

E17.7.1 Conduct pump tests in accordance with Hydraulic Institute Standards - Centrifugal Pumps Test Code. All definitions for the purpose of testing shall be as set forth by Hydraulic Institute Standards - Centrifugal Pumps Ratings.

E17.7.2 Pump test to be non-witnessed performance tested as per Hydraulic Institute Standards 14.6 Grade 1B.

E17.7.3 Conduct motor tests in accordance with CSA C22.2 No. 100, EEMAC, MG-2. Each motor shall be tested for:

(a) Running current,

(b) Locked rotor current,

(c) Hi-pot test, and

(d) Winding resistance.

E17.7.4 Shop Tests

(a) Test each pump in the manufacturer's shops over the range of operation from shut-off to run-out.

(b) Provide a certified test curve in duplicate showing the head, capacity, pump efficiency and power for each pump to the Contract Administrator for review prior to shipping Goods.

(c) Test curves to be signed by the pump manufacturer's official responsible for the test.

(d) Final payment for the Goods will be made only after the Contract Administrator has received the certified test curve for each pump supplied.

E17.7.5 Field Tests

(a) Field tests will be performed on each pumping unit as soon as possible after the Contractor has inspected the installation. Field tests will be to determine and check for the following:

(i) Capacity,

(ii) Noise (bearing, mechanical seal, cavitation, other),

(iii) Vibration,

(iv) Electrical energy supplied to the motors from motor control centre, and

(v) The liquid pumped during the field test will be storm water with a density taken to be 1.00 kilogram per litre.

(b) If the field pump tests indicates the Goods supplied does not meet the specified requirements, the Contractor shall promptly correct the problem at his expense to the Contract Administrator's satisfaction.

(c) If the Contractor is not satisfied with the procedure of the tests or the City's interpretation of the results thereof, the Contractor may have the tests repeated, or their interpretation referred to a referee acceptable to both the City and himself. The cost of the services of such referee shall be borne by the City if the referee rules that the tests as reported by the City were to the detriment of the Contractor but if otherwise, the Contractor shall pay the cost of the services of the referee and of repeating the tests. The decision of the referee shall be final and binding both on the City and the Contractor.

E17.8 Initial Start-up Inspection

E17.8.1 Goods supplied under this Contract will be installed under a separate Contract. The pumping equipment supplier will not be responsible for the installation work.

E17.8.2 The Contract Administrator will provide seven (7) Calendar Days notice of requirement for an initial pump start-up inspection.

E17.8.3 Provide the services of a qualified technical representative to be present at the initial start-up of each pumping unit supplied under this Contract to perform the following:

(a) Inspect the pumping equipment to ensure they have been properly installed in accordance with the manufacturer's instructions.

(b) Conduct and document amp draw, rotation and speed tests.

(c) Check for unusual vibration or noises.

(d) Instruct City personnel in the operation and maintenance of the Goods.

E17.8.4 Promptly correct any deficiencies with the pumping equipment at own expense to the Contract Administrator's satisfaction.

E17.8.5 The price provided for "Initial Start-up Inspection" shall cover all costs associated with this item of Work including travel expenses, accommodations, meals, and wages.

E17.9 Table 1 – Approximate Elevations and Dimensions

DETAIL	ELEVATION (M)
Wetwell Floor	221.39
Discharge Header Invert	226.30
Motor Room Floor	228.48

E17.10 Training

E17.10.1 The Contractor shall include costs for providing training to City staff by a factory-trained representative on the operation and maintenance of the Goods.

E17.10.2 Training for the pumping equipment shall be conducted on Site, in conjunction with commissioning. The Contractor shall provide a qualified instructor as well as the necessary course materials.

E17.10.3 Training shall be provided in one (1) session for operation and maintenance staff, and one (1) session for Electrical and Instrumentation staff.

E17.10.4 Training shall be completed in conjunction with commissioning of the Goods. The Contract shall not be considered complete until the training has been provided

E17.11 Only one (1) pump shall be replaced at a time. Refer to E8.3.

E17.12 Measurement and Payment:

E17.12.1 Payment will be based on Form B, "Metro Route 20 Underpass Pumping Station Process Mechanical Work", 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.

E18. METRO ROUTE 20 UNDERPASS PUMPING STATION BUILDING MECHANICAL WORK

E18.1 Provide new ventilation, and heating system in accordance with the drawings and specifications, including but not limited to the following:

(a) Supply and installation of new supply fans and filter sections, electric duct heating coils, and a new exhaust fan and. See Section 23 34 00.

(b) Supply and installation of mixing section with dampers and controls. See Section 23 09 33.

(c) Supply and installation of new, insulated ductwork. See Section 23 07 13 and Section 23 31 14.

(d) Supply and installation of new outdoor air and exhaust openings complete with new louvers. See Section 23 37 13.

(e) Supply and installation of a new electric unit heater. See Section 23 82 40.

E18.2 Supply and installation of a fire extinguisher as shown on the drawings. See Section 10 44 20.

E18.3 Coordinate with Manitoba Hydro for the modification of the existing gas service to a 34.5 kPa Natural gas service.

(a) All costs from Manitoba Hydro will be billed directly to the City, not the Contractor.

E18.4 Provide natural gas piping and required appurtenances from new Manitoba Hydro meter outside building to the new generator.

E18.5 The Contractor is responsible for paying all permit and inspection fees, including those for "Special Inspections" required by the Office of the Fire Commissioner.

E18.6 Measurement and Payment:

E18.6.1 Payment will be based on Form B, "Metro Route 20 Underpass Pumping Station Building Mechanical Work", 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.

E19. METRO ROUTE 20 UNDERPASS PUMPING STATION ELECTRICAL WORK

E19.1 Provide demolition of the existing electrical service cable and conduit, and in-fill existing wall penetration.

E19.2 Demolish existing station electrical distribution including the main fusible disconnect switch, 600V distribution panel, and 120/240V panelboard. The existing 600-120/240V transformer is to be relocated and reused.

E19.3 Demolish existing pump starters and associated cabling and conduit.

E19.4 Provide demolition of existing lighting, light switches, receptacles, conduit, pull boxes, junction boxes, telephone cabling, and all other items as indicated on the drawings and specifications.

E19.5 Provide demolition of existing motor starter, cabling, and controls associated with the roof top fan.

E19.6 Provide demolition of the existing cabling associated with the natural gas engine controls.

E19.7 Provide and install new direct buried service cabling from existing customer-owned pole to new fusible disconnect switch at south-east exterior corner of Station. Provide man-lift or scaffolding as required to access portion of cable on pole. Once the new cable is installed in the trench, and prior to backfilling, advise the Contract Administrator to allow for inspection of the trench and cable.

E19.8 Provide new 600V service entrance rated fusible disconnect switch, utility metering socket, 600V MCCs, 120/240V panelboard, lighting, light switches, emergency lighting system, receptacles, conduit, pull boxes, junction boxes, telephone cabling, grounding and bonding cabling, 600V standby natural gas generator, automatic transfer switch, carbon monoxide detector, and all other items as indicated on the drawings and specifications.

(a) The Contractor is responsible for coordinating with the generator supplier to determine circuit requirements for items such as the generator engine block heater, alternator strip heater, and battery charger. The Contractor is responsible for providing the required circuit breakers in Panelboard PNL-U73E for these circuits. No additional payment will be made for installation of additional required power circuits that are not already shown on the drawings.

(b) The Contractor is responsible for providing the required control signals between the automatic transfer switch and the generator control panel, as per the generator manufacturer's recommendations. Some of these signals have been shown on drawing 1-0309U-E0016 (i.e. "Engine Start", "On Utility Power", and "On Generator Power"), but other control signals may be required as well. No additional payment will be made for connection of additional control signals that are required by the generator manufacturer.

E19.9 Provide temporary power and lighting to facilitate construction activities.

(a) Use of the existing electrical distribution equipment (transformer and panelboard, etc.) for temporary power is permitted.

E19.10 Setup, test, and commission all new electrical equipment, including power meters and circuit breakers.

E19.11 The Contract Administrator will perform the electrical coordination and arc flash studies. The Contractor will be responsible for setting the circuit breaker trip settings as directed by the Contract Administrator, and for providing circuit breaker trip test results following the implementation of the circuit breaker settings.

E19.12 The Contractor is responsible for paying all permit and inspection fees, including those for "Special Inspections" required by the Office of the Fire Commissioner.

E19.13 Measurement and Payment:

E19.13.1 Payment will be based on Form B, "Metro Route 20 Underpass Pumping Station Electrical Work", 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.

E20. METRO ROUTE 20 UNDERPASS PUMPING STATION AUTOMATION WORK

E20.1 Demolish the existing Remote Terminal Unit (RTU) panel, wetwell level switches, and other items as per the drawings and specifications.

(a) The existing RTU panel shall remain in service until the new control panel (CP-U81) is commissioned such that the City is able to monitor critical station alarms (eg. high wetwell level). The RTU panel may be relocated to a temporary location to facilitate construction activities. The Contractor is responsible for providing power to the RTU panel during construction.

E20.2 Supply and install the new control panel, CP-U81. Note that the cellular modem and antenna is to be supplied by the City.

E20.3 Program and configure the PLC as per the included Functional Requirements Specification and the following design standards that are also included with this Bid Opportunity:

(a) Tag Naming Standard (Rev. 00), and

(b) HMI Layout and Animation Plan (Rev. 01).

(i) The HMI Layout and Animation Plan was developed for the Sewage Treatment Plants, but the object symbology and colour scheme shall be utilized.

E20.4 Conduct a Factory Acceptance Test (FAT) in accordance with the specifications. The Contract Administrator will be present for the FAT. Coordinate with the Contract Administrator to establish the date and time of the FAT.

E20.5 Provide and install new float switches in the wetwell.

E20.6 Supply and install one (1) ultrasonic based level transmitter and sensor. Transmitter to be door-mounted on control panel CP-U81. Sensor is thru-floor mounted facing into the wetwell.

E20.7 Supply and install of a methane (natural gas) detector, interlocked with the standby generator to shutdown the generator upon a gas alarm.

E20.8 Supply and install other instrumentation as shown on the drawing and specifications.

E20.9 Verification of status signals from the generator control panel, and generator transfer switch.

E20.10 Supply and install the ventilation controls, including damper actuators, temperature controllers, sensors, fan filter differential pressure switches, main floor supply fan current switch with associated junction box, and the Ventilation Panel (JBA-U86).

E20.11 Supply and install all miscellaneous automation equipment, cabling, and conduit as indicated on the drawings.

E20.12 Configure and test all instruments, pump controllers (soft-starters), and HVAC controllers. Make adjustments as directed by the Contract Administration. Record all instrument and controller parameters on test forms, and include the geodetic elevation of all level sensors (i.e. float switches and ultrasonic level sensor). Provide markups on the Piping & Instrumentation Diagrams (P&IDs) with all level sensor elevations.

E20.13 Configure and test all PLC inputs and outputs by operating field devices. The Contractor is responsible for testing alarm and status signals back to the SCADA system at the City's Wastewater Collections Control Centre. This SCADA system monitors the Station PLC via the cellular and dial-up connections. Coordinate a date and time with the Contract Administrator for testing of I/O signals back to the City's SCADA system, with a minimum of 48 hours notice.

E20.14 Test all equipment control operation and equipment interlocks. This includes, but is not limited to, operation of the HVAC controls, generator controls, and pump controls.

E20.15 The Contractor is responsible for submitting a detailed Commissioning Plan to the Contract Administrator for review and approval prior to commissioning. The Commissioning Plan shall contain an itemized list of all equipment, and the specific steps and tasks that will be undertaken to demonstrate proper operation and interlocking of each piece of equipment. The Contractor is required to prepare test sheets and checklists, which are filled out during commissioning.

E20.16 Measurement and Payment:

E20.16.1 Payment will be based on Form B, "Metro Route 20 Underpass Pumping Station Automation Work", 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.

E21. METRO ROUTE 90 UNDERPASS PUMPING STATION PUMP REPLACEMENT

E21.1 Scope:

(a) Replace the existing pumps including exposed horizontal discharge piping at the Metro Route 90 Underpass Pumping Station in accordance with the specifications herein.

(i) The existing pump motors and motor support pedestals shall be re-used.

(ii) The existing foundation plates are to be reused if possible. The Contractor is responsible for determining the suitability of the existing foundation plates for re-use.

(iii) The existing horizontal discharge piping requires replacement. This piping is situated between the vertical lineshaft column and a concrete-embedded elbow. Victaulic couplings are used to connect the horizontal piping to the lineshaft column and concrete-embedded elbow, and are shown in the included "475-2018_Appendix_E_Route_90_Pump_Photos.pdf".

(iv) No additional payment will be made for additional components that are required for a complete and operating system.

(b) Only one (1) pump shall be replaced at a time. Refer to E8.3.

E21.2 Specifications:

(a) General:

(i) This specification includes the supply and installation of vertical mixed-flow propeller oil lubricated enclosed lineshaft pump(s). Each unit shall include a new bowl assembly, suction strainer, column, below grade discharge elbow, enclosing tube and all lineshafting (to mate with existing motor), oil lubrication system including solenoids and reservoir, top bearing housing and packing box. Existing motors, motor support pedestals, lubrication oil reservoirs and foundation plates are to be re-used if possible.

(ii) Pumps will be used to pump surface water collected from the underpass drainage system having a temperature range of 0ºC to 30ºC and will operate under conditions of flooded suction.

(b) Quality Assurance:

(i) Pumps, complete with necessary guards and all other specified accessories and appurtenances shall be directly equal to and directly interchangeable with the existing pumps previously supplied by Brier Hydraulics (now ABBA Pump Parts and Service). Pump performance, construction and dimensions shall match that of the original pumps. Changes to existing infrastructure or pump construction detail will not be accepted.

(c) Performance:

(i) The pump(s) shall be designed for continuous operation under normal service.

(ii) Pumps to be compatible with existing hollow shaft motors. 75 hp, Operating speed 1175 RPM.

(iii) Operation Criteria:

Flow	TDH	Max. Pump Speed (RPM)	Max. Solids Passage	Minimum Submergence Over Bell (inches)
511 L/s	6.4 m	1175 RPM	75 mm	750mm

(d) Pumps:

(i) Pumps shall be manufactured / supplied by ABBA Pump Parts and Service, or approved equal in accordance with B7. The Contract Administrator and City have no information on the existing pumps other than what is shown on the pump and motor nameplates. The existing pumps were manufactured by Fairbanks Morse, supplied by Brier Hydraulics which is now ABBA Pump Parts and Service. The Contractor may elect to source the new pumps from ABBA Pump Parts and Service, who have records on the existing pumps, but this is not a mandatory requirement.

(ii) The pump will be counter-clockwise rotation when viewed from the driver end looking at the pump.

(iii) The propeller shall be of bronze construction conforming to ASTM B584, C83600. They shall be of one-piece construction, mixed-flow fixed pitch vane design capable of passing a 75 mm solid. Vane leading edges shall be rounded to prevent accumulation of fibrous material. Propeller(s) shall be statically and dynamically balanced to limit vibration and supported on both sides by sleeve-type bearings for stability.

(iv) Propeller(s) are to be secured to the shaft by means of a steel drive collet and bronze lock nut to prevent axial movement.

(v) Propeller location within the bowl shall be adjustable by means of a top shaft-adjusting nut.

(vi) Durable metal nameplates shall be securely attached to each pumping unit supplied. Pump nameplates shall indicate the serial number, capacity, head, rpm, and other pertinent data. Motor nameplates shall indicate the serial number, voltage, phase, hertz, rpm, horsepower, service factor, NEMA Design, insulation class and any other pertinent data.

(vii) The design of the pumps, and selection of materials, shall be such that galvanic corrosion is avoided. Using dissimilar metals in contact that may result in galvanic corrosion is not permitted.

(e) Bowls:

(i) The bowls shall be made of close-grained cast iron conforming to ASTM A48 CL30. Castings shall be free from blowholes, sand holes and shall be accurately machined and fitted to close dimensions.

(ii) Bowls shall be flange connected.

(iii) Bowls shall be designed with smooth passages to ensure efficient operation.

(iv) Each bowl assembly shall include a cast iron suction bell of the flared inlet type incorporating a permanently grease- packed bronze bearing. The suction bell shall incorporate a minimum of three guide vanes designed to minimize entrance losses and reduce vortexing.

(v) A bronze sand cap shall be provided with each pump to prevent entrance of sand into the suction bell bearing.

(vi) The discharge bowls shall be provided with a bronze bearing immediately above the propeller as well as a bronze connector bearing.

(vii) Bowls shall be fitted with galvanized basket strainer.

(f) Propeller Shafts:

(i) Propeller shafts shall be of stainless steel construction conforming to ASTM A582 (416 stainless steel) designed to transmit the drive torque required.

(ii) The shafts shall be supported by bronze bearings located on both sides of each propeller.

(g) Columns:

(i) Column pipe shall be not less than 350 mm (14 inches) nominal diameter.

(ii) Column pipe shall be flanged and furnished in sections not over 3.1 meters (10 feet) in length.

(h) Lineshafts:

(i) Lineshafting shall be of ample size to transmit the torque and operate the pump without distortion or vibration.

(ii) Lineshafting shall be made of 416 SS and be furnished in sections not over ten feet in length.

(iii) Lineshafting shall be coupled with extra-strong threaded stainless steel couplings machined from solid bar steel.

(iv) An enclosing tube shall be provided to house the lineshaft. It shall be of extra-strong ASTM A120, Schedule 80 pipe construction and furnished in interchangeable sections not over ten feet in length. Each end of the enclosing tube shall be machined to receive bronze connector bearings.

(v) Enclosing tube connector bearings shall be of bronze conforming to ASTM B505 C93200.

(vi) Enclosing tube shall be designed for oil lubrication of lineshaft bearings and bowl discharge connector bearing. Top enclosing tube shall be fitted with a tube tensioning nut and tube tensioning nut shall have a suitable connection for oil lubricator.

(i) Discharge Assembly:

(i) The pump discharge shall be of the below ground construction and consist of a driver mounting-base, underground elbow and riser pipe.

(ii) The underground elbow shall be of fabricated steel and have a standard Victaulic discharge connection.

(iii) All columns and discharge elbow shall be blasted and coated with a Polyamide Epoxy / Coal Tar corrosion resistant both inside and outside. Same coating shall be applied to the exterior surfaces of the new bowl assemblies.

(iv) A driveshaft of the same material as the lineshaft shall extend through the sealing assembly of the driver-mounting base and be coupled to a vertical hollow shaft driver and the input shaft from the right angle gearbox.

(v) The shaft sealing assembly shall consist of a bronze tension nut, a suitable oiler and oiler reservoir to ensure proper lubrication for the bearings when the pump is in operation.

(j) Vibration Limits:

(i) The limits of vibration as set forth in the standards of the Hydraulic Institute shall govern.

(k) Horizontal Discharge Piping:

(i) Provide new horizontal discharge piping between column elbow and discharge elbow.

(ii) Piping shall be ASTM A53 carbon steel Schedule 40 thickness. Contractor to confirm thickness of existing pipe and match. It is assumed it will not be thicker than Schedule 40.

(iii) Diameter: 500 mm. Contractor to confirm.

(iv) Length: Unknown. Approximately 1.5 meters +/- 0.5 meters. Contractor to confirm.

(v) Couplings: Victaulic Style 77, or approved equal in accordance with B7.

(vi) Contractor to groove new piping for installation of couplings.

(vii) Provide new 150 mm wide neoprene strip between piping and concrete saddle support. Refer to “Detail A” on reference drawing U228-83-P07.

(viii) Provide new 50 mm wide x 5 mm thick hold down strap, fastened with HSA 12 dia. X 110 Hilti stud anchor (stainless steel). Refer to “Detail A” on reference drawing U228-83-P07.

(l) Oil lubrication system of pump lineshafts:

(i) Reuse existing oil reservoirs or provide new oil reservoirs of the same or greater capacity.

(ii) Supply and install new oil piping to connect oil reservoir to lineshaft.

(iii) Provide new 120Vac solenoids for control of lubricating oil flow to pump lineshaft. Solendoids are to open when pump is operating and close when pump is not operation.

(iv) For Pump 2, the Contractor shall provide a 12Vdc solenoid, in addition to the 120Vac solenoid. This is required since Pump 2 can also be driven from a natural gas engine in the event of a Station power failure. Note that the 120Vac solenoids are powered from the electric motor starters, which will not have a source of power upon a Station power failure. The Contractor is responsible for design and installation of the 12Vdc solenoid and piping arrangement on the Pump 2 oil lubricator. Refer to drawing 1-0310U-A0034-001-03, which illustrates the modifications required to engine control junction box JBA-U83-1, and drawing 1-0130U-A0037-001-00, which illustrates the new field-run cabling for the 12Vdc solenoid.

(m) Note regarding existing discharge elbow pipe section:

(i) Each horizontal discharge piping connects to the discharge elbows via a Victaulic coupling. One of the existing discharge elbows is shown in Figure 12 in the “475-2018_Appendix_E_Route_90_Pump_Photos.pdf”. As can be seen, this pipe and elbow section is embedded in concrete and therefore will not be replaced. However, due to the age and condition of this pipe section it is anticipated that it may not be possible to re-use the existing groove. Bidders are to include pricing in their bid for restoring the discharge elbow pipe end as necessary to be compatible with a new Victaulic coupling to the new pump discharge piping. Note the proximity of the Victaulic connection to the side-wall of the open channel, which can be seen in the photos.

E21.3 Tools and Spare Parts

E21.3.1 Provide special tools or accessories required for maintenance, adjustment, assembly or disassembly of the pumping equipment supplied.

E21.3.2 Provide the following spare parts:

(a) Qty 1 set of wear rings;

(b) Qty 1 set of bowl liners;

(c) Qty 1 set of bearings;

(d) Qty 1 impeller/propeller (trimmed to size); and

(e) Qty 1 set of volute and casing gaskets.

E21.3.3 Properly package spare parts to resist damage.

E21.3.4 Clearly identify package as to its contents.

E21.3.5 Spare parts shall be identical to those supplied in the pumps.

E21.4 Training

E21.4.1 The Contractor shall include costs for providing training to City staff on the operation and maintenance of the Goods.

E21.4.2 Training for the pumping equipment shall be conducted on Site, in conjunction with commissioning. The Contractor shall provide a qualified instructor as well as the necessary course materials.

E21.4.3 Training shall be provided in one (1) session for operation and maintenance staff, and one (1) session for Electrical and Instrumentation staff.

E21.4.4 Training shall be completed in conjunction with commissioning of the Goods. The Contract shall not be considered complete until the training has been provided

E21.5 Measurement and Payment:

E21.5.1 Payment will be based on Form B, “Metro Route 90 Underpass Pumping Station Pump Replacement”, 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.

E22. EXPEDITED SHOP DRAWINGS

E22.1 In order to expedite Shop Drawings with critical timeliness, the Lowest Responsive Bidder, as outlined in B17, will be permitted, after receiving written approval from the Contract Administrator, to arrange for the preparation of Shop Drawings for the following items with critical timeliness:

(a) Metro Route 20 Underpass Pumping Station motor control centres, MCC-U71 and MCC-U72E,

(b) Metro Route 20 Underpass Pumping Station natural gas generator, GEN-U72 and automatic transfer switch, ATS-U72,

(c) Metro Route 20 Underpass Pumping Station pumps P-U01 and P-U02, complete with motors,

(d) Metro Route 20 Underpass Pumping Station pump discharge butterfly valves and discharge check valves, and

(e) Metro Route 90 Underpass Pumping Station pumps P-U01 and P-U02 and associated discharge piping.

E22.2 If the Contractor requires access to the Stations to inspect the existing equipment for the sake of preparation of shop drawings then advise the Contract Administrator to arrange for a site inspection.

E22.3 If Award is made to the lowest responsive bidder then no payment for the preparation of Shop Drawings will be made.

E22.4 If no Contract is awarded, then the City of Winnipeg will pay the requested Bidder up to a maximum of five hundred dollars ($500.00) for each of the requested submissions noted above, for the preparation and delivery of Shop Drawings. Delivery of the Shop Drawings to the City and payment of the above amounts will constitute full and final consideration of each party to the other, and neither party will have any further liability to the other with respect to this Bid Opportunity.