THE CITY OF WINNIPEG

TENDER

TENDER NO. 936-2024

WINDSOR PARK LIFT STATION 2025 UPGRADES

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 WINDSOR PARK LIFT STATION 2025 UPGRADES

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, December 20, 2024.

B2.2 The Contract Administrator or the Manager of Purchasing 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 Bidder shall attend a Site Investigation meeting at 945 Cottonwood Road on the following dates:

(a) November 29, 2024, beginning at 1:30 pm.

(b) December 4, 2024, beginning at 9:00 am.

B3.2 Bidders are required to bring their own PPE (safety vest, boots, hard hat, safety glasses and gloves) to the Site Investigation. Proponents without appropriate PPE will not be allowed access inside the Station.

(a) Proponents wanting to access the lower levels of the Lift Station will require to have Confined Space Entry Training and will be asked to show their certification at the site visit. Proponents without Confined Space Entry Training will not be allowed to access the lower levels of the Lift Station.

B3.3 Attendance of at least one (1) Bidder representative at one (1) of the Site Investigations is mandatory. Should a Bidder representative not attend at least one (1) site investigation, the Bidder's Bid will be determined to be non-responsive and will not be further evaluated.

B3.4 The Bidder shall not be entitled to rely on any information or interpretation received at the Site Meeting unless that information or interpretation is the Bidder's direct observation, or is provided by the Contract Administrator in writing.

B3.5 The Bidder will be allowed to take pictures of the site provided there are no City representatives in the pictures.

B3.6 The Bidder is responsible for inspecting the Site, the nature of the Work to be done and all conditions that might affect their Bid or their performance of the Work, and shall assume all risk for conditions existing or arising in the course of the Work which have been or could have been determined through such inspection.

B4. ENQUIRIES

B4.1 All enquiries shall be directed to the Contract Administrator identified in D6.1.

B4.2 If the Bidder finds errors, discrepancies or omissions in the Tender, 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 Tender 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 Tender 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.

B4.6 Any enquiries concerning submitting through MERX should be addressed to:
MERX Customer Support
Phone: 1-800-964-6379
Email: merx@merx.com

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 Tender to the media or any member of the public without the prior written authorization of the Contract Administrator.

B5.3 Notwithstanding B5.1, all quotations, invoices and other pricing related information associated with the Standardized Goods and acquired by a Bidder or its Subcontractors through enquiries, investigation or any other means is confidential. Such information shall not be used or disclosed in any way, other than meeting the requirements of this Bid Opportunity.

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 Tender, 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 MERX website at www.merx.com.

B6.4 The Bidder is responsible for ensuring that they have received all addenda and is advised to check the MERX 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/Proposal. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B6.6 Notwithstanding B4, enquiries related to an Addendum may be directed to the Contract Administrator indicated in D6.

B7. SUBSTITUTES

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

B7.2 Substitutes to the City's Standardized Goods, as identified in E12, will not be accepted.

B7.3 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

B7.4 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.

B7.5 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.

B7.6 The Contract Administrator, after assessing the request for approval of a substitute, may in their 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.

B7.7 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.

B7.7.1 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 they wish to inform.

B7.8 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

B7.9 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base their 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 B18.

B7.10 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/Proposal;

(b) Form B: Prices;

(c) Form G1: Bid Bond and Agreement to Bond.

B8.2 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.

B8.3 The Bid shall be submitted electronically through MERX at www.merx.com.

B8.3.1 Bids will **only** be accepted electronically through MERX.

B8.4 Bidders are advised that inclusion of terms and conditions inconsistent with the Tender document, including the General Conditions, will be evaluated in accordance with B18.1(a).

B9. BID

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

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

(a) if the Bidder is a sole proprietor carrying on business in their own name, their 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 their 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/Proposal, 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/Proposal shall be signed in accordance with the following requirements:

(a) if the Bidder is a sole proprietor carrying on business in their 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 their duly authorized officer or officers;

(d) if the Bidder is carrying on business under a name other than their 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/Proposal should be entered 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.

B10.1.1 Notwithstanding C12.2.3(c), prices on Form B: Prices shall not include the Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable. MRST is to be included as a separate line item on Form B:Prices.

B10.1.2 Prices stated on Form B: Prices shall not include any costs which may be incurred by the Contractor with respect to any applicable funding agreement obligations as outlined in D43. Any such costs shall be determined in accordance with D43.

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).

B10.5 The Bidder shall enter the Total Bid Price from Form B: Prices into the Total Bid Price field in MERX.

B10.5.1 Bidders are advised that the calculation indicated in B18.5 will prevail over the Total Bid Price entered in MERX.

B10.6 Form B, Item 15 The Bidder shall enter the cost of the Standardized Goods to be supplied from Schneider Electric Canada Ltd. (Schneider) as part of the Standardized Control System and Motor Control Equipment agreement identified in E13. The cost shall be the base cost received from Schneider, without any mark-up or taxes applied.

B10.6.1 Any mark-up to the supply of the Standardized Goods shall be deemed to be included in other applicable Form B lines.

B10.7 Form B, Item 17 The Bidder shall enter the cost of the Standardized Goods to be supplied from Rotork Control Canada Ltd. (Rotork) as part of the Standardized Electric Valve Actuators agreement identified in E14. The cost shall be the base cost received from Rotork, without any mark-up or taxes applied.

B10.7.1 Any mark-up to the supply of the Standardized Goods shall be deemed to be included in other applicable Form B lines.

B10.8 Form B, Item 16: The Bidder shall enter the cost of the Standardized Goods to be supplied from Mine Safety Appliances Company, LLC (MSA) as part of the Standardized Gas Detection Systems agreement identified in E15. The cost shall be the base cost received from MSA, without any mark-up or taxes applied.

B10.8.1 Any mark-up to the supply of the Standardized Goods shall be deemed to be included in other applicable Form B lines.

B10.9 Form B, Item 18: The Bidder shall enter the cost of the Standardized Goods to be supplied from Trans-West Supply Company Inc. (Trans-West) as part of the Standardized Instrumentation agreement identified in E16. The cost shall be the base cost received from Trans-West, without any mark-up or taxes applied.

B10.9.1 Any mark-up to the supply of the Standardized Goods shall be deemed to be included in other applicable Form B lines.

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) Pinchin Ltd.

B11.3 Additional Material:

(a) Hazardous Materials Assessment Report by Pinchin Ltd in Appendix B.

B12. CONFLICT OF INTEREST AND GOOD FAITH

B12.1 Further to C3.2, Bidders, by responding to this Tender, declare that no Conflict of Interest currently exists, or is reasonably expected to exist in the future.

B12.2 Conflict of Interest means any situation or circumstance where a Bidder or employee of the Bidder proposed for the Work has:

(a) other commitments;

(b) relationships;

(c) financial interests; or

(d) involvement in ongoing litigation;

that could or would be seen to:

(i) exercise an improper influence over the objective, unbiased and impartial exercise of the independent judgment of the City with respect to the evaluation of Bids or award of the Contract; or

(ii) compromise, impair or be incompatible with the effective performance of a Bidder's obligations under the Contract;

(e) has contractual or other obligations to the City that could or would be seen to have been compromised or impaired as a result of their participation in the Tender process or the Work; or

(f) has knowledge of confidential information (other than confidential information disclosed by the City in the normal course of the Tender process) of strategic and/or material relevance to the Tender process or to the Work that is not available to other bidders and that could or would be seen to give that Bidder an unfair competitive advantage.

B12.3 In connection with their Bid, each entity identified in B12.2 shall:

(a) avoid any perceived, potential or actual Conflict of Interest in relation to the procurement process and the Work;

(b) upon discovering any perceived, potential or actual Conflict of Interest at any time during the Tender process, promptly disclose a detailed description of the Conflict of Interest to the City in a written statement to the Contract Administrator; and

(c) provide the City with the proposed means to avoid or mitigate, to the greatest extent practicable, any perceived, potential or actual Conflict of Interest and shall submit any additional information to the City that the City considers necessary to properly assess the perceived, potential or actual Conflict of Interest.

B12.4 Without limiting B12.3, the City may, in their sole discretion, waive any and all perceived, potential or actual Conflicts of Interest. The City's waiver may be based upon such terms and conditions as the City, in their sole discretion, requires to satisfy itself that the Conflict of Interest has been appropriately avoided or mitigated, including requiring the Bidder to put into place such policies, procedures, measures and other safeguards as may be required by and be acceptable to the City, in their sole discretion, to avoid or mitigate the impact of such Conflict of Interest.

B12.5 Without limiting B12.3, and in addition to all contractual or other rights or rights at law or in equity or legislation that may be available to the City, the City may, in their sole discretion:

(a) disqualify a Bidder that fails to disclose a perceived, potential or actual Conflict of Interest of the Bidder or any of their employees proposed for the Work;

(b) require the removal or replacement of any employees proposed for the Work that has a perceived, actual or potential Conflict of Interest that the City, in their sole discretion, determines cannot be avoided or mitigated;

(c) disqualify a Bidder or employees proposed for the Work that fails to comply with any requirements prescribed by the City pursuant to B12.4 to avoid or mitigate a Conflict of Interest; and

(d) disqualify a Bidder if the Bidder, or one of their employees proposed for the Work, has a perceived, potential or actual Conflict of Interest that, in the City's sole discretion, cannot be avoided or mitigated, or otherwise resolved.

B12.6 The final determination of whether a perceived, potential or actual Conflict of Interest exists shall be made by the City, in their sole discretion.

B13. QUALIFICATION

B13.1 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.

(d) Submit a completed Social Procurement Plan. See Form M.

B13.2 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, Purchasing Division website https://www.winnipeg.ca/matmgt/Templates/files/debar.pdf

B13.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

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

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

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

(d) have completed the Accessible Customer Service online training required by the Accessibility for Manitobans Act (AMA) (see B13.5 and D8).

B13.4 Further to B13.3(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™) in the form of:

(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, Purchasing Division website at http://www.winnipeg.ca/matmgt/.

B13.5 Further to B13.3(d), the Bidder acknowledges they and all Subcontractors have obtained training required by the Accessibility for Manitobans Act (AMA) available at Accessibility Training for anyone that may have any interaction with the public on behalf of the City of Winnipeg.

B13.6 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B13.7 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B14. BID SECURITY

B14.1 The Bidder shall include in their Bid Submission bid security in the form of a digital 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 Form G1: Bid Bond and Agreement to Bond, available on The City of Winnipeg, Corporate Finance, Purchasing Division website at https://www.winnipeg.ca/MatMgt/templates/files/Bidsecurity.pdf.

B14.2 Bid security shall be submitted in a digital format meeting the following criteria:

(a) The version submitted by the Bidder must have valid digital signatures and seals;

(b) The version submitted by the Bidder must be verifiable by the City with respect to the totality and wholeness of the bond form, including: the content; all digital signatures and digital seals; with the surety company, or an approved verification service provider of the surety company.

(c) The version submitted must be viewable, printable and storable in standard electronic file formats compatible with the City, and in a single file. Allowable formats include pdf.

(d) The verification may be conducted by the City immediately or at any time during the life of the bond and at the discretion of the City with no requirement for passwords or fees.

(e) The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding B14.2(b).

B14.3 Bonds failing the verification process will not be considered to be valid and the bid shall be determined to be non-responsive in accordance with B18.1(a).

B14.4 Bonds passing the verification process will be treated as original and authentic.

B14.4.1 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.

B14.5 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 formed with the successful Bidder and the contract securities are furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

B14.6 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 Tender.

B15. OPENING OF BIDS AND RELEASE OF INFORMATION

B15.1 Bids will not be opened publicly.

B15.2 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 MERX website at www.merx.com.

B15.3 After award of Contract, the name(s) of the successful Bidder(s) and their Contract amount(s) will be available on the MERX website at www.merx.com.

B15.4 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).

B15.4.1 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.

B16. IRREVOCABLE BID

B16.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid/Proposal.

B16.2 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 formed and the contract securities have been 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/Proposal.

B17. WITHDRAWAL OF BIDS

B17.1 A Bidder may withdraw their Bid without penalty at any time prior to the Submission Deadline.

B18. EVALUATION OF BIDS

B18.1 Award of the Contract shall be based on the following bid evaluation criteria:

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

(b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B13 (pass/fail);

(c) the Bidder representative attended at least one (1) site investigation, pursuant to B3 (pass/fail).

(d) Total Bid Price;

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

B18.2 Further to B18.1(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.

B18.3 Further to B18.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in their Bid or in other information required to be submitted, that they are qualified.

B18.4 Further to B18.1(c), the Award Authority shall reject any Bid submitted by a Bidder who has not attended a mandatory site investigation.

B18.5 Further to B18.1(d), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.

B18.5.1 Further to B18.5, in the event that a unit price is not provided on Form B: Prices, the City may determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

B18.5.2 Bidders are advised that the calculation indicated in B18.5 will prevail over the Total Bid Price entered in MERX.

B19. AWARD OF CONTRACT

B19.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B19.2 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 qualified, and the Bids are determined to be responsive.

B19.2.1 Without limiting the generality of B19.2, 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 their 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.

B19.3 If funding for the Work is provided to the City of Winnipeg by the Government of Manitoba a nd/or the Government of Canada, Bidders are advised that the terms of D43 shall immediately take effect upon confirmation of such funding, regardless of when funding is confirmed.

B19.4 Where an award of Contract is made by the City, the award shall be made to the qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B18.

B19.4.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of their Bid upon written request to the Contract Administrator.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

C0.1 The *General Conditions for Construction* (Revision 2020 01 31) 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, Purchasing Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm

C0.2 A reference in the Tender 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. FORM OF CONTRACT DOCUMENTS

D2.1 Notwithstanding C4.1(c) and C4.4, the Contract Documents will be provided to the Contractor electronically and there will be no requirement for execution and return to the City by the Contractor. Accordingly, the provisions under C4.4(a) and C4.4(b) are no longer applicable.

D3. SCOPE OF WORK

D3.1 The Work to be done under the Contract shall consist of building upgrades and site improvements of Windsor Park Lift Station

D3.2 The major components of the Work are as follows:

(a) Structural and architectural upgrades;

(b) Mechanical process and building HVAC services;

(c) Supply and Installation of wastewater pumping equipment;

(d) Supply and Installation of a standby natural gas generator;

(e) Electrical upgrades;

(f) Automation and instrumentation upgrades;

(g) Civil and municipal services (outside of the station) upgrades;

(h) Temporary by-pass pumping and source bypass manhole installation;

(i) Excavation, Shoring and Backfilling;

(j) Site restoration and clean up; and

(k) As per drawings and specifications.

D3.3 The following shall apply to the Services:

(a) City of Winnipeg Green Building Policy: New City-Owned Buildings and major additions;
http://clkapps.winnipeg.ca/DMIS/DocExt/ViewDoc.asp?DocumentTypeId=2&DocId=5989

(b) Universal Design Policy
http://clkapps.winnipeg.ca/DMIS/DocExt/ViewDoc.asp?DocumentTypeId=2&DocId=3604

D4. SITE INVESTIGATION DUE DILIGENCE AND RISK

D4.1 Notwithstanding C3.1, the Contractor acknowledges that any site information included in this Tender has been provided to it and may be relied upon by the Contractor to the extent that the Contractor uses Good Industry Practice in interpreting such report(s) and site information and carries out the Work in accordance with Good Industry Practice based upon such report(s) and the information contained in them and such other site information. In the event that a site condition related to:

(a) the location of any utility which can be determined from the records or other information available at the offices of any public authority or person, including a municipal corporation and any board or commission thereof, having jurisdiction or control over the utility;

(b) the Site conditions, including but not limited to subsurface hazardous materials or other concealed physical conditions;

(c) the location, nature, quality or quantity of the materials to be removed or to be employed in the performance of the Work;

(d) the nature, quality or quantity of the Plant needed to perform the Work;

(e) all matters concerning access to the Site, power supplies, location of existing services, utilities or materials necessary for the completion of the Work; and

(f) all other matters which could in any way affect the performance of the Work;

that could not have been "properly inferable", "readily apparent" and readily discoverable" using Good Industry Practice by the Contractor, results in additional Work which is a direct result of this newly discovered site condition, such additional Work will be considered by the City under Changes in Work.

D4.2 The Hazardous Appendix Building Materials Assessment Report in Appendix B, lists several hazardous materials that were found and/or presumed to contain. The bidder shall refer Appendix B for areas of hazardous materials findings and follow provincial regulations for removing and disposing of these materials. The hazardous materials include:

(a) Asbestos presumed to existing within the Lift Station lower levels;

(b) Lead, Silica and Mercury within the Generator Building and Lift Station;

D5. DEFINITIONS

D5.1 When used in this Tender:

(a) **"A/C"** means Air Conditioning.

(b) **"ACH"** means Air Changes per Hour.

(c) **"ATS"** means Automatic Transfer Switch

(d) **"Authority Having Jurisdiction"** or **"AHJ"** means an organization, office, or individual responsible for enforcing the requirements of a code, standard, or by-law, or for approving equipment, materials, and installation or a procedure, which is typically in reference to the local inspection authority;

(e) **"As-Built"** means an accurate and complete record of the construction Work undertaken by the Contractor, resulting in adjustments and markups made to the construction set of documents;

(f) **"Certificate of Final Inspection"** means the certificate of final inspections, obtained from the City of Winnipeg inspections department;

(g) **"Code"** or "code" means the latest local code applicable at the project location

(h) **"Conflict of Interest"** is as defined in B12

(i) **"C.P.M.**" means critical path method;

(j) **"CSA"** means Canadian Standards Association;

(k) **"CSTE"** means Customer Service Termination End;

(l) **"FAT"** means Factory Acceptance Testing;

(m) **"FRP"** means Fibre Reinforced Polymer;

(n) **"H_2S"** means Hydrogen Sulfide;

(o) **"HMI"** means Human Machine Interface;

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

(q) **"I/O"** means Input / Output;

(r) **"Licenced Electrical Contractor"** means an individual meeting the requirements of the Manitoba Electricians' Licence Act (C.C.S.M. c E50) and the Manitoba Electricians' Licensing Regulation (186-87 R);

(s) **"Licenced Mechanical Contractor"** means a M-Prime contractor licensed by the City. M-Prime contractors may obtain permits for any work on HVAC systems, hazardous process systems, or fire protection systems where the work is to be performed by a M1 licenced contractor and/or a M2 licenced contractor;

(t) **"mASL"** means metres Above Sea Level;

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

(v) **"MH"** means Manhole;

(w) **"NEWPCC"** means North End Waste Pollution Control Centre;

(x) **"O&M"** means Operations & Maintenance;

(y) **"OSS"** means Operational Shutdown Summary;

(z) **"P&ID"** means Piping and Instrumentation Diagram;

(aa) **"PDF"** means Portable Document Format;

(bb) **"PDWF"** means Peak Dry Weather Flow;

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

(dd) **"Provide"** means to supply, install, and leave in working order all materials and necessary equipment, wiring, supports, access panels, etc., as necessary for item or system indicated;

(ee) **"PWWF"** means Peak Wet Weather Flow;

(ff) **"Record Drawing"** means an accurate and complete record of the construction Work undertaken by the Contractor, and prepared by the reviewing professional after verifying in detail the actual conditions of the completed project as a result of adjustments and markups made to the construction set of documents. The drawings shall bear the seal of the responsible professional;

(gg) **"RTU"** means Remote Terminal Unit;

(hh) **"SCADA"** means Supervisory Control And Data Acquisition;

(ii) **"SCR"** means Silicon Controlled Rectifier;

(jj) **"SEWPCC"** means South End Waste Pollution Control Centre;

(kk) **"Standard"** or "standard" means the latest standard that is in effect at the project location;

(ll) **"Standardized Goods"** or **"Standardized Equipment"** means the respective goods identified in D34 that have been standardized by the City.

(mm) **"Standardized Vendors"** means a Contractor or Supplier of Standardized Goods, as identified in D34.

(nn) "**Supply Chain Disruption**" means an inability by the Contractor to obtain goods or services from third parties necessary to perform the Work of the Contract within the schedule specified therein, despite the Contractor making all reasonable commercial efforts to procure same. Contractors are advised that increased costs do not, in and of themselves, amount to a Supply Chain Disruption;

(oo) **"TDH"** means Total Dynamic Head;

(pp) **"Total Bid Price"** means the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.

(qq) **"TVSS"** means Transient Voltage Surge Suppressor;

(rr) **"VFD"** means Variable Frequency Drive.

D6. CONTRACT ADMINISTRATOR

D6.1 The Contract Administrator is MPE a Division of Englobe , represented by:

Curtis Rawsthorne, EIT
Project Engineer

Telephone No. 431 554-2606
Email Address crawsthorne@mpe.ca

D6.2 At the pre-construction meeting, the Contract Administrator will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D7. CONTRACTOR'S SUPERVISOR

D7.1 At the pre-construction meeting, the Contractor shall identify their designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D8. ACCESSIBLE CUSTOMER SERVICE REQUIREMENTS

D8.1 The Accessibility for Manitobans Act (AMA) imposes obligations on The City of Winnipeg to provide accessible customer service to all persons in accordance with the Customer Service Standard Regulation ("CSSR") to ensure inclusive access and participation for all people who live, work or visit Winnipeg regardless of their abilities.

D8.1.1 The Contractor agrees to comply with the accessible customer service obligations under the CSSR and further agrees that when providing the Goods or Services or otherwise acting on the City of Winnipeg's behalf, shall comply with all obligations under the AMA applicable to public sector bodies.

D8.1.2 The accessible customer service obligations include, but are not limited to:

(a) providing barrier-free access to goods and services;

(b) providing reasonable accommodations;

(c) reasonably accommodating assistive devices, support persons, and support animals;

(d) providing accessibility features e.g. ramps, wide aisles, accessible washrooms, power doors and elevators;

(e) inform the public when accessibility features are not available;

(f) providing a mechanism or process for receiving and responding to public feedback on the accessibility of all goods and services; and

(g) providing adequate training of staff and documentation of same.

D9. UNFAIR LABOUR PRACTICES

D9.1 Further to C3.2, the Contractor declares that in bidding for the Work and in entering into this Contract, the Contractor and any proposed Subcontractor(s) conduct their respective business in accordance with established international codes embodied in United Nations Universal Declaration of Human Rights (UDHR) https://www.un.org/en/about-us/universal-declaration-of-human-rights International Labour Organization (ILO) https://www.ilo.org/global/lang--en/index.htm conventions as ratified by Canada.

D9.2 The City of Winnipeg is committed and requires its Contractors and their Subcontractors, to be committed to upholding and promoting international human and labour rights, including fundamental principles and rights at work covered by ILO eight (8) fundamental conventions and the United Nations Universal Declaration of Human Rights which includes child and forced labour.

D9.3 Upon request from the Contract Administrator, the Contractor shall provide disclosure of the sources (by company and country) of the raw materials used in the Work and a description of the manufacturing environment or processes (labour unions, minimum wages, safety, etc.).

D9.4 Failure to provide the evidence required under D9.3, may be determined to be an event of default in accordance with C18.

D9.5 In the event that the City, in its sole discretion, determines the Contractor to have violated the requirements of this section, it will be considered a fundamental breach of the Contract and the Contractor shall pay to the City a sum specified by the Contract Administrator in writing ("Unfair Labour Practice Penalty"). Such a violation shall also be considered an Event of Default, and shall entitle the City to pursue all other remedies it is entitled to in connection with same pursuant to the Contract.

D9.5.1 The Unfair Labour Practice Penalty shall be such a sum as determined appropriate by the City, having due regard to the gravity of the Contractor's violation of the above requirements, any cost of obtaining replacement goods/ services or rectification of the breach, and the impact upon the City's reputation in the eyes of the public as a result of same.

D9.5.2 The Contractor shall pay the Unfair Labour Practice Penalty to the City within thirty (30) Calendar Days of receiving a demand for same in accordance with D9.5. The City may also hold back the amount of the Unfair Labour Practice Penalty from payment for any amount it owes the Contractor.

D9.5.3 The obligations and rights conveyed by this clause survive the expiry or termination of this Contract, and may be exercised by the City following the performance of the Work, should the City determine, that a violation by the Contractor of the above clauses has occurred following same. In no instance shall the Unfair Labour Practice Penalty exceed the total of twice the Contract value.

D10. SOCIAL PROCUREMENT

D10.1 The Contractor shall commit to providing employment opportunities for Equity Groups. Equity Groups are groups that have historically been denied equal access to employment, education, and other opportunities and includes but is not limited to: Indigenous Peoples, Racialized peoples, newcomers (less than 5 years in Canada); Persons with Disabilities; Women; people facing poverty; Veterans, and 2SLGBTQQIA+ (Two-spirit, Lesbian, Gay, Bisexual, Trans, Queer, Questioning, Intersex, Asexual plus) Peoples.

D10.2 This commitment is inclusive of subcontractor employment hours and the Contractor will be required to report on their subcontractors employment hours if the subcontractor contract is greater than $100,000.

D10.3 The Contractor shall commit to providing employment hours with Equity Groups on the delivery of this Contract.

$$X\% = \frac{\text{\# of employment hours by Equity Groups on this Contract}}{\text{Total \# of employment hours on this Contract}}$$

D10.4 The Contractor shall keep detailed records of the total number of full-time and part-time employees that identify as Equity Groups. The Contractor shall report the total number of employee hours that are delivered by Equity Groups during this Contract.

(a) The Social Value Reporting Template has been included as a resource see Form O: Social Value Clause Reporting Template

D10.5 Employees includes all company employees who are working on this Contract. (Administration, Finance, Project Manager, Safety Officer, Trades, etc.)

D10.6 The Contractor shall provide the Contract Administrator a progress report midway through the Contract period and upon completion of the Contract period.

D10.7 The Employee Voluntary Self Identification Survey has been included as a resource see Form N: Employee Voluntary Self Identification Survey.

D11. FURNISHING OF DOCUMENTS

D11.1 Upon award of the Contract, the Contractor will be provided with 'issued for construction' Contract Documents electronically, including Drawings in PDF formal only.

SUBMISSIONS

D12. AUTHORITY TO CARRY ON BUSINESS

D12.1 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.

D13. SAFE WORK PLAN

D13.1 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 Documents, if applicable.

D13.2 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, Purchasing Division website at http://www.winnipeg.ca/matmgt/Safety/default.stm

D13.3 Notwithstanding B13.4 at any time during the term of the Contract, the City may, at their 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.

D14. INSURANCE

D14.1 The Contractor shall provide and maintain the following insurance coverage:

(a) commercial general liability insurance, in the amount of at least five million dollars ($5,000,000.00) 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, including testing and commissioning, 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.

D14.2 Deductibles shall be borne by the Contractor.

D14.3 All policies shall be taken out with insurers licensed to carry on business in the Province of Manitoba

D14.4 The Contractor shall ensure that any subcontractors hired in connection with the work provide evidence of comparable insurance as outlined in section D14.1(a) and D14.1(b). In addition, all subcontractors must provide evidence of acceptable workers compensation.

D14.5 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 Documents, as applicable.

D14.6 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.

D15. CONTRACT SECURITY

D15.1 The Contractor shall provide and maintain the performance bond and the labour and material payment bond 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; and

(b) a labour and material payment bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H2: Labour and Material Payment Bond), in an amount equal to fifty percent (50%) of the Contract Price.

D15.1.1 Where the contract security is a performance bond, it may be submitted in hard copy or digital format. If submitted in digital format the contract security must meet the following criteria:

(a) the version submitted by the Contractor must have valid digital signatures and seals;

(b) the version submitted by the Contractor must be verifiable by the City with respect to the totality and wholeness of the bond form, including: the content; all digital signatures and digital seals; with the surety company, or an approved verification service provider of the surety company.

(c) the version submitted must be viewable, printable and storable in standard electronic file formats compatible with the City, and in a single file. Allowable formats include pdf.

(d) the verification may be conducted by the City immediately or at any time during the life of the bond and at the discretion of the City with no requirement for passwords or fees.

(e) the results of the verification must provide a clear, immediate and printable indication of pass or fail regarding D15.1(b).

D15.1.2 Digital bonds failing the verification process will not be considered to be valid and may be determined to be an event of default in accordance with C18.1. If a digital bond fails the verification process, the Contractor may provide a replacement bond (in hard copy or digital format) within seven (7) Calendar Days of the City's request or within such greater period of time as the City in their discretion, exercised reasonably, allows.

D15.1.3 Digital bonds passing the verification process will be treated as original and authentic.

D15.2 The Contractor shall provide the Contract Administrator identified in D6 with the required performance and labour and material payment bonds within seven (7) Calendar Days of notification of the award of the Contract by way of an award letter 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 Documents, if applicable.

D15.3 The Contractor shall, as soon as practicable after entering into a contract with a Subcontractor:

(a) give the Subcontractor written notice of the existence of the labour and material payment bond in D15.1(b); and

(b) post a notice of the bond and/or a copy of that bond in a conspicuous location at the Site of the Work.

D16. ESTIMATES

D16.1 The Contractor shall provide the Contract Administrator with copies of the estimates provided by Standardized Equipment Suppliers identified in E13, E14, E15 and E16 within five (5) Business Days of a request by the Contract Administrator.

D17. SUBCONTRACTOR LIST

D17.1 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 Documents, if applicable.

D18. EQUIPMENT LIST

D18.1 The Contractor shall provide the Contract Administrator with a complete list of the equipment which the Contractor proposes to utilize (Form K: Equipment List) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, if applicable.

D19. DETAILED WORK SCHEDULE

D19.1 The Contractor shall provide the Contract Administrator with a detailed work schedule (Form L: D etailed 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 Documents, if applicable.

D19.2 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;

(c) a daily manpower schedule for the Work;

(d) all acceptable to the Contract Administrator.

D19.3 Further to D19.2(a), the C.P.M. schedule shall clearly identify the start and completion dates of all of the following activities/tasks making up the Work as well as showing those activities/tasks on the critical path.

(a) Construction commencement;

(b) Mobilizations and demobilization;

(c) Mechanical work;

(d) Electrical and Instrumentation work;

(e) Structural and Architectural work;

(f) Civil site work;

(g) Lift Pump in-person FAT Testing;

(h) Generator in-person FAT Testing;

(i) Installation of 1800 manhole and new bypass valve vault;

(j) Temporary by-pass pumping;

(k) Wet well cleaning and inspection;

(l) Lift station Pump installations;

(m) Generator installation;

(n) Commissioning;

(o) Substantial Performance;

(p) Total Performance;

(q) Training;

(r) Redline as-built markups; and

(s) Operation & Maintenance Manuals.

D19.4 Further to D19.2(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.

D19.5 Further to D19.2(c), the daily manpower schedule shall list the daily number of individuals on the Site for each trade.

D20. REQUIREMENT FOR SITE ACCESSIBILITY PLAN

D20.1 The Contractor shall provide the Contract Administrator with an Accessibility 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 Documents, if applicable.

D20.2 The Accessibility Plan shall demonstrate how the Contractor will accommodate the safe passage of pedestrians and cyclists in accordance with the Manual of Temporary Traffic Control, the Contract Drawings, Staging Plans, and Streets By-Law No. 1481/77 at all times for the duration of the Construction. Unless noted in the Contract, the Accessibility Plan must include a written plan for the following:

(a) How the Contractor will maintain at least one crossing in each direction for each intersection (one north/south crosswalk and one east/west crosswalk).

(b) How the Contractor will maintain access to bus stops within the site.

(c) How the Contractor will maintain access to pedestrian corridors and half signals.

(d) How the Contractor will maintain cycling facilities.

(e) Any required detour signage at adjacent crossings to facilitate sidewalk or active transportation pathway closures.

D20.3 The Accessibility Plan may also include figures, sketches, or drawings to demonstrate the proposed plan.

D20.4 The Accessibility Plan shall include written details on how the Contractor intends to review, maintain, and document all items related to the Accessibility Plan on-site during Construction, including, but not limited to:

(a) Signage

(b) Temporary Ramping

(c) Transit Stops

(d) Detour Signage

D20.5 At minimum, the Contractor shall review the site conditions on a daily basis to ensure that all features related to the Accessibility Plan are in place. The site review is intended to correct deficiencies as a result of unforeseen events such as wind, traffic, or the general public. Deficiencies that are direct result of the Contractors actions must be corrected immediately.

D20.6 Any changes to the Accessibility Plan must be approved by the Contract Administrator.

D20.7 Upon request from the Contract Administrator, the Contractor shall provide records demonstrating that the site has been maintained.

D20.8 Deficiencies as a direct result of actions by the Contractor that are not immediately corrected and/or failure to produce records that demonstrate that the site was maintained in compliance with the Accessibility Plan may result in a pay adjustment via the monthly Progress Payment. The rate of pay adjustment will be as per the following schedule:

(a) First Offence – A warning will be issued and documented in the weekly or bi-weekly site meeting.

(b) Third and subsequent Offences – A pay reduction will be issued in the amount of $250.00 per instance and per day.

(c) Third and subsequent Offences – A pay reduction will be issued in the amount of $250.00 per instance and per day.

D21. SOCIAL PROCUREMENT PLAN TEMPLATE

D21.1 The Contractor shall provide the Contract Administrator with a Social Procurement Plan Template (Form M: Social Procurement Plan Template) within five (5) Business Days of a request by the Contract Administrator as per B13.1(d).

SCHEDULE OF WORK

D22. COMMENCEMENT

D22.1 The Contractor shall not commence any Work until they are in receipt of an award letter from the Award Authority authorizing the commencement of the Work.

D22.2 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 D12;
  (ii) evidence of the workers compensation coverage specified in C6.15;
  (iii) the Safe Work Plan specified in D13;
  (iv) evidence of the insurance specified in D14;
  (v) the contract security specified in D15;
  (vi) the Subcontractor list specified in D17;
  (vii) the equipment list specified in D18;
  (viii) the detailed work schedule specified in D19;
  (ix) the Requirement for Site Accessibility Plan in D20;
  (x) the Social Procurement Plan in D21; and
  (xi) the direct deposit application form specified in D38

(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.

D22.3 The Contractor shall commence the Work on the Site within seven (7) Working Days of receipt of the award letter.

D22.4 The City intends to award this Contract by February 11, 2025.

D22.4.1 If the actual date of award is later than the intended date, the dates specified for Commencement, Critical Stages, Substantial Performance, and Total Performance will be adjusted by the difference between the aforementioned intended and actual dates.

D22.5 Once the temporary by-pass pumping system is in place the first items initiated as part of the Work shall be:

(a) Wet well cleaning

(b) Replacement of lift station pumps.

D22.6 Work on this project requiring the installation and use of temporary by-pass pumping is limited to the period between November 1 to February 29 of any given year, or as authorized by Contract Administrator. Under no condition shall temporary bypass pumping be utilized during March 1 – October 31.

D23. WORK BY OTHERS

D23.1 Further to C6.25, the Contractor's attention is directed to the fact that other Contractors, the p ersonnel of Utilities and the staff of the City may be working within the project limit, approach roadway, adjacent roadways or right-of-way. The activities of these agencies may coincide with the Contractors execution of Work and it will be the Contractor's responsibility to cooperate to the fullest extent with other personnel working in the area, and such cooperation is an obligation of the Contractor under the terms of Contract.

D23.2 Further to D23.1 the Contractor shall cooperate and coordinate all activities with all parties performing required Work by Others identified in D23.1 and accommodate the necessary area on Site required for the Work by Others to complete the Work

D24. WORKING DAYS

D24.1 Further to C1.1(tt), 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.

D24.2 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.

D24.3 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.

D24.4 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.

D25. CRITICAL STAGES

D25.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

(a) New lift station pumps in operation on new controls along with new generator in operation by February 27, 2026.

D26. SUBSTANTIAL PERFORMANCE

D26.1 The Contractor shall achieve Substantial Performance by April 7, 2026.

D26.2 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.

D26.3 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.

D26.4 Substantial Performance requires commissioning forms (Appendix C) to be completed with the Contract Administrator approval provided. The following items, at minimum, are required to qualify for Substantial Performance:

(a) New lift pumps in service (including automation seal water operation) along with new controls and starters functioning;

(b) HVAC system (including duct work, fans, dampers) are installed and operational;

(c) HVAC controllers are functional;

(d) PLC Control Panel installed with PLC & HMI screen programmed;

(e) SCADA can read and control PLC signals;

(f) Indoor (including emergency) and outdoor lighting installed and working; and

(g) Functional generator that can automatically start and stop.

D27. TOTAL PERFORMANCE

D27.1 The Contractor shall achieve Total Performance by June 4, 2026 .

D27.2 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.

D27.3 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.

D27.4 Total Performance requires all commissioning forms to be completed with the Contract Administrator approval provided. The following items, at minimum, are required to qualify for Total Performance:

(a) All construction work has been completed including any deficiencies addressed;

(b) Contractor has removed trailer(s) along with equipment from site;

(c) All temporary fencing has been removed; and

(d) Site has been restored to original condition and made safe for the public.

D28. LIQUIDATED DAMAGES

D28.1 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 Stage – two thousand dollars ($2,000);

(b) Substantial Performance – one thousand ($1,000);

(c) Total Performance – five hundred ($500).

D28.2 The amounts specified for liquidated damages in D28.1 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.

D28.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D29. SUPPLY CHAIN DISRUPTION SCHEDULE DELAYS

D29.1 The City acknowledges that the schedule for this Contract may be impacted by Supply Chain Disruption. Commencement and progress of the Work shall be performed by the Contractor with due consideration to the delivery requirements and schedule identified in the Contract, in close consultation with the Contract Administrator.

D29.2 If the Contractor is delayed in the performance of the Work by reason of Supply Chain Disruption, the Work schedule may be adjusted by a period of time equal to the time lost due to such delay and costs related to such delay will be determined as identified herein.

D29.3 A minimum of seven (7) Calendar Days prior to the commencement of Work, the Contractor shall declare whether a Supply Chain Disruption will affect the start date. The Contractor shall provide sufficient evidence that the delay is directly related to a Supply Chain Disruption, including but not limited to evidence related to availability ordering of Material or Goods, production and/or manufacturing schedules or availability of staff as appropriate.

D29.4 For any delay related to suppl chain disruption and identified after Work has commenced, the Contractor shall within seven (7) Calendar Days of becoming aware of the anticipated delay declare the additional delay and shall provide sufficient evidence as indicated in D29.3. Failure to provide this notice will result in no additional time delays being considered by the City.

D29.5 The Work schedule, including the durations identified in D25 to D27 where applicable, will be adjusted to reflect delays accepted by the Contract Administrator. No additional payment will be made for adjustment of schedules except where seasonal work, not previously identified in the Contract, is carried over to the following construction season.

D29.6 Where Work not previously identified is being carried over solely as a result of delays related to Supply Chain Disruption, as confirmed by the Contract Administrator, the cost of temporary works to maintain the Work in a safe manner until Work recommences, will be considered by the Contract Administrator. Where the Work is carried over only partially due to Supply Chain Disruption, a partial consideration of the cost of temporary works will be considered by the Contract Administrator.

D29.7 Any time or cost implications as a result of Supply Chain Disruption and in accordance with the above, as confirmed by the Contract Administrator, shall be documented in accordance with C7.

D30. SCHEDULED MAINTENANCE

D30.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

(a) Landscaping maintenance as specified in CW3510;

(b) Monitor and maintain temporarily restored surfaces as required until permanent restoration is complete as specified in E44.

D30.2 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

D31. JOB MEETINGS

D31.1 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.

D31.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever they deem it necessary.

D32. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D32.1 Further to C6.26, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

D33. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

D33.1 Further to B13.4, 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 their sole discretion and acting reasonably, require updated proof of compliance, as set out in B13.4.

STANDARDIZATION

D34. STANDARDIZED GOODS

D34.1 The following goods have been standardized by the City and will be supplied by the Contractor:

(a) Standardized Control System and Motor Control Equipment as per E13.

(b) Standardized Electric Valve Actuators as per E14.

(c) Standardized Gas Detection Systems as per E15.

(d) Standardized Instrumentation as per E16.

D35. CONTRACTUAL ARRANGEMENTS

D35.1 Each Standardization Vendor shall be a Subcontractor of the Contractor.

D35.2 The City's contract with each of the Standardization Vendors defines the prices and general terms of supply to the Contractor. Each Standardization Vendor is obligated to enter into a contract with the Contractor, based upon such prices and general terms of supply.

D35.2.1 The City is not a party to any contract between a Standardization Vendor and the Contractor, or any Subcontractor.

D35.3 In the event that a potential dispute arises between the Contractor and a Standardization Vendor, the Contract Administrator shall be notified.

D36. PAYMENT OF STANDARDIZATION VENDORS

D36.1 The Contractor is obligated to pay the Standardization Vendors in accordance with general terms of supply applicable to such Standardization Vendor.

D36.2 The Contractor's payment terms to the Standardization Vendor, in respect of Standardized Control System and Motor Control Equipment identified in E13, include the following:

D36.2.1 Except as indicated in D36.2.2, payment shall be in Canadian funds net thirty (30) Calendar Days after shipment.

D36.2.2 Payment for motor control centres shall be in Canadian funds net thirty (30) Calendar Days and initiated based upon the following schedule:

(a) Upon approval of the shop drawings or forty (40) Calendar days after the last comprehensive submittal, in the event that a response is not made to the submittal: 25% of the total value.

(b) Upon delivery of the complete MCC along with all associated as-manufactured documentation: 60% of the total value; or

(c) In the event that the delivery is intentionally delayed, upon request by the Contractor, the following payment schedule would replace the 60% payment:

(i) Upon completion of the FAT and delivery of all as-manufactured documentation to the Contractor – 30% of the total value.

(ii) Forty (40) Calendar days after delivery of the as-manufactured documentation to the Contractor, or upon delivery, whichever comes sooner – 30% of the total value.

(d) Upon successful commissioning and delivery of documentation or six (6) months after delivery, whichever comes first: 15% of the total value.

D36.3 The Contractor's payment terms to the Standardization Vendor, in respect of Standardized Electric Valve Actuators identified in E14, include the following:

D36.3.1 Payment shall be in Canadian funds net thirty (30) Calendar Days after receipt and approval of the Standardization Vendor's invoice.

D36.4 The Contractor's payment terms to the Standardization Vendor, in respect of Standardized Gas Detection Systems identified in E15, include the following:

D36.4.1 Payment shall be in Canadian funds net thirty (30) Calendar Days after receipt and approval of the Standardization Vendor's invoice.

D36.5 The Contractor's payment terms to the Standardization Vendor, in respect of Standardized Instrumentation identified in E16, include the following:

D36.5.1 Payment shall be in Canadian funds net thirty (30) Calendar Days after receipt and approval of the Standardization Vendor's invoice.

MEASUREMENT AND PAYMENT

D37. INVOICES

D37.1 Further to C12, the Contractor shall progress invoices for each portion of Work performed. The invoice shall be submitted to the Contract Administrator listed in D6.1.

D37.2 Invoices must clearly indicate, as a minimum:

(a) the City's purchase order number;

(b) the City's project number and title: 'S-1306 – Windsor Park Lift Station Upgrades';

(c) the City project representative's name;

(d) progress payment number;

(e) date of delivery;

(f) delivery address;

(g) type and quantity of work performed;

(h) the amount payable with GST and MRST shown as separate amounts; and

(i) the Contractor's GST registration number.

D37.3 The City will bear no responsibility for delays in approval of invoices which are improperly submitted.

D38. PAYMENT

D38.1 Further to C12, the City shall make payments to the Contractor by direct deposit to the Contractor's banking institution, and by no other means. Payments will not be made until the Contractor has made satisfactory direct deposit arrangements with the City. Direct deposit application forms are at https://winnipeg.ca/finance/files/Direct_Deposit_Form.pdf.

D38.2 Further to **E5**, no payment will be made for Cash Allowances other than as set out in **E5.4**.

D39. PAYMENT SCHEDULE

D39.1 Further to C12, payment shall be in accordance with the following payment schedule:

(a) Monthly invoices for Work performed during the previous calendar month

D39.2 The City's payment to the Contractor, associated with Standardized Goods, will be in accordance with C12.

WARRANTY

D40. WARRANTY

D40.1 Notwithstanding C13.2, the warranty period shall begin on the date of Total Performance and shall expire one (1) year thereafter, except where longer warranty periods are specified in the respective Specification sections, unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.

D40.1.1 For the purpose of contract security, the warranty period shall be one (1) year.

D40.2 Notwithstanding C13.2, the Contract Administrator may permit the warranty period for a portion or portions of the Work to begin prior to the date of Total Performance if a portion of the Work cannot be completed because of unseasonable weather or other conditions reasonably beyond the control of the Contractor but that portion does not prevent the balance of the Work from being put to its intended use.

D40.2.1 In such case, the date specified by the Contract Administrator for the warranty period to begin shall be substituted for the date specified in C13.2 for the warranty period to begin.

D40.2.2 The Contractor will be required to attend a warranty inspection site visit approximately ten (10) months after the date of Total Performance. Any deficiencies found during the site visit along with prior to completion of the warranty period, the Contractor will be provided with a deficiency list and will be required to correct all deficiencies.

DISPUTE RESOLUTION

D41. DISPUTE RESOLUTION

D41.1 If the Contractor disagrees with any opinion, determination, or decision of the Contract Administrator, the Contractor shall act in accordance with the Contract Administrator's opinion, determination, or decision unless and until same is modified by the process followed by the parties pursuant to D41.

D41.2 The entire text of C21.4 is deleted, and amended to read: “Intentionally Deleted”

D41.3 The entire text of C21.5 is deleted, and amended to read:

(a) If Legal Services has determined that the Disputed Matter may proceed in the Appeal Process, the Contractor must, within ten (10) Business Days of the date of the Legal Services Response Letter, submit their written Appeal Form, in the manner and format set out on the City’s Purchasing Website, to the Chief Administrative Officer, and to the Contract Administrator. The Contractor may not raise any other disputes other than the Disputed Matter in their Appeal Form.

D41.4 Further to C21, prior to the Contract Administrator’s issuance of a Final Determination, the following informal dispute resolution process shall be followed where the Contractor disagrees with any opinion, determination, or decision of the Contract Administrator (“Dispute”):

(a) In the event of a Dispute, attempts shall be made by the Contract Administrator and the Contractor’s equivalent representative to resolve Disputes within the normal course of project dealings between the Contract Administrator and the Contractor’s equivalent representative.

(b) Disputes which in the reasonable opinion of the Contract Administrator or the Contractor’s equivalent representative cannot be resolved within the normal course of project dealings as described above shall be referred to a without prejudice escalating negotiation process consisting of, at a minimum, the position levels as shown below and the equivalent Contractor representative levels:

(i) The Contract Administrator;

(ii) Supervisory level between the Contract Administrator and applicable Department Head;

(iii) Department Head.

D41.5 Names and positions of Contractor representatives equivalent to the above City position levels shall be determined by the Contractor and communicated to the City at the pre-commencement or kick off meeting.

D41.6 As these negotiations are not an adjudicative hearing, neither party may have legal counsel present during the negotiations.

D41.7 Both the City and the Contractor agree to make all reasonable efforts to conduct the above escalating negotiation process within twenty (20) Business Days, unless both parties agree, in writing, to extend that period of time.

D41.8 If the Dispute is not resolved to the City and Contractor’s mutual satisfaction after discussions have occurred at the final escalated level as described above, or the time period set out in D41.7, as extended if applicable, has elapsed, the Contract Administrator will issue a Final Determination as defined in C1.1(v), at which point the parties will be governed by the Dispute Resolution process set out in C21.

INDEMNITY

D42. INDEMNITY

D42.1 Indemnity shall be as stated in C17.

D42.2 Notwithstanding C17.1, the Contractor shall save harmless and indemnify the City in the amount of twice the Contract Price or five million dollars ($5,000,000), whichever is greater, against all costs, damages or expenses arising from actions, claims, demands and proceedings, by whomsoever brought, made or taken as a result of negligent acts or negligent omissions of the Contractor, their Subcontractors, employees or agents in the performance or purported performance of the Work, and more particularly from:

(a) accidental injury to or death of any person whether retained by or in the employ of the contractor or not, arising directly or indirectly by reason of the performance of the Work, or by reason of any trespass on or damage to property;

(b) damage to any property owned in whole or in part by the City, or which the City by duty or custom is obliged, directly or indirectly, in any way or to any degree, to construct, repair or maintain;

(c) damage to, or trespass or encroachment upon, property owned by persons other than the City;

(d) any claim for lien or trust claim served upon the City pursuant to The Builders' Liens Act;

(e) failure to pay a Workers Compensation assessment, or Federal or Provincial taxes;

(f) unauthorized use of any design, device, material or process covered by letters patent, copyright, trademark or trade name in connection with the Work;

(g) inaccuracies in any information provided to the City by the Contractor.

D42.3 Further to C17, The City shall save harmless and indemnify the Contractor in the amount of twice the Contract Price or five million dollars ($5,000,000), whichever is greater, against all costs, damages or expenses arising from actions, claims, demands and proceedings, by whomsoever brought, made or taken as a result of negligent acts or negligent omissions of the City, their employees or agents in the performance of its obligation under the Contract.

THIRD PARTY AGREEMENTS

D43. FUNDING AND/OR CONTRIBUTION AGREEMENT OBLIGATIONS

D43.1 In the event that funding for the Work of the Contract is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, the following terms and conditions shall apply, as required by the applicable funding agreements.

D43.2 Further to D43.1, in the event that the obligations in D43 apply, actual costs legitimately incurred by the Contractor as a direct result of these obligations ("Funding Costs") shall be determined by the actual cost to the Contractor and not by the valuation method(s) outlined in C7.4. In all other respects Funding Costs will be processed in accordance with Changes in Work under C7.

D43.3 For the purposes of D43:

(a) **"Government of Canada"** includes the authorized officials, auditors, and representatives of the Government of Canada; and

(b) **"Government of Manitoba"** includes the authorized officials, auditors, and representatives of the Government of Manitoba.

D43.4 Modified Insurance Requirements

D43.4.1 If not already required under the insurance requirements identified in D14, the Contractor will be required to provide wrap-up liability insurance in an amount of no less than two million dollars ($2,000,000) inclusive per occurrence. Such policy will be written in the joint names of the City, Contractor, Consultants and all sub-contractors and sub-consultants and include twelve (12) months completed operations. The Government of Manitoba and their Ministers, officers, employees, and agents shall be added as additional insureds.

D43.4.2 If not already required under the insurance requirements identified in D14, the Contractor will be required to provide builders' risk insurance (including boiler and machinery insurance, as applicable) providing all risks coverage at full replacement cost, or such lower level of insurance that the City may identify on a case-by-case basis, such as an installation floater.

D43.4.3 The Contractor shall obtain and maintain third party liability insurance with minimum coverage of two million dollars ($2,000,000.00) per occurrence on all licensed vehicles

operated at the Site. In the event that this requirement conflicts with another licensed vehicle insurance requirement in this Contract, then the requirement that provides the higher level of insurance shall apply.

D43.4.4 Further to D14.3, insurers shall provide satisfactory Certificates of Insurance to the Government of Manitoba prior to commencement of Work as written evidence of the insurance required. The Certificates of Insurance must provide for a minimum of thirty (30) days' prior written notice to the Government of Manitoba in case of insurance cancellation.

D43.4.5 All policies must be taken out with insurers licensed to carry on business in the Province of Manitoba.

D43.5 Indemnification By Contractor

D43.5.1 In addition to the indemnity obligations outlined in C17 of the General Conditions for Construction, the Contractor agrees to indemnify and save harmless the Government of Canada and the Government of Manitoba and each of their respective Ministers, officers, servants, employees, and agents from and against all claims and demands, losses, costs, damages, actions, suit or other proceedings brought or pursued in any manner in respect of any matter caused by the Contractor or arising from this Contract or the Work, or from the goods or services provided or required to be provided by the Contractor, except those resulting from the negligence of any of the Government of Canada's or the Government of Manitoba's Ministers, officers, servants, employees, or agents, as the case may be.

D43.5.2 The Contractor agrees that in no event will Canada or Manitoba, their respective officers, servants, employees or agents be held liable for any damages in contract, tort (including negligence) or otherwise, for:

(a) any injury to any person, including, but not limited to, death, economic loss or infringement of rights;

(b) any damage to or loss or destruction of property of any person; or

(c) any obligation of any person, including, but not limited to, any obligation arising from a loan, capital lease or other long term obligation;

in relation to this Contract or the Work.

D43.6 Records Retention and Audits

D43.6.1 The Contractor shall maintain and preserve accurate and complete records in respect of this Contract and the Work, including all accounting records, financial documents, copies of contracts with other parties and other records relating to this Contract and the Work during the term of the Contract and for at least six (6) years after Total Performance. Those records bearing original signatures or professional seals or stamps must be preserved in paper form; other records may be retained in electronic form.

D43.6.2 In addition to the record keeping and inspection obligations outlined in C6 of the General Conditions for Construction, the Contractor shall keep available for inspection and audit at all reasonable times while this Contract is in effect and until at least six (6) years after Total Performance, all records, documents, and contracts referred to in D43.6.1 for inspection, copying and audit by the City of Winnipeg, the Government of Manitoba and/or the Government of Canada and their respective representatives and auditors, and to produce them on demand; to provide reasonable facilities for such inspections, copying and audits, to provide copies of and extracts from such records, documents, or contracts upon request by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada and their respective representatives and auditors, and to promptly provide such other information and explanations as may be reasonably requested by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada from time-to-time.

D43.7 Other Obligations

D43.7.1 The Contractor consents to the City providing a copy of the Contract Documents to the Government of Manitoba and/or the Government of Canada upon request from either entity.

D43.7.2 If the Lobbyists Registration Act (Manitoba) applies to the Contractor, the Contractor represents and warrants that it has filed a return and is registered and in full compliance with the obligations of that Act, and covenants that it will continue to comply for the duration of this Contract.

D43.7.3 The Contractor shall comply with all applicable legislation and standards, whether federal, provincial, or municipal, including (without limitation) labour, environmental, and human rights laws, in the course of providing the Work.

D43.7.4 The Contractor shall properly account for the Work provided under this Contract and payment received in this respect, prepared in accordance with generally accepted accounting principles in effect in Canada, including those principles and standards approved or recommended from time-to-time by the Chartered Professional Accountants of Canada or the Public Sector Accounting Board, as applicable, applied on a consistent basis.

D43.7.5 The Contractor represents and warrants that no current or former public servant or public office holder, to whom the Value and Ethics Code for the Public Sector, the Policy on Conflict of Interest and Post Employment, or the Conflict of Interest Act applies, shall derive direct benefit from this Contract, including any employment, payments, or gifts, unless the provision or receipt of such benefits is in compliance with such codes and the legislation.

D43.7.6 The Contractor represents and warrants that no member of the House of Commons or of the Senate of Canada or of the Legislative Assembly of Manitoba is a shareholder, director or officer of the Contractor or of a Subcontractor, and that no such member is entitled to any benefits arising from this Contract or from a contract with the Contractor or a Subcontractor concerning the Work.

FORM H1: PERFORMANCE BOND
(See D15)

KNOW EVERYONE 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

TENDER NO. 936-2024

WINDSOR PARK LIFT STATION 2025 UPGRADES

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

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

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

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

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

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

_____ day of _____ , 20____ .

SIGNED AND SEALED
in the presence of:

_____
(Witness as to Principal if no seal)

_____
(Name of Principal)

Per: _____ (Seal)

Per: _____

_____
(Name of Surety)

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

FORM H2: LABOUR AND MATERIAL PAYMENT BOND
(See D15)

KNOW EVERYONE BY THESE PRESENTS THAT

_____
his/its heirs, executors, administrators, successors or assigns (hereinafter called the "Principal"), and

_____ ,
his/its heirs, executors, administrators, successors or assigns (hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter called the "Obligee"), for the use and benefit of claimants as herein below defined, in the amount of

_____

_____ dollars ($_____.____)

of lawful money of Canada, for the payment whereof we, the Principal and the Surety jointly and severally bind ourselves firmly by these presents.

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

TENDER NO. 936-2024

WINDSOR PARK LIFT STATION 2025 UPGRADES

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

NOW THEREFORE the condition of the above obligation is such that if the Principal shall promptly make payment to all claimants as hereinafter defined, for all labour, service and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void, otherwise it shall remain in full force and effect subject, however, to the following conditions:

(a) A claimant is defined as one having a direct contract with the Principal for labour, service and material, or any of them, used or reasonably required for use in the performance of the contract, labour, service and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment (but excluding rent of equipment where the rent pursuant to an agreement is to be applied towards the purchase price thereof) directly applicable to the Contract;

(b) The above-named Principal and Surety hereby jointly and severally agree with the Obligee that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant’s work, labour or service was done or performed, or materials were furnished by such claimant, may sue on this bond, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon;

(c) No suit or action shall be commenced hereunder by any claimant

    (i) unless claimant shall have given written notice to the Principal and the Surety above-named, within one hundred and twenty (120) days after such claimant did or performed the last of the work, labour or service, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work, labour or service was done or performed. Such notice shall be served by mailing the same by registered mail to the Principal, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the Province of Manitoba;

(ii) after the expiration of one (1) year following the date on which Principal ceased work on said Contract; including work performed under the guarantees provided in the Contract;

(iii) other than in a court of competent jurisdiction in the Province of Manitoba.

(d) The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

(e) The Surety shall not be liable for a greater sum than the specified penalty of this bond.

The Principal and Surety hereby agree that The Guarantors' Liability Act (Manitoba) shall apply to this Bond.

IN TESTIMONY WHEREOF, the Principal has hereunto set its hand affixed its seal, and the Surety has caused these presents to be sealed and with its corporate seal duly attested by the authorized signature of its signing authority this

_____ 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 J: SUBCONTRACTOR LIST

(See D16)

WINDSOR PARK LIFT STATION 2025 UPGRADES

Name	Address

FORM K: EQUIPMENT
(See D18)

WINDSOR PARK LIFT STATION 2025 UPGRADES

1. Category/type:

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

2. Category/type:

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

3. Category/type:

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

FORM K: EQUIPMENT
(See D18)

WINDSOR PARK LIFT STATION 2025 UPGRADES

4. Category/type:

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

5. Category/type:

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

6. Category/type:

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

FORM L: DETAILED WORK SCHEDULE

(See D19)

WINDSOR PARK LIFT STATION 2025 UPGRADES

For each item of Work, indicate the cumulative percentage proposed to be completed by the end of each time period until 100% completion is achieved.

Items of Work	Time Period in Working Days					
	0	10	20	30	40	50

FORM L: DETAILED WORK SCHEDULE
(See D19)

WINDSOR PARK LIFT STATION 2025 UPGRADES

For each item of Work, indicate the proposed date that each cumulative percentage to be completed will be achieved.

Items of Work	Percentage of Work Completed				
	Start	25%	50%	75%	100%

FORM M: SOCIAL PROCUREMENT PLAN

Every purchase has an economic, social, environmental, and cultural impact. Sustainable Procurement is about capturing the economic, social, environmental, and cultural impacts of purchasing decisions to foster healthy and vibrant communities.

Historically, procurement has been about choosing the supplier offering the lowest price while still meeting technical requirements of providing high quality products or services with minimal risk. By expanding the premise of 'best value' in procurement, to include the generation of positive societal benefits, alongside high quality and competitive bids, the City of Winnipeg is working to maximize community benefits and deliver improved socio-economic returns for stakeholders, within the existing spend.

The Contractor shall provide the Contract Administrator with a Social Procurement Plan Template (Form M: Social Procurement Plan Template) within five (5) Business Days of a request by the Contract Administrator as per D10.

Both Question 1 and 2 must be filled out responding to all criteria. Question 2 must explain the commitment to Question 1 within the context of the Contract.

1. The Contractor commits to _____ % of employment hours with Equity Groups on the delivery of this Contract.

X% = # of employment hours by Equity Groups on this Contract
Total # of employment hours on this Contract

Please reconfirm your commitment here:

2. Provide a detailed strategy for how the Contractor's current and planned efforts to employ Equity Groups will ensure the Contractor meets the commitment on the Contract.

Employment responses could include: We partner with Equity Group employment organizations to recruit Indigenous Rightsholders and other Equity Groups. When employees are onboarded, they are asked if they identify as an Indigenous Rightsholder or Equity Group. We track this and report on aggregate employment levels across our business each year per our Diversity and Inclusion Policy.

Please describe your strategy and/or plans to meet the above requirement:

FORM N: EMPLOYEE VOLUNTARY SELF-IDENTIFICATION SURVEY

The City of Winnipeg is committed to supporting a workforce that is representative of the community the City serves. The City is focused on human rights and ensuring full and equitable representation, success, and advancement of all people, and in particular, the equity groups that are under-represented.

Our company is in support of the goals above and are asking employees to participate in this survey to collect data on the demographics of our workforce.

Employee identity data collected by this survey will be shared with the City of Winnipeg in aggregate. All employee identity data will only be shared with our designated HR or management staff.

This data will be submitted to the City of Winnipeg as part of our Reporting requirements under City of Winnipeg Contracts.

Your response to the self-declaration questions is voluntary.

Thank you for participating in this **self-identified** and **voluntary** survey to help assess and measure the inclusion of equity groups in the workforce.

Company Name_____

Employee Name _____

1. Do you wish to participate in this survey?

   ☐ Yes ☐ No

2. Do you identify as an Indigenous person?

   ☐ Yes ☐ No

3. Do you identify as any of the following Equity Groups, also known as under-represented groups? Check all that apply.

   ☐ Racialized peoples;
   ☐ Newcomers;
   ☐ Persons with disabilities;
   ☐ Women;
   ☐ Peoples facing poverty;
   ☐ Veterans;
   ☐ 2SLGBTQQIA+ (Two-Spirit, Lesbian, Gay, Bisexual, Transgender, Queer, Questioning, Intersex, Asexual, plus) Peoples;

Indigenous refers to "Aboriginal Peoples of Canada" as defined in Section 35(2) of the Constitution Act, 1982 to include the First Nations, Inuit and Métis Peoples of Canada. (Source: Our Winnipeg 2045)

Racialized peoples refers to a group of people who have identifiable characteristics that differ from those of the majority or dominant population. Previously known as Visible Minority and although the term "visible minority" is used in legal (e.g. *Employment Equity Act*) and statistical (e.g. Census) contexts, it is considered outdated and no longer recommended because the word "visible" suggests being white is the standard, and the word "minority" limits the concept to numbers. The term is increasingly being replaced by "racialized" individuals or groups. (Source: Immigration, Refugees and Citizenship Canada)

Newcomers refers to new residents including people arriving from countries outside Canada, such as recent immigrants (less than five years in Canada), refugees, refugee claimants or asylum seekers, and temporary residents. (Source: Our Winnipeg 2045)

Persons with disabilities refers to individuals who have a long-term or recurring physical, mental, psychiatric, sensory, or learning impairment which may limit certain kinds of activity or could be perceived as a limitation. These include visible and non-visible disabilities. (Source: City of Winnipeg)

Women refers to all people who identify as women, whether they are cisgender or transgender women. (Source: Department of Justice, Government of Canada)

People facing poverty refers to people, given the size and region of residents, that do not have enough income to buy a set of goods and services considered to represent a modest, basic standard of living (Source: Market Basket Measure, Stats Canada)

Veterans refers to any former member of the Canadian Armed Forces who successfully underwent basic training and is honorably discharged. (Source: Veteran Affairs Canada)

2SLGBTQQIA+ peoples refer to Two-Spirit, Lesbian, Gay, Bisexual, Trans, Queer, Questioning, Intersex, Asexual, Plus peoples. (Source: Government of Canada)

FORM O: SOCIAL VALUE REPORTING TEMPLATE

Every purchase has an economic, social, environmental, and cultural impact. Sustainable Procurement is about capturing the economic, social, environmental, and cultural impacts of purchasing decisions to foster healthy and vibrant communities.

The data reported here is a contractual requirement to encourage and measure social, Indigenous, and environmental outcomes from the City's procurement. The City reserves the right to verify the information reported.

Company Name _____

Contract Number _____

Reporting Period Start Date _____

Reporting Period End Date _____

1. Employment of Equity Groups (# of employee hours)

The Contractor shall list the percentage (%) of employment hours they plan to commit with Equity Groups on the delivery of this Contract.

A. Total number of employment hours for **all employees** working on the project during the reporting period	_____hours
B. Total number of employment hours for **Equity Group** employees working on the project during the reporting period	_____hours
C. Percentage for the reporting period (B/A) (C = B / A)	_____%

Please describe any successes or challenges related to your commitment for the reporting period.

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 their 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, Purchasing 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 Tender shall govern over *The City of Winnipeg Standard Construction Specifications*.

E1.3 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B7. In every instance where a brand name or design specification is used, the City will also consider approved equals and/or approved alternatives in accordance with B7.

E1.4 The following are applicable to the Work:

NMS SPECIFICATIONS

DIVISION 01	**–**	**GENERAL REQUIREMENTS**
01 33 00		Submittal Procedures
01 35 29.06		Health and Safety Requirements
01 45 00		Quality Control
01 52 00		Construction Facilities
01 56 00		Temporary Barriers and Enclosures
01 73 00		Execution
01 74 00		Cleaning
01 74 19		Waste Management and Disposal
01 78 00		Closeout Submittals
01 91 13		General Commissioning Requirements
01 91 13.13		Commissioning Plan
01 91 13.16		Commissioning Forms
01 91 13.18		Commissioning Training
DIVISION 04	**–**	**MASONRY**
04 05 00		Common Work Results for Masonry
04 05 13		Masonry Mortaring and Grouting
04 05 19		Masonry Anchorage and Reinforcing
04 05 23		Masonry Accessories
04 21 13		Brick Masonry
04 22 00		Concrete Unit Masonry
DIVISION 05	**–**	**METALS**
05 12 23		Structural Steel for Building
05 14 10		Structural Aluminum
05 50 00		Metal Fabrication

WINDSOR PARK LIFT STATION 2025 UPGRADES

GENERAL DRAWINGS

1-0197L-D0001-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	COVER SHEET & ISOMETRIC VIEWS		
1-0197L-D0002-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	DRAWING INDEX		
1-0197L-D0003-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	ISOMETRIC VIEWS		

CIVIL DRAWINGS

1-0197L-C0001-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	CIVIL SITE SERVICES PLAN		
1-0197L-C0002-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	BYPASS PUMPING AND CIVIL DETAILS	PLANS AND SECTIONS	
1-0197L-C0003-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOT GRADING PLAN AND SITE DRAINAGE		

STRUCTURAL DRAWINGS

1-0197L-S0001-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	STRUCTURAL	SPECIFICATION NOTES, SCHEDULES	AND CODE REVIEW
1-0197L-S0002-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	STRUCTURAL PLANS	ABOVE GROUND AND ENTRANCE ROOM	DEMOLITION
1-0197L-S0002-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	STRUCTURAL PLANS	ABOVE GROUND AND ENTRANCE ROOM	NEW WORK
1-0197L-S0003-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	STRUCTURAL PLANS	PUMP AND MOTOR ROOM	DEMOLITION
1-0197L-S0003-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	STRUCTURAL PLANS	PUMP AND MOTOR ROOM	NEW WORK
1-0197L-S0003-002	002	WINDSOR PARK LIFT STATION	2025 UPGRADES	STRUCTURAL FRAMING PLAN AND DETAILS	ENTRANCE ROOM	

1-0197L-S0003-003	003	WINDSOR PARK LIFT STATION	2025 UPGRADES	STRUCTURAL FRAMING PLAN AND DETAILS	MOTOR ROOM	
1-0197L-S0004-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	STRUCTURAL SECTIONS	DEMOLITION	
1-0197L-S0004-002	002	WINDSOR PARK LIFT STATION	2025 UPGRADES	STRUCTURAL SECTIONS	DEMOLITION	
1-0197L-S0004-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	STRUCTURAL SECTIONS	NEW WORK	
1-0197L-S0004-002	002	WINDSOR PARK LIFT STATION	2025 UPGRADES	STRUCTURAL SECTIONS	NEW WORK	
1-0197L-S0005-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	STRUCTURAL DETAILS		
1-0197L-S0005-002	002	WINDSOR PARK LIFT STATION	2025 UPGRADES	STRUCTURAL DETAILS		
1-0197L-S0005-003	003	WINDSOR PARK LIFT STATION	2025 UPGRADES	STRUCTURAL DETAILS		

PROCESS DRAWINGS

1-0197L-P0001-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	PROCESS AND INSTRUMENTATION LEGEND		
1-0197L-P0002-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	PROCESS AND INSTRUMENTATION DIAGRAM (P&ID)	WASTEWATER LIFT PUMPING	
1-0197L-P0002-002	002	WINDSOR PARK LIFT STATION	2025 UPGRADES	PROCESS AND INSTRUMENTATION DIAGRAM (P&ID)	WASTEWATER LIFT PUMPING	
1-0197L-P0003-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	PROCESS AND INSTRUMENTATION DIAGRAM (P&ID)	HVAC SYSTEM AND FLOW	

MECHANICAL DRAWINGS

1-0197L-M0001-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL PIPING PLANS	ENTRANCE ROOM	DEMOLITION
1-0197L-M0001-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL PIPING PLANS	ENTRANCE ROOM	NEW WORK
1-0197L-M0002-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL PIPING PLANS	PUMP AND MOTOR ROOM	DEMOLITION
1-0197L-M0002-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL PIPING PLANS	PUMP AND MOTOR ROOM	NEW WORK
1-0197L-M0003-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL PIPING SECTIONS	DEMOLITION	
1-0197L-M0003-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL PIPING SECTIONS	NEW WORK	
1-0197L-M0003-002	002	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL PIPING SECTIONS	NEW WORK	
1-0197L-M0004-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL HVAC PLANS	ABOVE GROUND AND ENTRANCE ROOM	DEMOLITION
1-0197L-M0004-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL HVAC PLANS	ABOVE GROUND AND ENTRANCE ROOM	NEW WORK
1-0197L-M0005-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL HVAC PLANS	PUMP AND MOTOR ROOM	DEMOLITION
1-0197L-M0005-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL HVAC PLANS	PUMP AND MOTOR ROOM	NEW WORK
1-0197L-M0006-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL HVAC SECTIONS	DEMOLITION	
1-0197L-M0006-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL HVAC SECTIONS	NEW WORK	
1-0197L-M0007-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL DETAILS		

1-0197L-M0007-002	002	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL DETAILS		
1-0197L-M0008-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MECHANICAL SCHEDULES		

ELECTRICAL DRAWINGS

1-0197L-E0009-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	ELECTRICAL LEGEND		
1-0197L-E0010-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	ELECTRICAL SINGLE LINE DIAGRAM	DEMOLITION	
1-0197L-E0010-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	ELECTRICAL SINGLE LINE DIAGRAM		
1-0197L-E0010-002	002	WINDSOR PARK LIFT STATION	2025 UPGRADES	ELECTRICAL SINGLE LINE DIAGRAM		
1-0197L-E0011-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	ELECTRICAL SITE PLAN	PLANS AND SECTIONS	
1-0197L-E0012-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	ELECTRICAL LIFT STATION PLAN	DEMOLITION	
1-0197L-E0012-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	ELECTRICAL LIFT STATION PLAN	PLANS AND SECTIONS	
1-0197L-E0012-002	002	WINDSOR PARK LIFT STATION	2025 UPGRADES	ELECTRICAL LIFT STATION PLAN	PLANS AND SECTIONS	
1-0197L-E0013-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	ELECTRICAL HAZARDOUS LOCATION PLAN	PLANS AND SECTIONS	
1-0197L-E0014-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LIFT STATION ELECTRICAL SCHEDULES	PNL-L74, LUMINAIRES AND	OUTDOOR LIGHTING CONTROLS
1-0197L-E0015-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MOTOR STARTER SCHEMATIC	LIFT PUMP P-L01	
1-0197L-E0016-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MOTOR STARTER CONNECTION DIAGRAM	LIFT PUMP P-L01	

1-0197L-E0017-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MOTOR STARTER SCHEMATIC	LIFT PUMP P-L02	
1-0197L-E0018-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MOTOR STARTER CONNECTION DIAGRAM	LIFT PUMP P-L02	
1-0197L-E0019-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	MOTOR STARTER SCHEMATIC	LIFT PUMP P-L03	
1-0197L-E0021-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	HVAC FAN STARTER EF-L62	SCHEMATIC AND CONNECTION DIAGRAM	
1-0197L-E0022-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	ELECTRICAL POWER JUNCTION BOX	PANEL LAYOUT AND CONNECTION DIAGRAM	JB-L73-2
1-0197L-E0023-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	ELECTRICAL CONTROL JUNCTION BOX	PANEL LAYOUT AND CONNECTION DIAGRAM	JBA-L73-2
1-0197L-E0021-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	HVAC FAN STARTER EF-L62	SCHEMATIC AND CONNECTION DIAGRAM	

ELECTRICAL DOCUMENTS

5-0197L-E0001-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	SETTING LETTER	VARIABLE FREQUENCY DRIVE	LIFT PUMP P-L01
5-0197L-E0002-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	SETTING LETTER	VARIABLE FREQUENCY DRIVE	LIFT PUMP P-L02
5-0197L-E0003-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	SETTING LETTER	VARIABLE FREQUENCY DRIVE	LIFT PUMP P-L03

AUTOMATION DRAWINGS

1-0197L-A0001-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	AUTOMATION PLAN	PLANS AND SECTIONS	LIFT STATION DEMOLITION PLAN
1-0197L-A0001-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	AUTOMATION PLAN	PLANS AND SECTIONS	LIFT STATION PLAN
1-0197L-A0002-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	PANEL LAYOUT AND BILL OF MATERIALS	LIFT STATION HVAC VENTILATION CONTROL PANEL	CONTROL PANEL CP-L83

1-0197L-A0003-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	POWER DISTRIBUTION WIRING SCHEMATIC	LIFT STATION HVAC VENTILATION CONTROL PANEL	CONTROL PANEL CP-L83
1-0197L-A0004-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	PANEL LAYOUT AND BILL OF MATERIALS	REMOTE IO AND VALVE CONTROL PANEL	CONTROL PANEL CP-L84
1-0197L-A0005-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	POWER DISTRIBUTION WIRING SCHEMATIC	REMOTE IO AND VALVE CONTROL PANEL	CONTROL PANEL CP-L84
1-0197L-A0006-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	PLC IO WIRING	REMOTE IO PANEL CP-L84	ANALOG INPUT - RACK 1, MODULE 1
1-0197L-A0007-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	PLC IO WIRING	REMOTE IO PANEL CP-L84	ANALOG INPUT - RACK 1, MODULE 2
1-0197L-A0008-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	PLC IO WIRING	REMOTE IO PANEL CP-L84	ANALOG INPUT - RACK 1, MODULE 3
1-0197L-A0009-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	PLC IO WIRING	REMOTE IO PANEL CP-L84	ANALOG INPUT - RACK 1, MODULE 4
1-0197L-A0010-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	PLC IO WIRING	REMOTE IO PANEL CP-L84	DISCRETE INPUT - RACK 1, MODULE 5
1-0197L-A0011-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	PANEL LAYOUT AND BILL OF MATERIALS	INTRINSICALLY SAFE JUNCTION BOX	JBA-L85
1-0197L-A0012-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	WET WELL LEVEL CONTROLLER	LIC-L100-1, LIT-L100-1, LI-L100-1
1-0197L-A0013-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	WET WELL LEVEL CONTROLLER	LIC-L100-2, LIT-L100-2, LI-L100-2
1-0197L-A0014-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT STATION H2S GAS MONITORING DETECTOR	AIT-L611
1-0197L-A0015-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT PUMP P-L01 DISCHARGE FLOW TRANSMITTER	FE-L011, FIT-L011
1-0197L-A0016-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT PUMP P-L02 DISCHARGE FLOW TRANSMITTER	FE-L021, FIT-L021
1-0197L-A0017-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT PUMP P-L03 DISCHARGE FLOW TRANSMITTER	FE-L031, FIT-L031

1-0197L-A0018-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	WET WELL HIGH HIGH LEVEL FLOAT	LSHH-L101
1-0197L-A0019-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	DRY WELL FLOOD FLOAT	LSH-L501
1-0197L-A0020-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT STATION AIR FLOW SWITCH	FSL-L613
1-0197L-A0021-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT STATION HVAC RECIRCULATION AIR DAMPER	FV-L601
1-0197L-A0022-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT STATION BLOWER HEATER CONTROL	HCE-L61
1-0197L-A0023-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT STATION OCCUPANCY AND TEMPERATURE SWITCHES	HS-L604, TSH-L600, TSL-L600
1-0197L-A0024-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT PUMP P-L01 SEAL WATER FLOW SWITCH	FSL-L011
1-0197L-A0025-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	PUMP P-L01 SHAFT BEARING TEMPERATURE TRANSMITTERS	TT-L010-1, TT-L010-2, TT-L010-3, TT-L010-4
1-0197L-A0026-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	PUMP P-L01 SHAFT BEARING VIBRATION SENSORS	VT-L010-1, VT-L010-2, VT-L010-3, VT-L010-4
1-0197L-A0027-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT PUMP P-L02 SEAL WATER FLOW SWITCH	FSL-L021
1-0197L-A0028-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	PUMP P-L02 SHAFT BEARING TEMPERATURE TRANSMITTERS	TT-L020-1, TT-L020-2, TT-L020-3, TT-L020-4
1-0197L-A0029-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	PUMP P-L02 SHAFT BEARING VIBRATION SENSORS	VT-L020-1, VT-L020-2, VT-L020-3, VT-L020-4
1-0197L-A0030-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT PUMP P-L03 SEAL WATER FLOW SWITCH	FSL-L031
1-0197L-A0031-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	PUMP P-L03 SHAFT BEARING TEMPERATURE TRANSMITTERS	TT-L030-1, TT-L030-2, TT-L030-3, TT-L030-4

1-0197L-A0032-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	PUMP P-L03 SHAFT BEARING VIBRATION SENSORS	VT-L030-1, VT-L030-2, VT-L030-3, VT-L030-4
1-0197L-A0033-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	NEWPCC FORCE MAIN VALVE ACTUATOR	AO-L400
1-0197L-A0034-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	SEWPCC FORCE MAIN VALVE ACTUATOR	AO-L410
1-0197L-A0035-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT STATION ENTRANCE TEMPERATURE TRANSMITTER	TT-L631
1-0197L-A0036-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT STATION PUMP LEVEL TEMPERATURE TRANSMITTER	TT-L641
1-0197L-A0037-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	POTABLE WATER SUPPLY LOW PRESSURE	PSL-L526
1-0197L-A0038-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT PUMP P-L01 MOTOR HIGH TEMPERATURE SWITCH	TSH-L011
1-0197L-A0039-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT PUMP P-L02 MOTOR HIGH TEMPERATURE SWITCH	TSH-L021
1-0197L-A0040-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	LOOP DIAGRAM	LIFT PUMP P-L03 MOTOR HIGH TEMPERATURE SWITCH	TSH-L031

AUTOMATION DOCUMENTS

5-0197L-A0001-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	SETTING LETTER	HVAC TEMPERATURE CONTROLLER	TIC-L600
5-0197L-A0002-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	DNP3 MAPPING I/O LIST	PLC-L81	
5-0197L-A0003-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	INSTRUMENT LIST		
5-0197L-A0004-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	PROCESS CONTROL NARRATIVE	PLC-L81	

5-0197L-A0005-001	001	WINDSOR PARK LIFT STATION	2025 UPGRADES	PLC PROGRAMMING REPORT	PLC-L81	

WINDSOR PARK STANDBY GENERATOR BUILDING 2025 UPGRADES

BUILDING / ARCHITECTURAL DRAWINGS

1-0219L-B0001-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	ELEVATIONS		

STRUCTURAL DRAWINGS

1-0219L-S0001-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	STRUCTURAL	SPECIFICATION NOTES	AND CODE REVIEW
1-0219L-S0002-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	STRUCTURAL PLANS AND SECTIONS	GENERATOR BUILDING	DEMOLITION
1-0219L-S0002-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	STRUCTURAL PLANS	GENERATOR BUILDING	NEW WORK
1-0219L-S0003-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2026 UPGRADES	STRUCTURAL SECTIONS	GENERATOR BUILDING	NEW WORK
1-0219L-S0004-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	STRUCTURAL DETAILS		

PROCESS DRAWINGS

1-0219L-P0001-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	PROCESS AND INSTRUMENTATION DIAGRAM (P&ID)	HVAC SYSTEM AND FLOW	

MECHANICAL DRAWINGS

1-0219L-M0001-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	MECHANICAL PIPING PLAN	GENERATOR BUILDING	DEMOLITION
1-0219L-M0001-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	MECHANICAL PIPING PLAN AND SECTION	GENERATOR BUILDING	NEW WORK
1-0219L-M0002-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	MECHANICAL HVAC PLAN	GENERATOR BUILDING	DEMOLITION
1-0219L-M0002-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	MECHANICAL HVAC PLAN AND SECTION	GENERATOR BUILDING	NEW WORK
1-0219L-M0003-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	MECHANICAL DETAILS AND SCHEDULES		

ELECTRICAL DRAWINGS

1-0219L-E0001-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	ELECTRICAL GENERATOR BUILDING PLAN	DEMOLITION	
1-0219L-E0001-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	ELECTRICAL GENERATOR BUILDING PLAN	PLANS AND SECTIONS	
1-0219L-E0002-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	MCC ELEVATIONS AND DETAILS	MCC-L71 AND MCC-L72E	
1-0219L-E0003-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	STANDALONE VFD ELEVATIONS AND DETAILS	VFD-L01, VFD-L02 AND VFD-L03	
1-0219L-E0004-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	ELECTRICAL GROUNDING DETAILS		
1-0219L-E0005-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	GENERATOR BUILDING ELECTRICAL SCHEDULES	PNL-L75, LUMINAIRES AND	EMERGENCY LIGHTING CONTROLS
1-0219L-E0006-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	MOTOR STARTER SCHEMATIC	AND CONNECTION DIAGRAM	EF-L63

AUTOMATION DRAWINGS

1-0219L-A0001-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	AUTOMATION PLAN AND SECTIONS	GENERATOR BUILDING	NEW WORK
1-0219L-A0002-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	PANEL LAYOUT AND BILL OF MATERIALS	PLC CONTROL PANEL CP-L81	
1-0219L-A0003-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	NETWORK BLOCK DIAGRAM	PLC CONTROL PANEL CP-L81	
1-0219L-A0004-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	POWER DISTRIBUTION WIRING SCHEMATIC	PLC CONTROL PANEL CP-L81	
1-0219L-A0005-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	PLC I/O WIRING	PLC CONTROL PANEL CP-L81	DISCRETE INPUT - RACK 0, MODULE 4
1-0219L-A0006-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	PLC I/O WIRING	PLC CONTROL PANEL CP-L81	DISCRETE INPUT - RACK 0, MODULE 5
1-0219L-A0007-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	PLC I/O WIRING	PLC CONTROL PANEL CP-L81	DISCRETE INPUT - RACK 0, MODULE 6
1-0219L-A0008-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	PLC I/O WIRING	PLC CONTROL PANEL CP-L81	DISCRETE OUTPUT - RACK 0, MODULE 7
1-0219L-A0009-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	PLC I/O WIRING	PLC CONTROL PANEL CP-L81	ANALOG INPUT - RACK 0, MODULE 8
1-0219L-A0010-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	PLC I/O WIRING	PLC CONTROL PANEL CP-L81	ANALOG INPUT - RACK 0, MODULE 9
1-0219L-A0011-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	PLC I/O WIRING	PLC CONTROL PANEL CP-L81	ANALOG INPUT - RACK 0, MODULE 10
1-0219L-A0012-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	PLC I/O WIRING	PLC CONTROL PANEL CP-L81	ANALOG OUTPUT - RACK 0, MODULE 11
1-0219L-A0013-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	AUTOMATIC PUMP CONTROL WIRING SCHEMATIC	PLC CONTROL PANEL CP-L81	LOCAL MODE AND PLC MODE OF OPERATION
1-0219L-A0014-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	PANEL LAYOUT AND BILL OF MATERIALS	GENERATOR BUILDING HVAC VENTILATION	CONTROL PANEL CP-L82
1-0219L-A0015-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	POWER DISTRIBUTION WIRING SCHEMATIC	GENERATOR BUILDING HVAC VENTILATION	CONTROL PANEL CP-L82
1-0219L-A0016-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	LOOP DIAGRAM	GENERATOR BUILDING METHANE GAS	AIT-L520

					MONITORING DETECTOR	
1-0219L-A0017-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	LOOP DIAGRAM	GENERATOR BUILDING HVAC VENTILATION AIR DAMPERS	FV-L671
1-0219L-A0018-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	LOOP DIAGRAM	GENERATOR BUILDING HVAC VENTILATION AIR DAMPERS	FV-L631, FV-L632
1-0219L-A0019-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	LOOP DIAGRAM	GENERATOR BUILDING HVAC VENTILATION AIR DAMPERS	FV-L672, FV-L673, FV-L674, FV-L675
1-0219L-A0020-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	LOOP DIAGRAM	GENERATOR BUILDING TEMPERATURE TRANSMITTER AND OCCUPANCY SWITCH	TT-L721, HS-L670
1-0219L-A0021-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	LOOP DIAGRAM	GENERATOR BUILDING TEMPERATURE TRANSMITTERS	TT-L661, TT-L662
1-0219L-A0022-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	LOOP DIAGRAM	GENERATOR MONITORING SIGNALS	GEN-L72
1-0219L-A0023-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	LOOP DIAGRAM	MCC-L72E 600VAC POWER FAIL ALARM RELAY	ESL-L72E1
1-0219L-A0024-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	LOOP DIAGRAM	MCC-L71 TVSS STATUS ALARM	XS-L711
1-0219L-A0025-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	LOOP DIAGRAM	GENERATOR BUILDING DUCT HEATER TEMPERATURE AND CONTROL	TY-L641, TE-L671-3
1-0219L-A0026-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	LOOP DIAGRAM	GENERATOR BUILDING HVAC DUCTING SENSORS	FSL-L613, PDSH-L642

AUTOMATION DOCUMENTS

5-0219L-A0001-001	001	WINDSOR PARK STANDBY GENERATOR BUILDING	2025 UPGRADES	SETTING LETTER	HVAC TEMPERATURE CONTROLLER	TIC-L620

Appendix A: Record Drawings
Appendix B: Hazardous Materials Report
Appendix C: Commissioning Forms
Appendix D: Instrument List
Appendix E: Shop Drawing Submittal List
Appendix F: Setting Letters
Appendix G: Site Photos

GENERAL REQUIREMENTS

E2. OFFICE FACILITIES

E2.1 The Contractor shall supply a site trailer with available space for intermittent use by the Contract Administrator.

E2.2 The Contractor shall supply office facilities meeting the following requirements:

(a) Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

(b) Provide marked and fully stocked first-aid case in a readily available location.

(c) Subcontractors to provide their own offices as necessary. Direct location of these offices.

(d) Supply temporary office facilities for the Contract Administrator on Site, meeting the following requirements:

(i) Minimum floor area of 20 square metres, with windows and a door entrance complete with suitable lock satisfactory to the Contract Administrator.

(ii) Suitable for all-weather use and capable of maintaining a temperature range between 20 and 25 degrees C.

(iii) Equipped with fluorescent lights and 120 volt ac electrical wall outlets.

(iv) Furnished with one desk, one filing cabinet, and two chairs, all satisfactory to the Contract Administrator.

(v) All of the temporary structures provided by the Contractor for this project shall be stabilized in a sufficient manner to prevent the temporary structure from being overturned by wind forces as defined in the National Building Code (NBC). The stabilization provided shall be designed by a Professional Engineer registered in the Province of Manitoba. Detailed drawings and design notes for the stabilization works bearing the Engineer's seal shall be provided to the Contract Administrator for review.

(vi) Maintain in clean condition.

E2.3 The Contractor shall be responsible for installation, maintenance, removal, operating costs, and service installation costs for the office facilities as described herein.

E3. HAZARDOUS MATERIALS

E3.1 A Hazardous Materials Assessment is included as Appendix B.

E3.2 The Contractor shall note the presence of lead in paints used in existing construction and handle elements with lead containing paint in strict compliance with provincial regulations such as "Managing Demolition Debris Containing Hazardous Materials" by Environmental Compliance and Enforcement, The Dangerous Goods Handling and Transportation Act, Hazardous Waste Regulation etc.

E3.3 The Hazardous Materials Assessment does not include construction materials which are hidden from view such as superstructure roof base layers, wall finishes hidden from view or any other materials that were not assessed and which are to be demolished. The Contractor shall treat such materials as containing asbestos and shall handle these materials in strict compliance with any provincial regulations such as "Managing Demolition Debris Containing Hazardous Materials" by Environmental Compliance and Enforcement, The Dangerous Goods Handling and Transportation Act, Hazardous Waste Regulation etc.

(a) As an alternative to handling unassessed materials as hazardous, the Contractor may test them, and in the event that laboratory testing reveals no hazardous contents, the tested materials can be handled as non-hazardous. Cost for such testing shall be responsibility of the Contractor. Provide testing results to Contract Administrator as soon as they become available.

E4. MOBILIZATION AND DEMOBILIZATION

E4.1 Description

(a) This Specification shall govern mobilization and demobilization from site.

(b) The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, Materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Works as hereinafter specified.

E4.2 The Work under this Specification shall include, but not be limited to:

(a) submission of Site layout plan

(b) mobilizing and demobilizing on-Site Work facilities;

(c) supplying, setting up, laying out and removing Site office facilities;

(d) install, maintaining and removing any access roadway; and traffic control and traffic management.

E4.3 Mobilization and demolition are in accordance with the most recent Standard Construction Specifications:

(a) CW 1120 – Existing Services, Utilities and Structures; and

(b) CW 1130 – Site Requirements.

E4.4 Submittals

(a) The Contractor shall submit the following to the Contract Administrator fourteen (14) days prior to mobilization on-Site:

(i) a plan highlighting the Site layout plan which includes laydown area location(s), staging areas, office facility location, access road(s), temporary secure fencing limits and gate locations for review and approval.

(b) Contractor shall refer to the Drawings for limits of construction.

E4.5 Materials and Equipment

(a) All Materials supplied under this Specification shall be of a type approved by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.

(b) The Contractor shall be responsible for the supply, safe storage, and handling of all Materials as set forth in this Specification. All Materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

(c) All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.

E4.6 Construction Methods

(a) Site Inspection:

(i) inspect the Site with the Contract Administrator to verify existing conditions prior to mobilizing on-Site; and

(ii) inspect the Site with the Contract Administrator soon after demobilizing on-Site, confirming Site has been restored to its original condition prior to initiation of Work;

(b) Layout of On-Site Work Facilities:

(i) the Contractor shall mobilize all on-Site Work and other temporary facilities; and

(ii) upon completion of construction activities, the Contractor shall remove all on-Site Work and other temporary facilities;

(c) Cellular Telephone Communication:

(i) the Contractor’s Site supervisor is required to carry, at all times, a cellular telephone, with voicemail;

(d) Access Roadway:

(i) the Contractor shall maintain any access roadway they install;

(ii) the access road shall be maintained on a regular basis to provide continual unrestricted Site access, to the satisfaction of the Contract Administrator; and

(iii) upon completion of the Work, the area shall be restored to its original condition;

(e) Snow and Ice Removal:

(i) if required, snow clearing shall be done by the Contractor on a regular basis; and

(ii) if required, snow cover shall be cleared from the construction Site prior to commencement of the Work. The methodology to clear the snow shall be subject to the approval of the Contract Administrator;

(f) Restoration of Existing Facilities:

(i) upon completion of the Work and demobilization, the Contractor shall restore existing facilities to their original condition, including snow removal, to the approval of the Contract Administrator.

E4.7 Measurement and Payment

E4.7.1 Mobilization and Demobilization

(a) Mobilization and demobilization will be measured on a lump sum basis and paid for at the Contract Unit Price for "Mobilization and Demobilization" as shown in Form B for supplying all Materials and for performing all operations herein described and all other item incidental to the Work included in this Specification and accepted by the Contract Administrator.

(b) Thirty percent (30%) payment when Contract Administrator is satisfied that construction has commenced;

(c) Fifty percent (50%) during construction percentage distributed equally on a monthly basis at the discretion of the Contract Administrator; and

(d) Twenty percent (20%) upon completion of the Work.

E5. CASH ALLOWANCE FOR ADDITIONAL WORK

E5.1 Additional Work may be necessitated due to unforeseen circumstances that may arise during the course of the project due to:

(a) Additions to the scope of Work by the Contract Administrator, beyond that defined herein.

E5.2 A cash allowance has been included on Form B: Prices.

E5.3 The City reserves the right to delete any or all of the Cash Allowance from the Contract if the Work intended to be covered by the Cash Allowance is not required, or if the Works intended are found to be more extensive than the provisional Cash Allowance. A Change Work Order based on the agreed upon costs for performing the additional work shall be signed by both the Contract Administrator and Contractor representative in order to utilize funds under Additional Work Allowance. The Contract Administrator may decide to group additional work items under a single Change Work Order. Only funds approved under signed Change Work Orders will be allowed to be invoiced.

E5.4 Cost of additional work shall be evaluated by the methods outlined in C7.4, and a Change Work Order prepared by the Contract Administrator. Cost of the Change Order will be paid on the Progress Estimate and deducted from the Cash Allowance. If the valuation of the authorized work exceeds the Value of the Cash Allowance, the Contract Value will be adjusted by the shortfall.

E5.5 Additional services and/or Work will not be initiated for:

(a) Reasons of lack of performance or errors in execution.

(b) Scheduling changes initiated by the City, where at least 24 hours' notice is given prior to the Contractors schedule time to be on Site.

E5.6 Should it be determined that additional material or services are required, the Contract Administrator shall approve the Work, prior to commencement of the additional Work.

E5.7 Material Mark-Up Factors in accordance with C7:

(a) The base cost is to be the wholesale cost of the material, regardless of the Contractor or Subcontractor supplying the material.

(b) In general, the party (Contractor or Subcontractor) supplying the material is the party that purchases the material from a supplier who does not perform any work on Site, unless otherwise determined by the Contract Administrator.

(c) Where the Contractor is supplying the material, the mark-up on the material is limited to fifteen percent (15%).

(d) Where the Contractor's immediate Subcontractor is supplying the material the total mark-up on the material including all Subcontractors and the Contractor is limited to twenty-five percent (25%)

(i) The Subcontractor's mark-up on the material is limited to fifteen percent (15%);

(ii) The Contractor's mark-up on the material is limited to ten percent (10%).

(e) A Third-Level Subcontractor is a Subcontractor of a Subcontractor of the Contractor.

(i) No Third-Level Subcontractors on this project are approved for additional mark-up.

E5.8 In the event that a Third-Level Subcontractor is utilized, that is not approved for additional mark-up, the Contractor is responsible for coordinating the split of the maximum approved mark-up between the Contractor and Subcontractors.

E6. TRAFFIC CONTROL

E6.1 Further to 3.6, 3.7 and 3.8 of CW 1130:

(a) Where directed by the Contract Administrator, the Contractor shall construct and maintain temporary asphalt ramps to alleviate vertical pavement obstructions such as manholes and planing drop-offs to the satisfaction of the Contract Administrator. Payment shall be in accordance with CW3410.

(b) In accordance with the Manual of Temporary Traffic Control on City Streets (MTTC), the Contractor ("Construction Agency" in the Manual) shall be responsible for placing, maintaining and removing the appropriate temporary traffic control devices as specified by the MTTC, the Contract Drawings, Staging Plans and Traffic Management Plans or by the Traffic Management Branch of the City of Winnipeg Public Works Department. The Contractor shall bear all costs associated with the placement of temporary traffic control devices by their own forces or Subcontractor.

(c) In addition, the Contractor shall be responsible for supplying, removing, placing and maintaining all regulatory signing including but not limited to:

(i) Parking restrictions;

(ii) Stopping restrictions;

(iii) Turn restrictions;

(iv) Diamond lane removal;

(v) Full or directional closures on a Regional Street;

(vi) Traffic routed across a median;

(vii) Full or directional closure of a non-regional street where there is a requirement for regulatory signs (turn restrictions, bus stop relocations, etc.) to implement the closure.

(d) The Contractor shall remove and stockpile any regulatory signage not required during construction such as, but not limited to, parking restrictions, turn restrictions and loading restrictions.

E6.2 Upon request from the Contract Administrator, the Contractor shall provide records demonstrating that the site has been maintained.

E6.3 Further to E7.1(c) and E7.1(d) the Contractor shall make arrangements with the Traffic Services Branch of the City of Winnipeg to reinstall the permanent regulatory signs after the Contract Work is complete. The Contractor shall make arrangements to drop off the stockpiled materials to Traffic Services at 495 Archibald Street.

E6.4 Any changes to the approved Traffic Management Plan must be submitted to the Contract Administrator a minimum of five (5) Working Days prior to the required change for approval.

E6.5 If the Contract Administrator determines that the Contractor is not performing Traffic Control in accordance with this specification, Traffic Services may be engaged to perform the Traffic Control. In this event the Contractor shall bear costs charged to the project by the Traffic Services Branch of the City of Winnipeg in connection with the required Works.

E6.6 No stockpiling of material will be permitted on the roadway.

E6.7 Intersecting street and private approach access shall be maintained at all times.

E6.8 Should the Contractor be unable to maintain pedestrian or vehicular access to a residence or business, they shall review the planned disruption with the residence and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 24 hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access.

E6.9 Pedestrian access and ambulance/emergency vehicle access must be maintained at all times.

E6.10 Pedestrian access shall be restricted by maintaining a security fence around the perimeter of the Work site.

E6.11 Further to 3.7 of CW 1130:

(a) Single lane closures on intersecting and/or adjoining Regional Streets shall only be permitted during non-peak periods when required for construction activities when approved by the Traffic Management Branch. Storage/parking of materials, equipment or vehicles is not permitted on Regional Streets at any time unless approved by the Contract Administrator, in consultation with the Traffic Management Branch.

(b) Only the right-turning lane from Cottonwood Rd to northbound Autumnwood Dr may be closed. No lane closures of east/westbound traffic or north/southbound traffic on Autumnwood Dr or Cottonwood Rd will be permitted without the written permission of the Contract Administrator;

(c) Pedestrian crosswalks must be maintained across Cottonwood Rd and Autumnwood Dr to the sidewalk to the northeast of the intersection. Maintain footpaths around the construction zone and provide security fencing around the construction zone.

(d) Ambulance/emergency vehicle access must be maintained at all times.

E6.12 Payment

(a) Traffic Control shall be considered incidental to the Works of this Contract and no separate payment will be made for this item.

E7. DANGEROUS WORK CONDITIONS

E7.1 Further to clause C6.24 of the General Conditions, the Contractor shall be aware that underground chambers, lower levels of the lift station, manholes, and sewers are considered Hazardous Confined Spaces and shall follow the "Guidelines for Hazardous Confined Entry Work" as published by the Manitoba Workplace Safety and Health Division. The Contractor and all Subcontractors will be required to have Confined Space Entry Training and complete an entry permit each time work is to be performed in a Confined Space Area. The following locations are considered Hazardous Confined Spaces:

(a) Lift Station Wet Well (including Entrance Chamber).

(b) Lift Station Lower Levels (including Pump Room, Motor Room, Entrance).

(c) Sewer manholes.

(d) Any other areas labelled as 'Confined Space' at the Site.

E7.2 As part of provincial legislation for Confined Spaces, the Contractor will require a dedicated watch at all times staff are required to enter a Confined Space. The dedicated watch shall be solely for monitoring staff, providing regular check ins and initiating emergency response plans.

E7.3 The Contractor shall be aware of the potential hazards that can be encountered in confined spaces such as toxic gases and oxygen deficiency. The Contractor's Safe Work Plan should address these issues.

E7.4 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. The Contractor is responsible for all testing requirements.

E7.5 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.

E7.6 Workers must wear a respirator or have supplied air at all times when entering a chamber, manhole or sewer where live sewage is present.

E7.7 If products containing volatile organic carbons (VOCs) are used, the Contractor shall provide a photoionization detector (PID) on Site to monitor potential VOCs 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. In addition, the Contract Administrator may collect discrete air samples for laboratory analysis.

E7.8 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 his 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.

E8. BYPASS PUMPING VAULT

E8.1 Description

E8.1.1 The Work to be done by the Contractor under this Specification shall include the supply and construction of the new force main piping, connections, excavation, bedding, and backfill. Furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for an incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E8.2 Materials & Methods

E8.2.1 By-Pass Pumping Vault and Valve Assembly

(a) Bypass pumping of the lift station will convey flows from the sewer upstream of the lift station to a new bypass pumping vault in the lift station. Therefore, the vault must be constructed prior to bypass pumping operations.

(i) The Bypass Pumping Vault piping and valves must be installed during dry weather conditions. The Contractor shall only take one (1) force main offline at a time to install force main piping and valves.

(ii) Installation of the bypass pipes and valves will require closing alternating force mains.

(iii) Lift Station pumps are to continue pumping operations during installation of the bypass vault pipework and valves.

(b) A bypass vault and valve assembly shall be installed at the station shown on the drawings to allow by-pass pumping operation to take place when required. This bypass vault assembly shall include the installation of a gate valve on the force main upstream of the by-pass tee.

(c) A 450 mm x 450 mm x 300 mm carbon steel tee fitting with a 250 mm gate valve shall be installed on the south force main as shown on the Drawings and is to be used for discharging wastewater flows during the by-pass pumping operations.

(d) A 400 mm x 400 mm x 300 mm carbon steel tee fitting with a 250 mm gate valve shall be installed on the north force main as shown on the Drawings and is to be used for discharging wastewater flows during the by-pass pumping operations.

(e) The following items shall be procured and installed by the Contractor:

(i) Two (2) 300 mm gate valves with rising stems. Gate valves to conform to current AWWA C590 Standard for Resilient Seated Gate Valves. To be epoxy coated cast iron with a counterclockwise opening rising spindle.

(ii) Carbon steel and stainless steel spool pieces as needed for connection of the discharge piping in the lift station to the bypass pumping valves and to the to the existing asbestos cement (AC) force main on the downstream end using an approved compression coupling.

(iii) Concrete Vault installed as per Section E26 and as shown in the Contract drawings.

E8.2.2 Piping and valves:

(a) Piping and valves according to contract drawings.

(b) See E36 for carbon steel and stainless steel piping and fittings.

(c) Thrust blocking to be provided for buried piping according to SD-004.

(d) See E31 for gate valves.

E8.2.3 Compression Couplings

(a) Dimensions of existing asbestos cement force mains is unknown. Contractor to field-confirm dimensions of existing asbestos cement force mains prior to selection of compression coupling gasket sizes.

(b) Acceptable Manufacturers / Products: Compression Couplings

(i) Smith Blair 413

(ii) Approved equal in accordance with B7.

E8.2.4 Bedding and Backfill

(a) Concrete Vault: Class 1 backfill in accordance with CW 2030.

(b) Force Mains: See E21.

E8.3 Measurement and Payment

E8.3.1 Vault will be paid for at the Contract Lump Sum Price for “Bypass Pumping Vault Works”. Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification, accepted by the Contract Administrator.

E9. SUPPLY AND INSTALLATION OF 1800 MM MANHOLE

E9.1 Description:

E9.1.1 This section specifies the requirements for the supply and installation of the 1800 mm bypass source manhole.

E9.1.2 This section shall supplement CW 2130.

E9.1.3 Refer to the civil drawings for bypass source manhole details and notes.

E9.1.4 Contractor to verify that temporary bypass pumps to be fitted in the manhole will have adequate space for installation and operation prior to procuring the manhole materials.

E9.2 Materials

E9.2.1 Approved Products

(a) Use only those products listed as Approved Products for Underground Use in the City of Winnipeg found on the City of Winnipeg, Materials Management web site at: http://www.winnipeg.ca/matmgt/spec/

E9.2.2 Sewer and Sewer Service Pipe

(a) Mainline and sewer connection pipe to be in accordance with AT 4.2.1.10 and AT 4.2.2.10 of the Approved Products for Underground Use in the City of Winnipeg

E9.2.3 Sewer and Sewer Service Fittings and Connection Saddles

(a) 450 millimetre and larger gasketed push-on style PVC fabricated fittings in accordance with AT 4.2.1.61 of the Approved Products for Underground Use in the City of Winnipeg.

E9.2.4 Sewer Pipe Gaskets

(a) PVC pipe gaskets, flexible rubber in accordance with ASTM F477 .2 Concrete pipe gaskets, flexible rubber in accordance with ASTM C443.

E9.2.5 Manholes

(a) Pre-cast concrete sections as indicated on SD-010 to CSA A257.4 and ASTM Standard C 76 Class II and C 478 (circular sections)

(b) Cast iron frames and covers to be in accordance with AP-006, AP-007, AP-008, AP-009, and AP-010 in accordance with AT 4.2.1.73, AT 4.2.1.75, AT 4.2.1.83B, and AT 4.2.1.83M of the Approved Products for Underground Use in the City of Winnipeg.

(c) Ladder rungs to be in accordance with AT 4.2.1.72 of the Approved Products for Underground Use in the City of Winnipeg.

(d) Pre-cast concrete adjusting rings in accordance with CAN/CSA A257.4 and ASTM C478.

(e) Concrete brick in accordance with CAN3-A165 Series.

(f) Manhole and catchbasin joint gaskets to be in accordance with AT 4.2.1.71 of the Approved Products for Underground Use in the City of Winnipeg.

(g) Core and seat boot type flexible rubber connection for PVC pipe in accordance with material requirements of ASTM C923. 2.8 Fasteners

(h) Fasteners, tie rods, clamps, straps, bands, nuts and bolts to be stainless steel in accordance with ASTM A320, ANSI Type 316 marked as such with raised or indented numerals.

E9.2.6 Cast-in-Place Concrete, Grout, Mortar and Cement-Stabilized Fill

(a) Cast-in-place concrete, grout, mortar and cement stabilized fill in accordance with CW 2160.

E9.2.7 Cement Patching Compound

(a) Cement patching compound to be fast hardening, high strength non-shrink mixture suitable for use on vertical surfaces.

E9.2.8 Bedding and Backfill

(a) Class 1 Bedding and backfill in accordance with CW 2030.

E9.2.9 Fittings and Appurtenances

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

E9.3 Construction Methods

E9.3.1 Excavation

(a) Remove existing concrete pavement slabs, miscellaneous concrete slabs, curbs and asphalt pavement in accordance with CW 3110, CW3230, CW 3235, CW 3240 and CW 3410.

(b) Excavate in accordance with CW 2030. Excavate and prepare trench a sufficient distance in ahead to not to interfere with installation of the pipe.

E9.3.2 Foundation and Bedding

(a) Place and compact foundation material, where required and bedding material in bottom of trench or excavation in accordance with CW 2030 and SD-001 to grade and elevation shown on the Drawings. Level across full width of trench or excavation and leave ready for pipe installation.

E9.3.3 Installation of Pipe

(a) Assemble pipe in accordance with manufacturer's instructions so when complete sewer will have a smooth and uniform invert. Lay pipe with bell upgrade. Use longest pipe size manufactured where practicable to reduce total number of joints on sewer.

(b) Place pipe on compacted bedding ensuring uniform support under bell and pipe body throughout its full length. Work and compact bedding material under sides of pipe to provide proper haunching.

(c) Protect exposed pipe ends with an approved stopper to prevent excess amounts of water, earth and debris from entering pipe as work proceeds.

(d) Install pipe to the line and grade shown on the Drawings or as determined by the Contract Administrator on-site.

(e) Remove construction debris and materials from sewers before performing video inspection.

E9.3.4 Line and Grade

(a) Correct alignment and grade exceeding the allowable variance in a manner acceptable to the Contract Administrator.

E9.3.5 Backfill

(a) Place and compact initial backfill above the pipe in accordance with CW 2030 and SD-001. Class 1 Backfill the reminder of the trench or excavation in accordance with CW 2030 and SD-002.

E9.3.6 Manhole

(a) Level bedding to ensure manhole base is uniformly supported and the floor is level.

(b) Construct manholes in accordance with SD-010 and as shown on the Drawings. Install manhole sections plumb and level.

(c) Install approved gasket or joint sealer between pre-cast concrete sections including 750 millimetre diameter riser adjusting rings and between frame and pre-cast concrete riser as construction progresses. Alternately install grout between frame and pre-cast concrete risers as approved and directed by Contract Administrator. Ensure grout completely fills space between frame and riser to make joint watertight and finish flush with inside surface of risers.

(d) Connect sewers to manhole bases, catch basins and catch pits at invert elevations shown on the Drawings and grout in place to make a watertight connection. Coat outside of PVC pipe end for a length equal to the manhole, catch basin and catch pit wall thickness plus 150 millimetres with an approved cementing agent to which sand has been added and allow mixture to harden before grouting in place. Alternatively,

PVC pipe may be connected using an approved pre-treated, gasketed PVC insert or an approved interference fit flexible rubber boot or gasket inserted into a hole cored in the manhole base, catch basin or catch pit wall.

(e) Bench and channel manhole floor with mortar or concrete in accordance with SD-010 and as shown on the Drawings. Curve flow channels smoothly and provide smooth transition between inlet and outlet pipes.

(f) Grout and plug lifting holes, joints and frame with mortar to make watertight. Remove excess mortar from inside surface of manhole.

(g) Compact backfill between manholes, catch basins or catch pits and the sides of the trench or excavation in accordance with CW 2030.

E9.3.7 Connection of Bypass Source Manhole to Sewer

(a) Connect to existing sewer fittings where provided with approved coupling, adapter or bushing to make a watertight connection.

(b) Connect to other types of existing sewers where no fitting is provided by making a neat circular hole in the existing sewer a maximum of 25 millimetres larger than sewer or sewer service pipe to be connected. Insert a short piece of sewer or service pipe into the hole with the bell end resting on the outside of the existing sewer pipe. Grout around and between the sewer or service pipe bell and the existing sewer pipe wall with mortar in accordance with SD-009 or construct a concrete collar in accordance with the Drawings to make a watertight connection.

(c) Make holes in existing non-reinforced monolithic concrete sewer and pre-cast reinforced concrete pipe 900 millimetres in diameter and larger: by concrete coring

(d) Ensure the new sewer or service pipe does not protrude more than 19 millimetres into the existing sewer.

(e) Remove all construction debris and materials from the existing sewer when the Work is complete.

(f) Perform a video inspection of the existing sewer after completion of backfilling and compaction using the video equipment indicated in CW 2145 from the nearest manhole to a minimum of 2 metres past the new connection. Provide the DVD of the inspection to the Contract Administrator for review. The video inspection is to clearly show the distance from the manhole to the connection and the connection. Coding of the video inspection will not be required.

E9.3.8 Plugging and Abandoning Existing Sewers

(a) The 450 mm PVC sewer connection from the source manhole to the existing 1500 mm sewer shall be plugged and abandoned upon achievement of substantial performance.

(b) Abandon sewer services under pavement by installing a plug within 1.0 metre of the sewer and filling with flowable cement-stabilized fill in accordance with SD-021 and as shown on the drawings except where the existing sewer itself will be abandoned with flowable cement-stabilized fill.

E9.4 Measurement and Payment

E9.4.1 1800 mm Manhole and connection to existing sewer will be paid for at the Contract Lump Sum Price for “Supply and Installation of 1800 mm Manhole”. Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification, accepted by the Contract Administrator.

E10. TEMPORARY WASTERWATER BYPASS PUMPING

E10.1 Description:

E10.1.1 This section specifies the requirements for the temporary by-pass pumping of wastewater flows during the Work.

E10.1.2 Refer to the contract civil drawings for bypass pumping notes.

E10.1.3 Contractor to provide a Bypass Pumping Plan and OSS to the contract administrator for approval a minimum of two (2) weeks prior to the commencement of any work.

E10.1.4 Bypass pumping is to include two (2) electric pumps (duty and stand-by) installed and ready for duty at any time.

(a) A new 1800 mm bypass source manhole is to be installed directly northeast of the lift station. The manhole shall be installed in accordance with the drawings.

(b) Each pump shall be sized for a flow of 50 L/s, at a total dynamic head to be determined by the bypass pumping system designer.

(c) Pumps may be submersible, self-priming, or any combination of the two. For any self-priming pumps used, a platform may be excavated and manhole barrels removed as needed to achieve an acceptable static lift. It is expected than the acceptable static lift from sewer base to pump centerline will be approximately 10 m. Diesel-powered pumps will not be allowed.

(d) The contractor shall install temporary plugs and piping in accordance with the drawings to direct all sewer flows to the new source manhole.

(e) The contractor shall seal the 1500 mm sewer from the wet well with a steel plate in accordance with the drawings.

(f) A backup generator capable of powering a single bypass pump, along with temporary RTU Panel, are required to be on-site at all times during any bypass pumping operations.

(g) Contractor to ensure 120-volt power is available on-site for City equipment as needed, at both the lift station and generator building, full-time for duration of bypass pumping.

(h) Temporary force mains will be required to tie into bypass vault valve. Contractor shall ensure that temporary force mains are protected in order to avoid releasing wastewater to the site.

E10.1.5 Contractor to provide 24-hour availability every day for the duration of the bypass pumping operations to immediately address interruptions in bypass pumping and mitigate the risks of spills, overflows, or basement flooding. Emergency contact information will be provided in the bypass pumping plan & OSS.

E10.1.6 Contractor to review and verify the critical basement elevation in the catchment area.

E10.1.7 Sewers can receive flow of an undetermined amount from watermain breaks, snow melt, rain, and other unforeseen sources. The Contractor will be responsible to monitor the flow in the sewer and adjust work activities accordingly, such as putting the spare standby by-pass pump into operation to handle any excessive flows due to unforeseen flow.

E10.1.8 All instrumentation in the sewer and lift station are to be protected and avoided at all times.

E10.1.9 Reference Information

(a) The expected minimum peak dry weather flow (PDWF) to the station is 30.9 L/s. The current lift station maximum capacity is 465 L/s. Note that these values do not govern the required pumping capacity as given in E10.1.4.

(b) The floor of the sewer manhole immediately upstream of the lift station will be installed at approximate elevation 222.4 metres.

E10.2 Materials

E10.2.1 Temporary By-Pass Pumping Equipment

(a) Non-clog submersible pumping units, each sized to meet or exceed the required capacity. Complete with all required piping, fittings, floats, alarms, back-up generator, pump controls, and related appurtenances suitable for temporary installation in the existing manhole.

(b) Duty pump and stand-by pump(s) to each provide a duty point flow of one hundred fifty 50 L/s.

(c) Provide model and capacity curves to the Contract Administrator for approval.

(d) Power supply to be suitably sized for pumping equipment complete with all required controls. Fuel to be in lockable, tamperproof container, approved by Contract Administrator.

(e) Contractor shall take special precautions and supply noise abatement measures as required to reduce the public exposure to noise to ensure all work is conducted in accordance with the City of Winnipeg Neighbourhood Liveability By-Law, Part 5 – Noise Control. Such measures may include but are not limited to:

(i) Enclosures for noise producing equipment (pumps, generators, etc.)

(f) The Contractor shall provide separate temporary motor starters for each pump and arrange for any temporary power required from Manitoba Hydro. Motor starters shall be installed at an easily accessible and secured location. Motor starters shall include automatic and manual modes of operation along with pilot indicating lights (run, fault, etc.).

E10.2.2 Bypass Pumping Vault and Valve Assembly.

(a) The bypass pumping discharge piping is to connect to the top flange of the vertical opened gate valve in the bypass pumping vault on the north force main. The horizontal gate valve on upstream discharge piping is to be closed to prevent backflow.

(b) The by-pass pumping discharge piping may be installed to the south force main during the installation of the north force main bypass pumping vault piping and valves.

E10.2.3 Pumps Controls

(a) Control system complete with float switches for automatic level control. Pumps shall automatically turn on and off along with include manual operation.

(b) Temporarily connect all pump controls and signals to an RTU control panel provided by the City. The monitoring points shall include all pump controls, auto modes, manual modes, pumps running, pump faults along with monitoring a high level alarm and loss of utility power.

(c) All signals going to/from the RTU control panel shall be hard wired.

E10.2.4 Backup Power

(a) Provide a portable fuel generator during the entire time temporary bypass pumping is in place to provide backup power in the event of a utility failure. Switching to generator and back to utility shall be a manual transfer switch. Contractor shall monitor generator fuel levels and top up as needed.

E10.2.5 Fittings and Appurtenances

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

E10.2.6 Inflatable Rubber Sewer Plugs may be used as needed

(a) Except for gates and valves, only inflatable rubber sewer plugs or weir structures shall be used to plug sewers.

(i) Made of rubber, capable of remaining in place when inflated to the pressure required to withstand the expected sewer levels.

(ii) Provided with an inflation/deflation hose, monitoring pressure valve, removal rope or cable and safety chain, all of sufficient length to reach ground elevations for monitoring and removal.

(b) Clean sewer pipe as required to properly install inflatable sewer plug(s) in accordance with the manufacturer`s instructions.

(c) Secure inflatable sewer plugs at or near the ground surface.

(d) Continuously monitor air pressure while sewer plug is in place and have proper inflation equipment available at all times.

E10.3 Construction Methods

E10.3.1 General

(a) Provide a plan for monitoring the temporary by-pass pumping to ensure proper operation at all times. The Contractor shall provide 24 hour personnel to address any issues with the temporary by-pass pumping. A 24 hour contact person shall be specified for the project.

(b) Contractor shall include plans for their initial temporary by-pass pumping to facilitate installation of the bypass pumping vault in their overall temporary by-pass pumping flow control plan.

(c) All instrumentation in lift station and manholes shall be protected and avoided at all times. Any damage to the lift station instrumentation by the Contractor will be repaired or replaced to the satisfaction of the Contract Administrator.

(d) A clear marker shall be installed within the upstream manhole to facilitate on-site monitoring.

(e) The Contractor shall cooperate and coordinate with the City to allow full access at all times for City staff to carry out maintenance and operational duties.

(f) Provide a temporary by-pass flow control plan to the Contract Administrator for review and approval prior to starting construction. It shall provide detailed information for pumping equipment to be used including pump capacity and dimensions, depth of submergence, pump controls and installation details. Also include discharge piping details, arrangements to protect manhole openings required to run piping and power to the pumps and power supply details.

(g) Power supply connection to the existing site power supply shall be approved by the Contract Administrator before set-up.

(h) Provide suitable traffic ramps approved by the Contract Administrator if the by-pass pumping discharge pipe and power supply cables are laid across vehicle or pedestrian traffic areas on the force main site.

(i) Cooperation and coordination will always be required with the City to allow full access to the lift station to carry out maintenance and operational duties on the site.

E10.3.2 Bypass Pumping Vault Construction

(a) The Contractor shall be responsible to obtain all necessary permits from the concerned offices/agencies in regard to the construction of the bypass pumping vault and valve assembly. The Contractor will satisfy all permits and application requirements including any testing (e.g., geotechnical, etc.) if required to obtain the permit at no extra cost.

(b) Survey and locate all existing services and limits of proposed excavation relative to existing structures. The Contractor shall provide all survey and layout Work necessary to accurately layout and position the new construction. The Contract Administrator, at their sole discretion, may undertake a confirmatory survey of the Contractor's Work if considered necessary.

(c) Design, supply, and install shoring system necessary for opening the new excavation to the required depth and dimensions necessary to install the new assembly.

(d) All excavations within 1.5 metres of sewers to be soft dug, either hydro excavated or by hand, as necessary to avoid potentially damaging the existing sewers.

E10.3.3 Restoration

(a) Restore the disturbed area and surface during construction to match the existing surroundings as per the City requirements and applicable standards.

E10.3.4 Temporary Bypass Pumping

(a) Once bypass pumping vault and valve assembly is in operation, sewage can be pumped from the new source manhole to the north force main by-pass tee during pumping station shutdown.

(b) Provide detailed information for pumping equipment to be used including pump capacity and dimensions, depth of submergence, pump controls and installation details to the Contract Administrator for review before construction starts.

(c) Power supply to be approved by the Contract Administrator before set-up. Locate the power supply where it will not adversely affect local residences. Location to be approved by the Contract Administrator before construction starts.

(d) Power supply for the pumps is the responsibility of the Contractor and must be suitably sized for pumping equipment complete with all required automatic controls. Should one pump not perform, an alarm shall be raised to the contractor's representative and the standby pump shall be used.

(e) Provide a check valves on the by-pass pumping discharge pipe as required to prevent cycling.

(f) If a temporary pump in use fails, it must be replaced immediately.

(g) The Contractor shall ensure temporary by-pass pumping equipment and Materials will be properly insulated and heated, if required, to be protected from freezing and to maintain proper functioning during cold weather.

(h) Under no circumstances shall wastewater levels in the sewer rise above the critical basement elevation indicated.

(i) Temporary by-pass pumping equipment and Materials shall remain on-Site until the pumping station construction is completed as described in these Specifications and to the satisfaction of the Contract Administrator.

E10.4 Measurement and Payment

(a) Wastewater Temporary By-Pass Pumping will be paid for at the Contract Lump Sum Price for "Wastewater Temporary By-Pass Pumping". Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification, accepted by the Contract Administrator.

(b) There shall be no claim for additional costs or time due to increased standby pumping operations from high wet weather flows.

E11. SHOP DRAWINGS

E11.1 Submit shop drawings in accordance with Section 01 33 00. Refer to Appendix E for shop drawings to be submitted on this contract. The shop drawings submitted must not necessarily be limited to the items in this list.

E12. CONTRACTOR SUPPLIED STANDARDIZED EQUIPMENT

E12.1 Comply with the general requirements of E12 for all Standardized Goods supplied by the Contractor.

E12.2 Comply with the following Standardization Goods requirements:

E12.2.1 Standardized PLC Control System and Motor Control Equipment in accordance with E13.

E12.2.2 Standardized Electric Valve Actuators in accordance with E14.

E12.2.3 Standardized Gas Detection Systems in accordance with E15.

E12.2.4 Standardized Instrumentation in accordance with E16.

E12.3 Contact the Contract Administrator regarding any potential uncertainty as to whether a good is covered under a standardization agreement.

E12.4 The Contractor may utilize a Standardization Vendor to provide other goods required under the Contract, in addition to Standardized Goods.

E12.5 The Contractor shall separately track all goods supplied under each standardization agreement.

E12.5.1 In the event that one or more Standardization Vendors are utilized to procure goods not covered under a standardization agreement, the Contractor shall ensure such goods are quoted, ordered, tracked and accounted in a separate manner.

E12.6 Pricing:

E12.6.1 The City has obtained discounted pricing for Standardized Goods. Each Standardization Vendor is obligated to sell Standardized Goods to all prospective Contractors at the discounted price, provided the goods are for the City of Winnipeg.

E12.6.2 The Standardization Vendors may at their option provide lump sum pricing for goods packages. The Standardization Vendor is not required to provide breakout pricing details to the Contractor.

E12.6.3 The Contractor and Subcontractors shall not utilize the City's agreements with the Standardization Vendors for any purpose other than City work.

E12.6.4 The City may audit the goods purchased from the Standardization Vendors under the standardization agreements and may identify to the Standardization Vendors any goods procured that are not associated with the Contract.

E12.7 The Contractor is responsible for ensuring that the Material supplied by the Standardization Vendors meets the requirement of the Contract. The Contractor shall review and confirm quotations supplied by the Standardization Vendors to ensure that all required Material is supplied.

E12.8 Without limiting or otherwise affecting any other term or condition of the Contract, including (non-exhaustive) D35.2.1:

E12.8.1 The supply of goods through a Standardization Vendor shall not relieve the Contractor of their obligations.

E12.8.2 Errors or omissions by a Standardization Vendor shall not be a cause for a Change in Work.

E12.8.3 Delays by a Standardization Vendor shall not be a cause for a Change in Work where the delay could have been avoided through reasonable planning, contingency allocation, or communication by the Contractor.

E12.8.4 The Contractor shall engage directly with the persons listed as the Standardized Vendor contact in the following sections E13.8, E14.12, E15.7 and E16.8 unless otherwise directed by the Contract Administrator.

E12.9 Submittals

E12.9.1 Submittals shall be provided for Standardized Goods in accordance with the Specifications and typical industry practice. Submittals shall not be bypassed for Standardized Goods.

E13. STANDARDIZED PLC CONTROL SYSTEM AND MOTOR CONTROL EQUIPMENT

E13.1 The City has standardized on a specific vendor for the supply and delivery of PLC control system and motor control equipment. The Standardization Vendor was selected via RFP 756-2013 and was awarded to Schneider Electric Canada Inc. (Schneider).

(a) Refer to E13.8 for contact information.

(b) Copies of the tender documents are available from City of Winnipeg Material Management's website.

E13.2 Goods to be procured via this standardization agreement includes but is not limited to:

(a) Modicon Programmable Automation Controllers (PACs) M580, M580S, M340 including all associated IO and Network hardware.

(b) PLC to Infi90 Termination Unit migration cables

(c) PAC Programming Software

(d) AVEVA Dynamic- Dynsim Process Simulator Software.

(e) AVEVA Plant SCADA HMI System software.

(f) AVEVA Historian Server and Client Software.

(g) Harmony Touchscreen HMI Hardware Panel systems including iPC (Industrial PC).

(h) Touchscreen HMI Programming Software.

(i) Model6 Motor Control Centers including all EcoStruxure components.

(j) Altivar Process and APM LV VFDs, Altivar6000 MV VFD Systems, motor starters, AltiStart22, 480 soft starters, and associated components.

(k) Modicon Industrial Ethernet Switches as per design. Note that some Ethernet switches may be specified to be from other vendors due to application requirements. Refer to drawings and specifications.

(l) AVEVA Octoplant Version Management Software.

(m) AVEVA Insight Information Server Software.

(n) AVEVA Reports for Operations Metric Software

(o) AVEVA Teamwork – Enterprise Database Integration Software

(p) AVEVA PI – Global Historian Software

(q) Schneider Electric Systems Integration Services (including programming and configuration);

(r) Schneider ETAP Electrical – Model, Monitor and Manage Electrical Networks Software

(s) Schneider Electric Classroom and Virtual training sessions.

E13.3 For clarity, this standardization agreement does not include:

(a) Computer workstation hardware including operating systems;

(b) Computer server hardware, including operating systems and general terminal server / client software;

(c) Thin client terminals;

(d) Fused and un-fused disconnect switches not incorporated into a MCC or other motor starter;

(e) Control stations and pendants not incorporated into a MCC or other motor starter;

(f) Electrical Transformers not in a MCC or motor starter;

(g) Panelboards not integrated in a MCC;

(h) Switchboards / Switchgear not integrated in a MCC;

(i) Control Panels to house PLCs;

(j) Instrumentation;

(k) Power supplies not integrated with the PLC / HMI systems; and

(l) Terminal blocks not integrated with the PLC / HMI systems

E13.4 The following model series shall be utilized unless otherwise indicated in the Specifications, Drawings or otherwise approved by the Contract Administrator:

(a) Modicon M580, M580S (for SIL level applications)

(b) Modicon X80 PLC I/O; Modicon Ethernet Switches

(c) EcoStruxure Control Expert programming software

(d) AVEVA Plant Scada HMI systems; AVEVA Teamwork, AVEVA INSIGHT, AVEVA Octoplant, AVEVA Reports for Operation

(e) AVEVA Historian; AVEVA PI

(f) Local Panel HMI – Harmony series

(g) Schneider Electric Model 6 MCC – NEMA rated standard starters, Intelligent Ethernet (unless otherwise specified)

(h) Altivar Process 600 series VFDs for variable torque applications; and

(i) Altivar Process 900 series VFDs for more demanding applications.

(j) Altivar APM LV VFDs for over 125HP applications

(k) Altivar 6000 Medium Voltage System VFD and Service

(l) Schneider ETAP Electrical – Model, Monitor and Manage Electrical Networks Software

E13.5 The following shown on the Drawings and Specifications are considered standardized control system and motor control equipment:

(a) Non-Emergency MCC-L71 and Emergency MCC-L72E;

(b) VFD-L01, VFD-L02 and VFD-L03; and

(c) PLC-L82 and HMI-L82.

E13.6 Commissioning and start-up:

E13.6.1 Except as identified in E13.6.2, commissioning and start-up of all goods purchased under this standardization agreement shall be performed by Schneider Electric Systems Canada Inc.

E13.6.2 Schneider shall provide MCC start-up services, but not commissioning services. Coordinate with Schneider as required to understand the limitations of Schneider's MCC start-up services and contractor to provide all remaining testing, commissioning and start-up services to provide a complete commissioning and start-up. VFDs either stand-alone or in MCC shall be set-up and commissioned by Schneider Electric to certify a 5-year warranty,

The contact information for all quotations for service for 5-year warranty of Schneider VFDs is:
Dan Schmautz
Expert Service
21 Omands Creek Blvd. Winnipeg. Mb.
C: 204-612-4349
dan.schmautz@se.com

E13.7 Training

E13.7.1 Training to be incorporated into the on-site program outlined in E43.

E13.7.2 PLC, MCC, and VFD Local Training Session

(a) Overview

(i) Provide instruction to designated City personnel in the operation and maintenance of the Schneider components and associated Schneider tools and equipment.

(ii) This training does not relieve the Contractor of other training requirements associated with the control system.

(b) Location

(i) The training will be performed in conjunction with commissioning, on-site. See E43.

(c) Materials

(i) Provide equipment, visual and audio aids, and materials as needed.

(d) Attendees

(i) The attendees are expected to include, but not be limited to: electrical and instrumentation maintenance personnel and programmable controller support specialists.

E13.8 The contact information for all quotations and purchases from Schneider is:

Garth Eastman
21 Omands Creek Blvd
Winnipeg, MB, R2R 2V2
Telephone: 204-228-7807
E-mail: garth.eastman@se.com

E13.8.1 Goods to be procured directly from Schneider using the Schneider contact:

(a) Further to E13.2, goods to be procured via Schneider includes but is not limited to:

(i) PLC to Infi90 Termination Unit migration cables.

(ii) Schneider Electric Systems Integration Services (including programming and configuration);

(iii) ETAP – Electrical Design Software

(iv) Training sessions.

E13.8.2 The Contact information for all quotations for Software from Industrial Software Solutions (ISS) is:

Fraser Newton
Vice President Sales
Industrial Software Solutions - AVEVA
frasern@industrial-software.com
10189 101 Street NW

C (604) 306-6585

E13.8.3 Goods (Software) to be procured directly from ISS using the ISS contact:

(i) AVEVA Plant SCADA Software

(ii) AVEVA Historian Server and Client Software.

(iii) AVEVA Process Simulator Software.

(iv) AVEVA Octoplant Version Management Software.

(v) AVEVA Insight Information Server Software.

(vi) AVEVA Reports for Operations Metric Software

(vii) AVEVA Teamwork – Enterprise Database Integration Software

(viii) AVEVA PI – Global Historian Software

(ix) AVEVA Training sessions.

E13.8.4 Goods to be procured via EECOL Electric (EECOL) Winnipeg or Choice Electrical Supply (Choice) Winnipeg, as Schneider's High Tech Automation Distributors:

(a) Further to E13.2, goods to be procured via EECOL or Choice includes but is not limited to:

(i) Programmable Controllers (PLCs) including all associated components hardware and software;

(ii) Programmable Controller Programming Software.

(iii) Schneider Electric Systems Integration Services (including programming and configuration);

(iv) Schneider Electric VFD 5-year warranty Services

(v) HMI System software.

(vi) Touchscreen HMI systems such as Harmony HMIs.

(vii) Touchscreen HMI Programming Software;

(viii) Motor Control Centers including all components;

(ix) Loose VFDs, motor starters, soft starters, and associated components; and

(x) Industrial Ethernet Switches as per design. Note that some Ethernet switches may be specified to be from other vendors due to application requirements. Refer to drawings and specifications.

(b) The EECOL contact:

Sean Eschyschyn
Regional Industrial Manager
EECOL Electric
Sean.Eschyschyn@eecol.com
1760 Wellington Ave. MB R3H 0E9
P (204) 774-2800 C (204) 399-9304

(c) The Choice Contact:

Ofer Margovski
Technical Sales
Choice Electrical Supply
oferm@choicesupply.ca
2130 Notre Dame Ave.
Winnipeg, Mb.
P (204) 783-2333 C (204) 688-4241

(d) All correspondence related to requests-for-quotations to EECOL or Choice for goods listed under E13.8.1(a) shall be copied to the Schneider contact listed under E13.8

For whatever reason, if EECOL or Choice is unable to receive or respond to request-for-quotations for goods listed under E13.8.1(a), request-for-quotations may be issued directly to the Schneider contact listed under E13.8.

E13.9 Quotations and orders:

E13.9.1 Reference the following in all quotation requests and purchase orders:

(a) This Bid Opportunity number; and

(b) A statement indicating:

"This request / purchase order is subject to the Terms and Conditions of City of Winnipeg Request for Proposal RFP 756-2013."

E13.10 Measurement and Payment:

(a) According to Form B. Indicate base costs for material supply under the standardization agreement. Any material mark-up or installation costs, as applicable, shall be included in other line items of Form B.

(b) Payment shall be in accordance with the following payment schedule:

(i) Ten (10) percent upon approval of Shop Drawings.

(ii) Seventy (70) percent upon all standardized Schneider equipment received in Winnipeg.

(iii) Twenty (20) percent upon completion of commissioning and standardized Schneider equipment is in-service.

(c) Training to be included as part of E43

E14. STANDARDIZED ELECTRIC VALVE ACTUATORS

E14.1 The City has standardized on a specific vendor for the supply and delivery of electric valve actuators. The Standardization Vendor was selected via RFP 331-2014 and was awarded to Rotork Control Canada Ltd. (Rotork).

(a) Copies of the tender documents are available from City of Winnipeg Material Management's website.

E14.2 Goods to be procured via this standardization agreement include but are not limited to:

(a) Multi-turn electric valve actuators and quarter-turn electric valve actuators with approximate torque requirements of:

(i) On/off torques > 250 Nm

(ii) Modulating torques > 150 Nm

(b) Associated accessories are also included in the agreement.

E14.3 For clarity, this standardization agreement does not include:

(a) Solenoid valve actuators;

(b) Small HVAC damper actuators; and

(c) Electric valve actuators with a power supply < 120 VAC.

E14.4 The following shown on the Drawings, Specifications and Instrument List are considered standardized valve equipment:

(a) XV-L412 and XV-L422.

E14.5 The use of gearboxes shall not be utilized to reduce actuator torque requirements for the purpose of bypassing this standardization agreement.

E14.6 The following model series shall be utilized unless otherwise indicated in the Specifications, Drawings or otherwise approved by the Contract Administrator:

(a) IQ3 Range – (IQ, IQM, IQS, IQT, IQTM)

E14.7 Electric Motor Actuators – Plug Valves, Three Phase:

(a) General:

(i) Comply with AWWA C542.

(ii) Controls integral with the actuator and fully equipped as specified in AWWA 542.

(iii) Stem protection for rising stem valves.

(iv) Lubricant shall be NSF 61 certified for potable water application.

(v) Capable of functioning properly in ambient temperature range of minus 33 degrees C to 70 degrees C and up to 100 percent relative humidity.

(vi) Provide intermediate gear box if required to meet valve torque requirements. Gear box shall be of same manufacturer as actuator.

(vii) Design that allows gear case to be opened for inspection or disassembly without releasing stem thrust or taking valve out of service.

(viii) Circuitry which ensures motor turns in correct direction irrespective of supply polarity connected to power terminal; valve and operator to suffer no damage due to incorrect power connection.

(ix) Instantaneous reversal protection whereby automatic time delay circuit limits current surges when actuator is signaled to instantaneously reverse direction.

(x) Anti-hammer protection whereby electronic torque limitation switches off actuator when preset load is reached due to obstruction or end of travel.

(xi) Bi-metal thermostat embodied in motor control transformer windings to prevent overheating due to extensive use.

(xii) Jammed valve motor protection whereby logic circuit protects motor from overheating by de-energizing motor if valve does not move after developing maximum torque.

(xiii) Opto-isolators incorporated to interface with remote control inputs to protect logic circuits from high voltage transients appearing at actuator terminals.

(xiv) Actuator shall include diagnostic module which will store and enable download of historical actuator data to permit analysis of changes in actuator or valve performance. Retrieval of this information must be demonstrated in the field.

(b) Actuator Operation - General:

(i) Suitable for fully opening and closing corresponding plug valves.

(ii) Rated for a minimum shut-off pressure of 35 PSI. On/off torque of approximately 3000-4000 Nm.

(iii) Valve position indication.

(iv) Operate from fully CLOSED to fully OPEN positions or reverse in minimum of 60 seconds, unless indicated otherwise.

(v) Non-Intrusive Electronics: Local controls, diagnostics, and calibration, including limit and torque switch settings, shall be accomplished non-intrusively. Electronic valve position display with capability to show continuous torque output. If applicable, provide two hand-held configuration units for every 10 actuators provided, two minimum.

(c) Open/Close Service

(i) Capable of 60 starts per hour.

(ii) Size with a minimum of 1.5 safety factor based on the maximum unseating and seating torque of the valve at its AWWA pressure classification. Safety factor shall be demonstrated and documented in Shop Drawings submittals and at time of commissioning under real service conditions using actuator software and torque display on actuator. Motor stall torque not to exceed capacity of valve.

(iii) Actuator suitable for throttling operation of valve at intermediate positions.

(iv) Controls and Indicators:

- PROFIBUS DP interface, unless otherwise noted.
- LOCAL-OFF-REMOTE selector switch, padlockable in each position.
- Integral OPEN-STOP-CLOSE momentary pushbuttons with seal-in circuits to control valve in LOCAL position.
- Remote OPEN-STOP-CLOSE momentary control dry contact inputs in REMOTE position. Integral seal-in circuits for remote OPEN and CLOSE commands; valve travel stops when remote STOP contact opens.
- Auxiliary contact that closes in REMOTE position.
- OPEN and CLOSED indicating lights.
- Integral reversing motor starter with built-in overload protection. Control transformer for 120-volt or 24-volt control voltage.
- Valve shall remain in OPEN position on loss of operator power.

(d) Actuator Power Supply:

(i) 600V ac, three-phase, 60 Hz unless indicated otherwise.

(ii) Control power transformer, 24-volt or 120-volt secondary.

(iii) Externally operable power disconnect switch.

(e) Enclosure:

(i) Unless indicated otherwise, provide enclosure as defined in NEMA 250, Type 6P.

(ii) Hazardous environment- and water-tight enclosure, double-sealed internal housing preventing infiltration of moisture/air such that condensation and corrosion risks are mitigated.

(f) Fire Protection:

(i) Where indicated in Electric Motor Actuated Valve Schedule, provide actuator with intumescent coating system for fire protection.

(ii) Coating shall provide minimum 30 minutes protection at 1093 degrees C and meet or exceed requirements of API 607 and UL 1709.

(iii) Coating shall provide complete access to all actuator components and permit dismantling and re-assembly of actuator without disturbing coating.

(g) Limit Switches:

(i) Single-pole, double-throw (SPDT) type, field adjustable, with contacts rated for 5 amps at 120 volts ac.

(ii) Each valve actuator to have minimum of two transfer contacts at end position, one for valve fully OPEN and one for valve fully CLOSED.

(iii) Housed in actuator control enclosure.

(h) Remote Control Stations:

(i) Provide remote control stations.

(ii) Enclosure:

- CSA approved.
- Non-hazardous Locations: NEMA 250 Type 4X, Type 316 stainless steel.
- Hazardous Locations: NEMA 250 Type 7, cast ferrous metal with electro-galvanized finish, or copper-free aluminum, with drilled and tapped conduit entrances, hinged cover.
- Provide stanchion for floor-mounting control station where wall-mounting is not practical.
- Control station shall be supplied with terminal strip that corresponds with actuator terminals. Control will be wired from plant PLC to control station, then to actuator.
- All control stations shall contain LOCAL-REMOTE selector switch and “Remote Selected” contact to be wired in series with remote-selected contact in actuator.
- For open-close/throttling actuators, control station shall include OPEN and CLOSE momentary pushbuttons, red indicating light for OPEN, yellow indicating light for mid-position, green indicating light for CLOSED, and emergency STOP pushbutton.
- For modulating actuators, control station shall include OPEN and CLOSE hold-to-run pushbuttons, red indicating light for OPEN, yellow indicating light for mid-position, green indicating light for CLOSED, and two digital displays, one for input commanded position and one for output valve position indication.
- All pushbuttons, lights and digital displays shall be properly labeled with lamacoids.

E14.8 Valve Integration Assistance

E14.8.1 Coordinate with Rotork to review the integration of valves with the valve actuators. Comply with guidance provided by Rotork.

E14.8.2 The review provided by Rotork shall be for the purpose of ascertaining conformance of the actuator application with the given valve. The responsibility for integration of the valve with the valve actuator shall remain with the Contractor.

E14.8.3 Rotork will make all applicable actuator shop drawings and datasheets available to the Contractor to allow for integration of the valve with the valve actuator.

E14.8.4 In the event that the valve cannot directly attach to a standard base available for the electric actuator, supply and installation of valve adaptors between the actuator base and the valve will be the responsibility of the Contractor.

E14.8.5 Costs

(a) Rotork is obligated to provide valve integration assistance services at no additional cost above the supply of the actuator.

E14.9 Valve Integration Services

E14.9.1 The Contractor may engage Rotork to provide valve integration services in addition to that required in E14.7; however, this additional work would be outside of the Standardization Agreement.

(a) The Contractor is encouraged to provide the best value for services provided.

E14.10 Field setup and commissioning:

E14.10.1 Field setup and commissioning of the actuators shall be performed by Rotork under the standardization agreement for the following:

(a) The first actuator of each type installed on site; and

(b) A minimum of two actuators additional of each type, or 5% of the actuators of that type, whichever is greater.

E14.10.2 Coordinate with Rotork as required to understand the limitations of Rotork's field setup and commissioning services and provide all remaining services to provide a complete commissioning and start-up.

E14.10.3 Field setup and commissioning of the remaining actuators may be performed by Rotork, or by a representative of the valve manufacturer.

E14.10.4 Rotork's presence to setup and commission the actuator in no way limits the valve or gate vendor's responsibility for setup and commissioning.

E14.10.5 Responsibility of the Contractor:

(a) It is the responsibility of the Contractor to ensure that the installation of the actuator is complete and that the valve is ready to commission, as per Rotork's documented pre-commissioning checklist.

E14.10.6 Field setup and commissioning servers shall include all standard manufacturer recommended start-up and commissioning procedures, as well as the following:

(a) Visual Inspection
  (i) Inspect equipment for signs of damage.
  (ii) Verify mechanical installation per drawings.
  (iii) Inspect electrical terminal compartment for foreign objects.

(b) Mechanical Inspection
  (i) Check all bolts for tightness and to the correct torque.
  (ii) Check for alignment.
  (iii) Ensure appropriate clearances for all connecting bushings and connecting faces.

(c) Electrical Inspection
  (i) Check all power wiring connections for tightness.
  (ii) Check all fuses for continuity.
  (iii) Confirm input voltage and phase rotation is correct.
  (iv) Confirm that the control / fieldbus connections are correct.

(d) Start-up Services
  (i) Coordinate turning on power to the actuator.
  (ii) Perform functional tests.
  (iii) Coordinate with City personnel and designated representatives to confirm and finalize the application requirements.
  (iv) Configure and document all settings, as appropriate for the application.
  (v) Perform test runs.
  (vi) Verify that all configuration values are in the correct state.
  (vii) Transfer the configuration settings to on-site personnel.

E14.11 On-Site Training Session

E14.11.1 Training to be incorporated into the on-site program outlined in E43.

E14.11.2 Operation and Basic Maintenance

(a) Overview

(i) Provide instruction to designated City personnel in the operation and basic maintenance of the electric actuators.

(ii) This training will be provided by an authorized Rotork representative.

(iii) This training does not relieve the contractor of other training requirements associated with process equipment.

(b) Location

(i) The training will be performed in conjunction with commissioning, on-site. See E43.

(c) Submittals

(i) Submit the names and qualifications of the proposed instructors. The Contract Administrator may reject instructors it deems to not be qualified.

(ii) Submit brief overview of content of each training segment a minimum of 30 Calendar Days prior to the anticipated date of beginning of training.

(d) Materials

(i) Provide equipment, visual and audio aids, and materials as needed.

(ii) Supply manual for each trainee, describing in detail the information included in each training program.

(e) Attendees

(i) The attendees are expected to include, but not be limited to:

- Operations personnel.
- Mechanical maintenance personnel.
- Electrical and instrumentation maintenance personnel.

(f) Content

(i) Overview of the equipment.

(ii) Internal operation of the actuators.

(iii) Equipment operating training and manual to include:

- Local operation of the actuator,
- Manual / handwheel operation,
- Remote operation, and
- Operation via the remote configuration tool.
- Basic diagnostics,
- Basic troubleshooting,
- Access to historical information and torque values, and
- Preventative maintenance

E14.11.3 Detailed Configuration and Service

(a) Overview

(i) Provide instruction to designated City personnel in the operation and basic maintenance of the electric actuators.

(ii) This training will be provided by an authorized Rotork representative.

(iii) This training does not relieve the contractor of other training requirements associated with process equipment.

(b) Location

(i) The training will be performed in conjunction with commissioning, on-site. See E43.

(c) Submittals

(i) Submit the names and qualifications of the proposed instructors.

(ii) Submit brief overview of content of each training segment a minimum of 30 Calendar Days prior to the anticipated date of beginning of training.

(d) Materials

(i) Provide equipment, visual and audio aids, and materials.

(ii) Supply manual for each trainee, describing in detail the information included in each training program.

(e) Attendees

(i) The attendees are expected to include, but not be limited to:

- Mechanical maintenance personnel.
- Electrical and instrumentation maintenance personnel.

(f) Content

(i) Detailed overview of the equipment and its internal construction.

(ii) Equipment configuration training and manual to include:

- Setup of the actuator parameters,
- Establishing communications, and
- Setting torque limits and end limits.
- Detailed diagnostics,
- Detailed troubleshooting,
- Preventative maintenance,
- Disassembly,
- Replacement of modules, and
- Fieldbus diagnostics
- Basic operation of the software,
- Connecting to electric actuators,
- Download and upload of the actuator configuration, and
- Diagnostics and troubleshooting.

E14.12 The contact for all quotations and purchases:

Terry Arduini
Sector Manager
Water & Power- Canada
C: +1 (514) 292-3488
E: terry.arduini@rotork.com
Rotork Controls (Canada) Ltd
4228 – 55 Ave NW, Edmonton, AB T6B 3S2

E14.13 Quotations and orders:

E14.13.1 Reference the following in all quotation requests, quotations \ proposals, purchase orders, and invoices:

(a) This Bid Opportunity number; and

(b) A statement indicating:

"This request / purchase order is subject to the Terms and Conditions of City of Winnipeg Request for Proposal RFP 331-2014."

E14.14 Measurement and Payment:

(a) According to Form B. Indicate base costs for material supply under the standardization agreement. Any material mark-up or installation costs, as applicable, shall be included in Item 23 of Form B.

(b) Training to be included as part of E43, Item 32 of Form B.

E15. STANDARDIZED GAS DETECTION SYSTEMS

E15.1 The City has standardized on a specific vendor for the supply and delivery of gas detection systems. The Standardization Vendor was selected via RFP 123-2014 and was awarded to Mine Safety Appliances Company, LLC (MSA) c/o Tundra Process Solutions Ltd.

(a) Copies of the tender documents are available from City of Winnipeg Material Management's website.

E15.2 Goods to be procured via this standardization agreement include but are not limited to:

(a) Gas detection sensors;

(b) Gas detection transmitters;

(c) Gas detection controllers;

(d) Gas detection sensor consumables; and

(e) Associated accessories.

E15.3 The following model series shall be utilized unless otherwise indicated in the Specifications, Drawings or otherwise approved by the Contract Administrator:

(a) X5000 gas detection systems.

(b) GasGard XL controllers.

E15.4 The following shown on the Drawings, Specifications and Instrument List are considered standardized gas detector equipment:

(a) AIT-L510 and sensor AE-L510-1; and

(b) AIT-L520 and sensor AE-L520-1.

E15.5 Field setup and commissioning:

E15.5.1 Field setup and commissioning of the gas detection systems may be performed by MSA under the Standardization Agreement. Coordinate with MSA as required to understand the capabilities and limitations of MSA's field setup and commissioning services and provide all remaining services to provide a complete commissioning and start-up.

E15.5.2 The Contractor may provide field setup and commissioning services for the gas detection system via alternate means, provided that this does not result in a reduction of the services or quality of work.

E15.5.3 City of Winnipeg commissioning forms must be used. Forms are provided in Appendix C. The forms provided are subject to change prior to commissioning.

E15.5.4 Where MSA is utilized to provide field setup and commissioning, their scope of work has been standardized as follows:

(a) Provide the services for a factory-trained instrument technician to setup and commission the gas detection instruments and controllers, as requested by the City. It is expected that setup and commissioning will be required for some, but not all, of the equipment.

(b) Qualification

(i) The personnel provided shall be a factory trained and certified technologist, with a minimum of one year of experience working with the products proposed.

(c) Services

(i) Provide a full eight hours of on-site labour, for each allocated day, to setup and commission the gas detection systems.

(ii) Provide all travel and tools required.

E15.6 Training

E15.6.1 Training to be incorporated into the on-site program outlined in E43.

E15.7 The contact for all quotations and purchases:

Sheldon Bradley
Western Canada Sales Manager
Fixed Gas & Flame Detection
MSA Safety Sales, LLC
Telephone: 587-437-9843
E-mail: Sheldon.Bradley@msasafety.com

E15.8 Quotations and orders:

E15.8.1 Reference the following in all quotation requests, quotations \ proposals, purchase orders, and invoices:

(a) This Bid Opportunity number; and

(b) A statement indicating:

"This request / purchase order is subject to the Terms and Conditions of City of Winnipeg Request for Proposal RFP 123-2014."

E15.9 Measurement and Payment:

(a) According to Form B. Indicate base costs for material supply under the standardization agreement. Any material mark-up or installation costs, as applicable, shall be included in other line items of Form B.

E16. STANDARDIZED INSTRUMENTATION

E16.1 The City has standardized on a specific vendor for the supply and delivery of specific instrumentation. The Standardization Vendor was selected via RFP 449-2014 and was awarded to Trans-West Supply Company Inc. (Trans-West).

(a) Copies of the tender documents are available from City of Winnipeg Material Management's website.

E16.2 Goods to be procured via this standardization agreement include but are not limited to:

(a) Flowmeters – Electromagnetic;

(b) Flowmeters – Differential pressure based;

(c) Pressure Transmitters including manifold assemblies;

(d) Temperature Transmitters including temperature elements and thermowells;

(e) Ultrasonic Level Transmitters; and

(f) Associated accessories.

E16.3 For clarity, this standardization agreement does not include:

(a) Flowmeters - Coriolis;

(b) Flowmeters – Thermal Dispersion;

(c) Flowmeters – Ultrasonic;

(d) Flow switches (i.e. mechanical);

(e) Pressure switches;

(f) Temperature switches;

(g) Radar Level Transmitters; and

(h) Level Switches (non-ultrasonic based).

E16.4 The following model series shall be utilized unless otherwise indicated in the Specifications, Drawings or otherwise approved by the Contract Administrator:

(a) Magnetic Flowmeter Flowtubes – SITRANS F M MAG 5100W series.

(i) SITRANS F M MAG 3100W series may be utilized where specified.

(b) Magnetic Flowmeter Transmitters - SITRANS F M MAG 6000 series.

(c) Pressure Transmitters - SITRANS P420.

(d) Temperature Transmitters

(i) SITRANS TF (Process Applications)

(ii) SITRANS TH400 (HVAC applications)

(e) Ultrasonic Level Transmitters

(i) Integrated applications: SITRANS Probe LU

(ii) Separate controller applications: Multiranger 100/200 with EchoMax transducers.

E16.5 The following shown on the Drawings, Specifications and Instrument List are considered standardized instrumentation equipment:

(a) FIT-L012 and sensor FE-L012;

(b) FIT-L022 and sensor FE-L022;

(c) FIT-L032 and sensor FE-L032;

(d) LIT-L100-1 and LIT-L100-2; and

(e) TT-L631, TT-L651, TT-L661, TT-L662 and TT-L721.

E16.6 Field setup and commissioning:

E16.6.1 Field setup and commissioning of the gas detection systems may be performed by Trans-West under the Standardization Agreement. Coordinate with Trans-West as required to understand the capabilities and limitations of Trans-West's field setup and commissioning services and provide all remaining services to provide a complete commissioning and start-up.

E16.6.2 Field setup and commissioning of the standardized instrumentation shall be performed by Trans-West under the standardization agreement for the following:

(a) The first instrument of each type installed on site; and

(b) A minimum of five additional instruments of each type, or 10% of the actuators of that type, whichever is greater.

E16.6.3 The Contractor may provide field setup and commissioning services for the remaining instrumentation via alternate means, provided that this does not result in a reduction of the services or quality of work.

E16.6.4 The services provided are to include at all standard manufacturer recommended start-up and commissioning procedures, as well as the following:

(a) Visual Inspection

(i) Inspect instrument for signs of damage,

(ii) Verify mechanical and piping installation per drawings and manufacturer requirements,

(iii) Verify wiring installation per drawings and manufacturer requirements, and

(iv) Inspect electrical terminal compartment for foreign objects.

(b) Mechanical Inspection
  (i) Check all connections and bolts for tightness and to the correct torque,
  (ii) Check for alignment, and
  (iii) Ensure appropriate clearances for all connecting bushings and connecting faces.

(c) Electrical Inspection
  (i) Check all power wiring connections for tightness,
  (ii) Check all fuses in the instrument for continuity,
  (iii) Confirm input voltage is correct, and
  (iv) Confirm that the signal / fieldbus connections are correct.

(d) Start-up Services
  (i) Coordinate turning on power to the instrument,
  (ii) Configure all applicable settings and parameters that could not be configured prior to installation,
  (iii) Perform functional tests,
  (iv) Coordinate with City personnel and designated representatives to confirm and finalize the application requirements,
  (v) Configure and document all settings, as appropriate for the application,
  (vi) Coordinate to perform test demonstrations to verify instrument performance,
  (vii) Verify that all configuration values are in the correct state, and
  (viii) Transfer the configuration settings to on-site personnel.

(e) Documentation
  (i) Provide a signed documented commissioning form for each instrument, in a format acceptable to the Contract Administrator.

(f) Travel
  (i) Provide all travel and accommodations at no additional cost.

(g) Personnel:
  (i) Personnel shall be factory trained in the maintenance, configuration, and service of the proposed instrumentation.

E16.6.5 Responsibility of the Contractor:

(a) It is the responsibility of the Contractor to ensure that the installation of the instrumentation is complete and that the instrument is ready to commission prior to engaging Trans-West to commission any instrumentation.

E16.7 Training

E16.7.1 Training to be incorporated into the on-site program outlined in E43.

E16.8 The contact for all quotations and purchases:

Amurthan (Amu) Abimanan Branch Manager
126 Bannister Road
Winnipeg, MB, R3R 0S3
Telephone: 204-783-0100
Mobile: 204-782-1864
E-mail: amu@transwest-mb.com

E16.9 Quotations and orders:

E16.9.1 Reference the following in all quotation requests, quotations \ proposals, purchase orders, and invoices:

(a) This Bid Opportunity number; and

(b) A statement indicating:

"This request / purchase order is subject to the Terms and Conditions of City of Winnipeg Request for Proposal RFP 449-2014."

E16.10 Measurement and Payment:

(a) According to Form B. Indicate base costs for material supply under the standardization agreement. Any material mark-up or installation costs, as applicable, shall be included in other line items of Form B.

(b) Training to be included as part of E43

E17. PRE-CONSTRUCTION PHOTOGRAPHS

E17.1 The Contractor is responsible for taking photographs and/or video of the surrounding structures, houses and landscaping in order to establish the condition of the area around the pumping station prior to commencement of the Work. The pictures and/or video must be submitted to and approved by the Contract Administrator prior to the commencement of the Work.

E17.2 Payment

(a) Pre-Construction Photographs shall be considered incidental to the Works of this Contract and no separate payment will be made for this item.

E18. WORK AND EQUIPMENT SUPPLIED BY OTHERS

E18.1 The City will provide temporary RTU panels for bypass pumping. The Contractor will be required to install the temporary RTU panels.

E19. SITE DEVELOPMENT AND RESTORATION

E19.1 Description

(a) This Specification shall supplement the requirements of CW1130.

(b) This Specification shall cover all aspects of the Site Development and Restoration Work, including:

(i) Erection, maintenance and removal of safety fencing;
(ii) Snow clearing;
(iii) Water/flow control;
(iv) General access development;
(v) Start-up costs;
(vi) Equipment setup and removal;
(vii) Office facilities;
(viii) Access maintenance; and
(ix) Site restoration.

E19.1.1 Additional Site specific Works included within this Specification are the temporary removal, relocating, and replacing existing site furniture, fencing, and other obstructions within easement right-of-ways or as required for site access.

(a) Works and permits associated with raising and/or relocating overhead power lines and/or light standards as required to facilitate the Works. Contact the local Manitoba Hydro Office to arrange for Manitoba Hydro Staff to lift power lines, temporarily support utilities, and/or relocate utilities as required. Only Manitoba Hydro staff will be permitted to lift power lines.

E19.1.2 This Specification shall amend and supplement Standard Specification CW 3510.

E19.2 Materials

E19.2.1 Equipment

(a) All equipment, implements, tools and facilities used shall be of a size and type as required to complete the Work in a reasonable time, approved by the Contract Administrator. The Contractor shall keep all equipment in good working order, and have sufficient standby equipment available at all times, as required.

E19.3 Construction Methods

E19.3.1 Site and Construction Access

(a) The Contractor shall be responsible to develop suitable Site access. This includes but is not limited to, temporary bridging over structures, temporary removal and reinstallation of safety fencing, any landscaping and grading repairs, restoration of vegetation, etc. necessary to restore any Site and construction access area to their pre-existing condition.

E19.3.2 Excavation Security Fence

(a) Further to Clause 3.1 of CW 1130, completely cover any excavation and provide a security fence to completely surround the excavation when unattended in accordance with E19.3.4(c).

E19.3.3 Vegetation Removal

(a) Some vegetation removal may be permitted in order to facilitate the work. Existing vegetation shall not be removed without prior approval from the Contract Administrator. The Contractor shall load and haul any removed vegetation, and dispose of the material off Site immediately upon collection. Stockpiling shall not be permitted unless written approval has been obtained from the Contract Administrator. Refer to E20 for tree protection.

E19.3.4 Site Security

(a) Pedestrian access shall be restricted by maintaining a security fence around the perimeter of the Work site

(b) At the end of each Work Day, all excavations and underground structure openings shall be secured to prevent access. Safety fence shall also be closed and secured to prevent public access.

(c) Fence to completely surround the site according to:

(i) security fence shall be chain link fence or approved equal, a minimum 1.80 metres high with metal support posts embedded far enough into the ground and spaced close enough together so the fence will not sag or collapse;

(ii) attach fencing securely to posts;

(iii) secure the gate or end of the fencing to a post with chain and a padlock; and

(iv) provide alternate security fence proposal to Contract Administrator for approval.

E19.3.5 Environmental Regulations

(a) The Contractor shall adhere to all relevant Federal and Provincial environmental regulations.

(b) The Contractor shall plan to Work in accordance with the current environmental regulations of “Manitoba Stream Crossing Guidelines for Protection of Fish and Fish Habitat”, Fisheries and Oceans, and Manitoba Natural Resources.

(c) The Contractor shall supply, in writing, prior to the commencement of Work on-Site to cleanup minor spills, should they occur. The Contractor shall supply the name, address and phone number of a local supplier, where additional kits are available on short notice.

E19.4 Staging and Laydown Areas

(a) Prior to mobilization to site, the Contractor shall identify and propose to the City for approval, the areas requested for laydown, staging materials, and placement of the site trailer.

E19.5 General Site Cleanup and Restoration

(a) All areas of the construction Site shall be restored to a condition at least equivalent to its original condition prior to initiation of Work. This may include, but is not necessarily limited to the Contractor's lay down area, and removal of all temporary fencing.

E19.6 Permanent Surface Restorations

(a) If required, permanently restore all existing surface areas disturbed by construction activities including but not limited to areas disturbed by; construction equipment, placement of equipment trailers and where construction materials were stockpiled, shall be restored as follows:

(i) Boulevards, ditches and grassed areas – sodding using imported topsoil in accordance with CW 3510.

(ii) Asphalt surfaces – match existing base course and asphalt thickness or a minimum of 150 millimetres of base course and 75 millimetres of Type 1A Asphaltic Concrete, whichever is greater, in accordance with CW 3410.

(iii) Miscellaneous concrete slabs, including sidewalk - in accordance with CW 3235.

(iv) Concrete curb and gutter – in accordance with CW 3240.

E19.7 Topsoil and Seed

(a) The primary means of restoration for existing grassy areas will be topsoil and sodding.

E19.8 Measurement and Payment

E19.8.1 Site Development and Restoration

(a) The site development and restoration shall be measured on a lump sum basis and paid for at the Contract Lump Sum Price for "Site Development and Restoration," which prices shall be payment in fill for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification.

(i) 50% of the Site Development and Restoration lump sum will be paid for on the first progress payment following commencement of the work on the specific Site being developed.

(ii) The remaining 50% of the Site Development and Restoration unit price will be paid subsequent to the completion of the Work and restoration and cleanup of the Site.

E19.8.2 Surface restorations or any site restoration required to restore laydown areas, or similar temporary work areas, shall be considered incidental to Site Development and Restoration. No separate payment shall be made for these areas.

E20. PROTECTION OF EXISTING TREES

E20.1 The Contractor shall take the following precautionary steps to avoid damage from construction activities to any existing trees not marked for removal within the limits of the construction area.

E20.1.1 Do not stockpile materials and soil or park vehicles and equipment within 2 metres of trees.

E20.1.2 Strap mature tree trunks with 25 x 150 x 2400 wood planks. Smaller trees shall be similarly protected using appropriately sized wood planks.

E20.1.3 Excavations shall be carried out in a manner to minimize damage to existing root systems. Where roots must be cut to facilitate an excavation, they shall be neatly pruned at the face of the excavation and coated with an appropriate wound dressing to prevent infection.

E20.1.4 Work on Site shall be carried out in a manner to minimize damage to existing tree branches. Where damage to tree branches does occur, the Contractor shall neatly prune the damaged branch.

E20.1.5 American elm trees shall not be pruned between April 1st and August 1st and Siberian elm trees between April 1st and July 1st of any year under provisions of The Dutch Elm Disease Act.

E20.2 All damage to existing trees due to construction activities shall be repaired to the requirements and satisfaction of the City of Winnipeg, Public Works Department and Forestry Branch at the Contractor's expense.

E20.3 Payment

(a) Protection of Existing Trees shall be considered incidental to the Works of this Contract and no separate payment will be made for this item.

E21. WASTEWATER FORCE MAIN PIPING

E21.1 Description

(a) This Section specifies requirements for supplying and constructing wastewater force main piping and appurtenances, including:
   (i) Supplying and installing pipes, fittings and specials;
   (ii) Excavating, bedding, tracer wire, backfilling and compacting trench;
   (iii) Disposal of surplus excavated materials; shoring and bracing trench as required;
   (iv) Supporting and protecting existing services, Site preparation, connecting to existing pipelines; and
   (v) Restoring and cleaning up Site and all other Work necessary to complete yard piping as specified.

E21.2 Administrative Requirements

(a) Scheduling:
   (i) Schedule Work to minimize interruptions to existing services.
   (ii) Maintain existing flow during construction.
   (iii) Submit schedule of expected interruptions to Contract Administrator for approval a minimum of three (3) weeks prior to commencement of Work and adhere to approved schedule.
   (iv) Notify Contract Administrator a minimum of twenty-four (24) hours in advance of interruption in service.

E21.3 Action and Information Submittals

(a) Submit in accordance with Section 01 33 00 – Submittal Procedures.

(b) Product Data:
   (i) Submit manufacturer's instructions, printed product literature and data sheets for pipes and include product characteristics, performance criteria, physical size, finish and limitations.

(c) Certification to be marked on pipe.

(d) Construction Waste Management in accordance with 01 74 19 – Waste Management and Disposal.

E21.4 Delivery, Storage and Handling

(a) Delivery and Acceptance Requirements: deliver materials to Site in original factory packaging, labelled with manufacturer's name and address.

(b) Storage and Handling Requirements:
   (i) Store materials in accordance with manufacturer's recommendations.
   (ii) Store and protect pipes from damage.
   (iii) Replace defective or damaged materials with new.

(iv) Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 74 19 – Waste Management and Disposal.

E21.5 Project Record Drawings

(a) Provide data to produce Project Record Drawings, in accordance with Section 01 78 00 – Closeout Submittals.

E21.6 Materials

(a) Supply pipe in size and class as shown on Contract Drawings and/or as specified.

(b) Supply pipe of material as indicated.

(c) Supply fittings suitable for and compatible with class and type of pipe with which they will be used.

(d) Thrust blocking to be provided for buried piping according to SD-004

E21.7 Pipe Bedding and Surrounding Materials

(a) Compacted sand Class B Bedding according to SD-001 and CW 2030.

E21.8 Backfill Material

(a) Class 1 Backfill using according to SD-002 and CW 2030.

E21.9 Preparation

(a) Follow pipe manufacturer’s handling and storage recommendations.

(b) Pipes and fittings to be clean and dry.

(c) Prior to installation, obtain Contract Administrator's approval of pipes and fittings.

(d) The Contractor shall verify all topographical survey information and confirm the depth and location of the buried facilities in the field prior to construction.

E21.10 Shafts and Trenching

(a) Excavate shafts and trenching in accordance with CW 2030

E21.11 Installation

(a) Pipe shall be installed using standard trenching methods in accordance with CW 2030.

E21.12 Testing

(a) Testing shall be completed in accordance with CW 2125.

E21.13 Measurement and Payment

E21.13.1 Sewage force main and fittings supply and installation will be measured on a length basis for each size, material, method of installation, type of bedding and type of backfill and paid for at the Contract Unit Price per metre for “Wastewater Force Main Piping” as shown in Form B: Prices, installed in accordance with this Specification, accepted and measured by the Contract Administrator.

(a) Measurement for length of force main installed in a trench will be made horizontally at grade above the centreline of the pipe through fittings.

(b) Extraction of existing pipe required to install new pipe will be included with payment for trenchless method of installation.

(c) Repair of damage to underground and surface structures due to surface subsidence and soil heaving caused by trenchless methods will be at the Contractor’s own expense.

(d) Correction of alignment and grade exceeding the allowable variance will be at the Contractor’s own expense.

E21.13.2 Hydrostatic leakage testing will be included with payment for “Sanitary Force Main”

E22. SUPPLY AND INSTALLATION OF TEMPORARY SHORING

E22.1 Description

(a) This Specification shall cover shoring requirements for the Works where required under Manitoba Acts, Regulations, and Guidelines, or as indicated on the Drawings.

E22.2 Construction Methods

E22.2.1 Excavation

(a) Remove excavated material from the Site immediately. Excavated material shall not be stockpiled on-Site.

(b) 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 or injury to any person from falling material.

(c) Any groundwater seepage into the excavation shall be properly managed to protect the bearing surface from disturbance or loss of resistance. Groundwater seepage management may consist of sumps and pumps at the exterior of the bearing surface in the excavation.

(d) Supply and place lean mix concrete, as directed by the Contract Administrator, as backfill for any portions of the excavation, carried beyond the required limits of excavation. The limits of excavation shall be considered to be the inside face of the shoring system and the underside of the working base slab.

(e) 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 or injury to any person from falling material.

(f) Backfill to be Class 1 according to the requirements of CW 2030, unless specified otherwise in other sections of this specification.

E22.2.2 Excavation Security Fence

(a) Refer to E19.3.2

E22.2.3 Shoring

(a) The type, strength, amount of shoring and bracing shall be determined by the Contractor's Professional Engineer/Geoscientists registered in Manitoba. The design should consider the nature of the ground and attendance conditions that may be required, taking into account property lines, existing slopes, utilities, roadways and existing structures.

(b) Shoring and bracing shall be so spaced, embedded, and dimensioned as to prevent the failure of the shoring system, caving, loss of ground, base heave, surface settlement, or squeezing of the soil beyond the neat lines of excavation and to provide control of seepage emanating from the overburden soil layers, including piping through and/or below the shoring system. Shoring structures shall be free from defects that might impair its strength or suitability for the Work. Sheeting/shoring and bracing shall conform to the latest revisions of the "Construction Safety Act" of the Department of Labour of the Government of Manitoba and in accordance with Province of Manitoba "W210 The Workplace Safety and Health Act" and "Guidelines for Excavation Work".

(c) Supporting design information, including soil log information and stratigraphy, and design calculations as required to facilitate review of the submission for conformance with the Contract Documents.

(d) Submit AutoCAD Shop Drawings and design calculations for the shoring/excavation system designed as well as the shop drawings sealed by a Professional Engineer registered and licensed to practice in the Province of Manitoba and experienced in the structural design of shoring systems. The designer of the shoring system shall inspect the system during construction and certify, in writing to the Contract Administrator, that construction is in conformance with the approved design.

(e) Shoring and bracing shall be installed such that the structure size and wall thickness shown on the shop drawings can be obtained subsequent to installation of the shoring system.

(f) Shoring and bracing shall be designed and installed to prevent settlement and damage to existing structures. In the event of damage, the Contractor will be held liable, and shall be required to provide appropriate restoration at his cost, to the satisfaction of the Contract Administrator.

(g) Shoring and bracing shall be designed and installed to ensure that there is adequate space to achieve compaction of bedding and backfill and such that it does not impact compaction of bedding and backfill and/or cause settlement when shoring is removed.

(h) Shoring and bracing shall remain in place until concrete has attained 75% of the design strength.

E22.2.4 Monitoring Movement of Shoring

(a) The Contractor shall submit to the Contract Administrator a plan for monitoring the movement of shoring during construction a minimum of two (2) Working Days prior to the installation of shoring. The monitoring plan shall be performed by approved survey methods for vertical or horizontal movement of the shoring, acceptable to the Contract Administrator. Costs for monitoring shall be incidental to the installation of the temporary shoring.

E22.3 Measurement and Payment

(a) Shoring will be paid for at the Contract Lump Sum Price for “Temporary Shoring”. Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

E23. WET WELL CLEANING AND INSPECTION

E23.1 Wet well cleaning will commence after bypass pumping system is activated. Contractor will alert the contract administrator when cleaning is complete for wet well inspection.

E23.2 Description

(a) Work under this section shall include cleaning and dewatering of the existing wet well.

(b) This Specification shall amend and supplement Standard Specifications CW 2140.

E23.2.1 Construction Methods

(a) Cleaning to start only after the inflow and outflow wet well outlets are fully blocked and the temporary by-pass pumping system is in place.

(b) Cleaning shall include washing the surfaces with high pressurized water. Ceiling and walls shall be cleaned first and then finish with cleaning the floor. Surfaces shall be cleaned to a point where there is no residue covering the concrete surfaces of the wet well or as accepted by the Contract Administrator.

(c) Remove all residue from the wet well including any solids, debris, grit etc. Remove any standing water – wet well floor shall be dry.

(d) Provide photos of cleaned wet well to Contract Administrator for review and approval.

(e) Maintain the wet well clean until the completion of the inspection by the Contract Administrator.

(f) Advise the Contract Administrator immediately when backfill material or large cracks are observed during the cleaning of a sewer and/or chamber. The Contract Administrator will direct one of the following operations be performed:

(i) Complete or attempt to complete cleaning of the wet well.

(ii) Suspend cleaning operations for inspection of the wet well.

(iii) Simultaneously clean and inspect the wet well.

E23.3 Measurement and Payment

E23.3.1 Amend Section 4.1 of Specification CW 2140 to read:

(a) Wet Well Cleaning will paid for at the Contract Lump Sum Price for "Wet Well Cleaning and Inspection". Area to be paid for will be the total area of cleaning and inspection, accepted and measured by the Contract Administrator.

(b) Sewer Cleaning shall include all water supply costs, permits (access or otherwise), cleaning, reverse set-up cleaning, dumping, travel time, tipping fees, units, flow control and whatever may be required for the cleaning of the wet well chamber and surge tank.

E23.3.2 Delete sections 4.3, 4.7 and 4.8 of specification CW 2140.

E24. DEMOLITION OF STRUCTURES

E24.1 Description of Work

The Work required under this section shall include, but is not limited to, the following:

(a) Partial demolition of the wet well entrance concrete as shown on the contract drawings.

(b) Demolition of the existing generator building roof structure.

(c) Partial demolition of the existing generator building superstructure walls and wall finishes in preparation for new finishes.

(d) Partial selective concrete demolition in the sub-levels of the pump station.

(e) Selective demolition of equipment and pipework within the pump station according to contract drawings.

(f) Sandblasting of subgrade concrete surfaces in preparation for new finishes.

(g) Demolition and removal of segments of the asbestos cement force main necessary for the installation of the bypass manhole and other segments of force main.

(h) Demolition and removal of the existing water service to the pump station if necessary, to be determined by Contract Administrator upon visual inspection.

(i) Removal and disposal of debris found within the wet well.

(j) Removal and disposal of construction debris.

E24.1.1 The Work required under this section shall include, but is not limited to, the following:

(a) Removal of all existing electrical, mechanical components as indicated in project drawings; concrete and brick masonry demolition; performing saw cutting; demolition and disposal of existing concrete and brick masonry; and clean-up of work site in anticipation of new work for those demolition areas indicated on the drawings.

E24.1.2 The work to be done by the Contractor under this section shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Works as described hereinafter.

E24.2 References

E24.2.1 CSA S350-M1980, Code of Practice for Safety in Demolition of Structures.

E24.2.2 Manitoba Workplace Safety and Health Act, and all applicable National, Provincial and Municipal regulations.

E24.2.3 Hazardous Materials Assessment Report, Pinchin Ltd.

E24.3 Protection

E24.3.1 Prevent damage of existing structure to remain. Make good any damage caused by the demolition Work.

E24.3.2 Take precautions to support adjacent and affected structures and, if safety of structure being demolished or adjacent structures appears to be endangered, cease operations and notify the Contract Administrator.

E24.3.3 The Contractor shall take precautions during demolition works to prevent damage to existing structures and adjacent property. In the event of damage, the Contractor will be held liable and shall be required to provide appropriate restoration at his cost, to the satisfaction of the Contract Administrator.

E24.3.4 Inspection

(a) Inspect Site with Contract Administrator and verify extent of items for removal, disposal, salvage and items to remain.

(b) Notify and obtain approval of Contract Administrator before starting demolition.

E24.3.5 Safety Code and Requirements

(a) Unless otherwise specified, carry out demolition in accordance with the City of Winnipeg Safety Directives and Guidelines.

E24.3.6 Demolition

(a) Demolish structures to permit construction of new work as required.

(b) The work shall be done in accordance with E3– Hazardous Materials and the recommendations of the Hazardous Materials Assessment Report.

(c) Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as Work progresses.

(d) At end of each day's Work, leave Work in safe condition so that no part is in danger of toppling or falling.

(e) Do not sell or burn materials on Site.

(f) Damage to concrete that is to remain shall be minimized. Concrete shall be demolished by saw cutting and subsequent jackhammering using hand-held breakers or jack hammers (maximum 10 kgs/20 lbs unless noted otherwise on drawings). Other methods of performing concrete demolition may be submitted for review and approval to the Contract Administrator. The Contractor shall take measures to ensure that the concrete beyond the limits of demolition is not fractured or shattered. The Contractor shall remove concrete using acceptable methods and replace any concrete which is deemed to be fractured as a result of demolition methods employed by the Contractor. This repair Work shall be performed at no additional cost to the City of Winnipeg.

E24.3.7 Demolition Tolerances

(a) All demolition shall be done using equipment and procedure to prevent over-breakage of the existing structure.

(b) Final demolition surfaces must remain locally within (25 mm) of the demolition lines, alignments, or limits shown on the drawings. Demolition beyond the limits shown shall be reviewed by the Contract Administrator. The Contractor shall repair excess demolition to the satisfaction of the Contract Administrator, and at no cost to the City where required.

(c) All protrusions into the defined limits of demolition shall be removed if they interfere with the placement and alignment of embedded components or reinforcing steel.

E24.3.8 Abrasive Wiresaw and Sawcutting

(a) Areas of demolition shall be delineated from existing concrete that is to remain using either abrasive disc sawcutting, or abrasive wire sawing.

(b) All sawcuts shall be performed straight and normal to the surface being cut, following the locations shown on the drawings, or as directed by the Contract Administrator.

(c) Overruns at the junctions of sawcuts, and mis-starts shall be cleaned and filled with dry patching mortar of matching colour, as directed by the Contract Administrator.

(d) Overruns at the junctions of sawcuts, and mis-starts shall be cleaned and filled with dry patching mortar of matching colour, as directed by the Contract Administrator.

E24.3.9 Disposal of Demolished Material

(a) The Contractor shall be responsible for removal of debris and waste from the Work area to the location to an appropriate solid waste disposal area approved by the contract administrator.

(b) Metal debris, which may include reinforcing steel, shall be removed from Site and disposed of by the Contractor.

E24.4 Measurement and Payment

(a) Lift Station Demolition will be measured on a lump sum basis and paid for at the Contract Lump Sum Price for "Demolition of Structures."

(i) Payment will be distributed based on progress on a monthly basis at the discretion of the Contract Administrator.

(b) No payment shall be made for demolition beyond the limits specified, or those otherwise approved by the Contract Administrator. The separation, as necessary of embedded and structural steel shall be considered incidental to the Work. The installation of temporary supports, shoring or hangers shall also be considered incidental to the Work. Saw cutting of concrete and removal of construction debris shall be considered incidental to the Work.

E25. SALVAGE

E25.1 Contractor to coordinate with Contract Administrator to arrange for City of Winnipeg Staff to visit site and mark equipment and material for salvage prior to commencement of demolition. Salvaged materials are expected to include, but not necessarily be limited to:

(a) SCADAPack

(b) 600V Undervoltage relay.

(c) PSTN module.

E25.2 All salvaged equipment and materials as determined under E25.1 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 Northeast corner of the intersection of Dugald Road and Van Bellegham Avenue, Winnipeg, Manitoba.

E25.3 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.

E25.4 The Contactor shall remove and haul all rejected salvage from the site and legally dispose of it.

E25.5 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.

E26. CAST-IN-PLACE CONCRETE

E26.1 Description

E26.1.1 This specification will cover construction of cast-in-place concrete for the lift station chamber, generator building, and shall supplement, revise and amend CW 2160.

E26.2 Materials

(a) Concrete Mix Design

The Contractor shall be responsible for the design and performance of all concrete mixes supplied under this Specification. Concrete shall be supplied in accordance with the requirements of CSA A23.1-14, with the minimum properties as provided below:

(i) Cast-In-Place Structural Concrete - Exterior

Location	Exterior slabs, walls, curbs, pads
Class of Exposure	S-1
Maximum Size of Aggregate	20 mm
Cement Type	HS
Maximum Water/Cementing Materials Ratio	0.40
Compressive Strength at 28 Days	32 MPa
Slump/Flow	80 mm +/- 20 mm
Air Content	5.0% to 8.0%

(ii) Cast -In-Place Structural Concrete – Interior

Location	Interior slabs, curbs, pads not in contact with soil, not subject to moisture and freeze thaw cycles.
Class of Exposure	C-1
Maximum Size of Aggregate	20 mm
Cement Type	GU
Maximum Water/Cementing Materials Ratio	0.40
Compressive Strength at 28 Days	30 MPa
Slump/Flow	80 mm +/- 20 mm
Air Content	nil

(iii) Lean Mix Concrete

Location	Benching,
Cement Type	Type HS
Maximum Water/Cementing Materials Ratio	0.49
Compressive Strength at 28 Days	15 MPa
Slump/Flow	80 mm
Air Content	nil

(iv) Concrete Curbs, Pads, and Aprons - Interior

Location:	Interior locations not in contact with soil
Class of Exposure	C-1
Maximum Size of Aggregate	20 mm
Cement Type	GU
Maximum Water/Cementing Materials Ratio	0.40
Compressive Strength at 28 Days	25 MPa
Slump/Flow	80 mm +/- 20 mm
Air Content	5.0% to 8.0%

(v) Self Consolidating Concrete – See E27

(b) Provide a “Mix Design Statement” for each type of concrete to be used certifying constituent materials and mixing proportions to the Contract Administrator at least 2 weeks prior to delivery of Concrete to the Site. Supply reasonable evidence to the Contract Administrator that the mix proportions selected will produce concrete meeting the specified strength, workability and yield.

(c) Admixtures

(i) All admixtures shall be compatible and meet the following standards:

- Air entraining agent shall meet ASTM C260.
- Chemical water reducing admixtures shall meet ASTM C494.
- Type F high-range water reducing (super-plasticizing) admixture shall be used when a slump of more than 110 mm is desired.

(d) Grout

(i) Grout shall be Sika Grout 212 SR or approved equivalent in accordance with B7.

(ii) Floor surface in lower pump room to be prepared according to product manufacturer's requirements prior to application of grout.

(iii) Grout to be applied as per manufacturer's requirements and sloped towards sump.

(iv) Hydraulic cement for form hole patching shall be Xypex Patch-n-Plug or approved equivalent in accordance with B7.

(e) Reinforcing Steel

(i) New deformed billet steel bars conforming to CSA G30.18 (latest). Grade to be 400.

(ii) Bar accessories:

- To be made of a non-corroding material
- Shall not stain, blemish or spall the concrete surface for the life of the concrete
- Shall be approved by the Contract Administrator
- Bar chairs shall be PVC.

(f) Bonding Agent shall be Sika Latex R or approved equivalent in accordance with B7.

(g) Reinforcing steel shall be clean, free of rust, dirt, loose scale, oil, grease or any material that could reduce bond with the concrete.

(h) Waterproofing

(i) Provide two coats bitumen waterproofing emulsion to all below grade exterior concrete surfaces.

(ii) Approved product: Mapai Plastimul or approved equal in accordance with B7.

(i) Waterstop

(i) Waterstop shall be 150 mm wide by 10 mm thick vinyles ribbed-center bulb or approved equal in accordance with B7 or

(ii) Waterstop shall be Cetco Volclay Waterstop - RX 101 or approved equal, continuous around perimeter of each pour break. Installed as per manufacturer's instructions.

(j) Miscellaneous Metals and Accessories

(i) As shown on the Drawings.

(k) Shop Drawings:

(i) Provide shop drawings in accordance with E11 of this specification.

(ii) Submit shop drawings for reinforcing steel a minimum of two (2) weeks prior to the fabrication of any reinforcing steel.

E26.3 Construction Methods

E26.3.1 Construction Method Submission

(a) No Work shall commence on construction of cast-in-place concrete until after the Contract Administrator's review of the Contractor's Construction Method submission.

(b) The Contractor shall prepare for the Contract Administrator's review a Construction Method submission detailing:

(i) Construction sequence to be followed including all methods to be employed.

(ii) Shoring system(s) to be used.

(iii) Proposed method of structure construction.

(iv) Specialized equipment to be used.

(v) Any design revisions proposed to accommodate the Contractor's proposed construction method.

(vi) Water control consideration including details on the Contractor's proposed method of groundwater and surface runoff control.

(vii) Curing

(c) The Contractor shall respond to any concerns that may be raised by the Contract Administrator after review of Construction Method submission.

E26.3.2 Lift Station Upgrades and Generator Building Upgrades

(a) Construct cast in place concrete in accordance with CW 2160 and CSA A23.1, except as supplemented, revised or amended in this specification and as indicated in the construction notes on the Drawings.

(b) Adjust the location of reinforcing steel adjacent to openings to frame those openings in accordance with good practice, and maintain the bar spacing intent.

(c) Do not use welded splices for reinforcing steel.

(d) Remove all form tie plastic cones and patch with hydraulic cement compound.

(e) Order all wall reinforcement steel in lengths to best suit the spacing of walers so that reinforcing bars will not be bent or misformed in order to remove the walers.

(f) Reinforcing steel shall be clean, free of rust, dirt, loose scale, oil, grease or any other material which would reduce bond with concrete.

(g) Tie, support, and space all reinforcing steel with proper approved devices designed for use in reinforced concrete, to prevent displacement of reinforcing and ensure specified concrete cover.

(h) Provide minimum concrete cover for reinforcing steel as follows:

(i)	Slab faces exposed to soil:	75 mm
(ii)	Slab faces not exposed to soil:	50 mm
(iii)	Subgrade Walls (exterior face):	75 mm
(iv)	Subgrade Walls (interior face):	50 mm
(v)	Chamber To Slab (top and bottom):	50 mm
(vi)	Interior Walls:	50 mm

E26.3.3 Curing

(a) Concrete to be cured in accordance with CSA A23.1

(b) Wet curing to be continuous for 14 days. Use of wetted burlap or suitable sheets is accepted

(c) Wall forms to be left in place minimum of 7 days, can be reduced to 3 days with engineer approval. Cure for remainder of the 14 days.

E26.3.4 Backfill

(a) Place and compact backfill material in accordance with CW 2030.

(i) Class 1 backfill for lift station.

(ii) Class 5 backfill around new slab-on-grade for generator building.

(b) Do not place backfill material on frozen ground.

(c) Do not place backfill material in a frozen state.

(d) Supply heating and hoarding in accordance with CW 2160 if required to ensure material does not freeze before compaction is complete.

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

E26.3.5 Grout & Patching Cement

(a) Mix and apply grout and patching cement in accordance with the manufacturer's instructions. Consistency is to be suitable for the intended application.

E26.3.6 Concrete Inspection and Testing

(a) Inspection and testing of concrete and concrete materials will be in accordance with CSA A23.1 and carried out by a Testing Laboratory designated by the Contract Administrator. Quality control tests for concrete will be used to determine the acceptability of the concrete supplied.

(b) Provide without charge samples of concrete and constituent materials required for quality control tests and provide assistance and use of tools and construction equipment as is required.

(c) The frequency and number of concrete quality control tests will be in accordance with the requirements of CSA A23.1.

(d) Non-destructive methods for testing concrete will be in accordance with CSA A23.2.

(e) An outline of the quality control testing is as follows.

(i) Samples of concrete for test specimens will be taken in accordance with CSA A23.2-1C.

(ii) Slump tests will be performed in accordance with A23.2-5C. If measured slump falls outside limits specified in Table CW 2160.1 a second test will be made. In the event of a second failure the Contract Administrator reserves right to refuse the batch of concrete represented.

(f) Air content test will be performed in accordance with CSA A23.2-4C. If measured air content falls outside limits specified in Table CW 2160.1 a second test will be made at any time within the specified discharge time limit for the mix. In the event of a second failure the Contract Administrator reserves the right to reject the batch of concrete represented.

(g) Compressive strength test specimens will taken in accordance with CSA A23.2-3C.

(h) Compressive strength tests at 28 days will be the basis for acceptance of all concrete supplied. For each 28 day test the strength of two companion standard-cured test specimens will be determined in accordance with CSA A23.2-9C. Test result will be the average strength of both specimens.

E26.3.7 Measurement and Payment

(a) Payment will be Lump Sum based on Form B, "Cast-In-Place Concrete". Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification, accepted and measured by the Contract Administrator.

E27. SELF CONSOLIDATING CONCRETE

E27.1 Description

E27.1.1 This specification will cover construction of self consolidation concrete for the motor room floor support beam, and shall supplement, revise and amend CW 2160.

E27.2 Materials

(a) Concrete Mix Design

The Contractor shall be responsible for the design and performance of all concrete mixes supplied under this Specification. Concrete shall be supplied in accordance with the requirements of CSA A23.1-14, with the minimum properties as provided below:

(i) Self Consolidating Concrete

Location:	Motor Room Floor Support Beam
Class of Exposure	C-1
Compressive Strength:	32 MPa @ 28 days

Mix Design:	Per Manufacturer. In compliance with CSA A23.14

Approved Product

.1 Lafarge “Agilia” Self Consolidating Concrete

.2 Approved equal

(b) Provide a “Mix Design Statement” for each type of concrete to be used certifying constituent materials and mixing proportions to the Contract Administrator at least 2 weeks prior to delivery of Concrete to the Site. Supply reasonable evidence to the Contract Administrator that the mix proportions selected will produce concrete meeting the specified strength, workability and yield.

(c) Admixtures

(i) All admixtures shall be compatible and meet the following standards:

- Air entraining agent shall meet ASTM C260.
- Chemical water reducing admixtures shall meet ASTM C494.
- Type F high-range water reducing (super-plasticizing) admixture shall be used when a slump of more than 110 mm is desired.

(d) Reinforcing Steel

(i) New deformed billet steel bars conforming to CSA G30.18 (latest). Grade to be 400.

(ii) Bar accessories:

- To be made of a non-corroding material
- Shall not stain, blemish or spall the concrete surface for the life of the concrete
- Shall be approved by the Contract Administrator
- Bar chairs shall be PVC.

(e) Bonding Agent shall be Sika Latex R or approved equivalent in accordance with B7.

(f) Reinforcing steel shall be clean, free of rust, dirt, loose scale, oil, grease or any material that could reduce bond with the concrete.

(g) Miscellaneous Metals and Accessories

(i) As shown on the Drawings.

(h) Shop Drawings:

(i) Provide shop drawings in accordance with E11 of this specification.

(ii) Submit shop drawings for reinforcing steel a minimum of two (2) weeks prior to the fabrication of any reinforcing steel.

E27.3 Construction Methods

E27.3.1 Construction Method Submission

(a) No Work shall commence on construction of cast-in-place concrete until after the Contract Administrator’s review of the Contractor’s Construction Method submission.

(b) Core holes in slab above for placement of concrete. Pour in one hole until level rises flush in other holes.

(c) Seal all forms joints and connections to prevent leakage during pour

(d) 20 Chamfer exposed corners

(e) Rebar placement / cover as per structural concrete

(f) The Contractor shall prepare for the Contract Administrator’s review a Construction Method submission detailing:

(i) Construction sequence to be followed including all methods to be employed.

(ii) Shoring system(s) to be used.

(iii) Proposed method of structure construction.

(iv) Specialized equipment to be used.

(v) Any design revisions proposed to accommodate the Contractor's proposed construction method.

(vi) Water control consideration including details on the Contractor's proposed method of groundwater and surface runoff control.

(vii) Curing

(g) The Contractor shall respond to any concerns that may be raised by the Contract Administrator after review of Construction Method submission.

E27.3.2 Curing

(a) Concrete to be cured in accordance with CSA A23.1

E27.3.3 Concrete Inspection and Testing

(a) Inspection and testing of concrete and concrete materials will be in accordance with CSA A23.1 and carried out by a Testing Laboratory designated by the Contract Administrator. Quality control tests for concrete will be used to determine the acceptability of the concrete supplied.

(b) Compressive strength test specimens will taken in accordance with CSA A23.2-3C.

(c) Compressive strength tests at 28 days will be the basis for acceptance of all concrete supplied. For each 28 day test the strength of two companion standard-cured test specimens will be determined in accordance with CSA A23.2-9C. Test result will be the average strength of both specimens.

E27.3.4 Measurement and Payment

(a) Payment will be Lump Sum based on Form B, "Self Consolidating Concrete". Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification, accepted and measured by the Contract Administrator.

E28. COLD WEATHER REQUIREMENTS

E28.1 Should any concrete Work be required to be carried out when the daily mean temperature is below 5°C or anticipated to be below 5°C within the 24 hour cure period, cold weather requirements will be specified herein.

E28.2 All freshly placed concrete shall be protected from the elements and from defacements due to construction operations.

E28.3 The following are minimum requirements for protecting concrete during and after placement during freezing weather, but mere adherence to these requirements will not relieve the Contractor of the necessity for producing concrete which has not been weakened or injured by frost or freezing, or replacing such damaged Work at no additional cost to the City;

(a) Before any concrete is placed, all ice, snow, and frost shall be completely removed from all formwork, and other surfaces against which concrete temperatures of such surfaces raised above 7°C for twenty-four (24) hours minimum prior to concreting. Where concrete Work is to come in contact with the earth, the surface of the earth shall be completely free of frost when concrete is placed thereon.

(b) Concrete aggregates and water shall be heated to not over 80°C. Concrete shall be not less than 20°C or more than 30°C in temperature when deposited. Concrete when placed during freezing weather, or if freezing is anticipated during curing period, shall be fully enclosed and the temperature of same maintained at not less than 20°C for five (5) days nor less than 5°C for an additional five (5) days.

(c) Heating enclosures shall be strong and wind-proof, well ventilated with heating units so located as to prevent local overheating or drying of the concrete or damage from combustion gases. Only indirect fired heaters will be accepted. Units must be vented outside the enclosure. No direct fired units will be accepted.

(d) The Contractor shall inform the Contract Administrator well in advance as to the methods of enclosure and frost protection he proposes to employ.

E28.4 Measurement and Payment

(a) Cold weather requirements shall be considered incidental to the construction of Cast-in-Place concrete and Self Consolidation Concrete. No separate payment will be made for this item.

E29. METAL FABRICATIONS

E29.1 Refer to Section 05 14 10 – Structural Aluminum

E29.2 Refer to Section 05 50 00 – Metal Fabrication

E29.3 Measurement and Payment

(a) Supply, fabrication, transportation, handling, delivery and placement of metal fabrications will be paid for at the Contract Lump Sum Price for "Miscellaneous Metals." Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification.

E30. LIFT PUMPING EQUIPMENT SUPPLY COMPLETE WITH PUMPS, MOTORS, DRIVE SHAFTS AND INSTRUMENTS

E30.1 General:

(a) This Specification shall cover the supply and delivery of pumping equipment, motors, and accessories.

(b) The two (2) existing pumps at the Windsor Park Lift Station are to be replaced with three (3) new similarly sized pumps.

(c) City of Winnipeg records indicate that the existing pumps currently in use are:

(i) 60HP Aurora Model 612A 10x10x15 Split-Coupled Non-Clog Pumps

(ii) One of the two pumps has been updated to include a 75HP motor since original construction.

(d) The pumps will be used to pump raw sewage having a temperature range of 0ºC to 30ºC with solids up to 75mm.

(e) Each pump shall be a single stage, non-clogging, centrifugal flow, vertical mounted, pump coupled with a drive shaft to an electric motor suitable for dry pit installation. Pump assemblies that are considered a submersible style pump where the motor is directly coupled to the pump will not be acceptable.

(f) Submit torsional natural frequency analysis including the pump, motor, and vertical U-joint drive shaft in accordance with ANSI/HI 9.6.8 level 2 analysis or higher with minimum frequency separation margin of +/- 15%. If resonate conditions are found in the required speed range of the pump a forced response stress analysis is required to determine if the stress is below the fatigue limitations. Submit the analysis as a separate submittal prior to pump shop testing. Analysis shall be completed over the full operating range of the pump. Analysis to include a Campbell/interference diagram. Submission shall be in accordance with E11.

(g) 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.

(i) Impeller information nameplate shall also be included and attached to each pump.

(ii) A separate name plate shall be fixed to the pump identifying the maximum impeller diameter allowable with a 75HP driver.

(iii) Motor nameplates shall indicate the serial number, voltage, phase, hertz, rpm, horsepower, service factor, NEMA Design, insulation class and any other pertinent data.

(h) Pumping units shall generally comply with the requirements of the Hydraulic Institute Standards and shall be CSA approved. Have equipment comply with the latest edition of the applicable codes and regulations including, but not limited to, the following

(i) American Society of Mechanical Engineers (ASME); .
(ii) Canadian Standards Association (CSA);
(iii) Canadian Electrical Manufacturers Association (CEMA);
(iv) National Electrical Manufacturer's Association (NEMA);
(v) American Society for Testing and Materials (ASTM);
(vi) American National Standard Institute (ANSI);
(vii) Electrical Electronics Manufacturing Association of Canada (EEMAC); and
(viii) Electrical Safety Association (ESA)
(ix) National Electric Code (NEC)
(x) American Iron and Steel Institute (AISI)
(xi) American Gear Manufacturer's Association (AGMA)
(xii) American Institute of Steel Construction (AISC)
(xiii) American Welding Society (AWS)

(i) ANSI Standards:

(i) B-16.5 Pipe Flanges and Flanged Fittings
(ii) ANSI/HI 9.6.4-2009 American National Standard for Rotodynamic Pumps for Vibration Measurements and Allowable Values
(iii) ANSI/HI 9.6.5-2009 American National Standard for Rotodynamic (Centrifugal and Vertical) Pumps – Guideline for Condition Monitoring
(iv) ANSI/HI 9.8-2012 American National Standard for Rotodynamic Pumps for Pump Intake Design

(ii) ANSI/HI 9.6.8-2014 Rotodynamic Pumps – Guideline for Dynamics of Pumping Machinery

(j) Have all electrical equipment comply in every respect with the rules and regulations of Manitoba Hydro and be acceptable to their local inspector.

(k) In cases of any conflict between these Specifications and any of the above standards, the most stringent standard will have precedence.

E30.2 Products & Construction Methods:

E30.2.1 General Pump Performance Requirements

(a) The head-capacity curve shall have a single flow rate for each pumping head value and have a continuously rising head characteristic to shut-off to ensure stability.

(b) At no point on the power demand curve between shut-in and the minimum operating head shall the pump power demand, as determined from the shop performance tests, exceed the "Rated Power" of the motor.

(c) The maximum speed specified for each pump shall not exceed the maximum specific speed recommended in the Hydraulic Institute Standards, for the specified total dynamic head and the suction head at design minimum suction head conditions. Notwithstanding this requirement, the pump shall be free from cavitation, as described in the Hydraulic Institute Standards, throughout the specified operating ranges listed in E30.3.1.

(d) The pumps and motors shall be capable of being run in reverse rotation (via the variable frequency drive) in an attempt to de-rag the pump. When a de-ragging function is run, the pump will be run in reverse for approximately 5 to 10 seconds at approximately 20% to 40% speed. Approximately four to six attempts will be made, with a 20 to 30 second wait period between each attempt.

E30.3 Pump (P-L01, P-L02 and P-L03) Requirements:

E30.3.1 Pump General Requirements:

(a) Required range of continuous stable flow: from Duty Point 2 to Duty Point 1 in (b) below. The best efficiency point of these pumps must fall within this flow range.

(b) Rated Speed (1200 RPM)

(i) Duty Point 1: 235 L/s @ 13m TDH

(ii) Duty Point 2: 280 L/s @ 12m TDH

(iii) NPHSa: 8.5m

(c) Minimum Efficiency at all duty points 1 & 2 listed above, regardless of speed: 75%

(d) Discharge Orientation: Tangential

(e) Volute outside diameter: 850mm Maximum

(f) Rotation (viewed from above): Clockwise

(g) Type of Impeller: Non-Clog

(h) Size of sphere impeller shall pass: 110mm

(i) The ratio of the trimmed impeller diameter to the maximum impeller diameter allowable in the pump volute will not be less than 0.875.

(j) Diameter of Pump Suction: 300-400mm

(k) Diameter of Pump Discharge: 300mm

(l) Suction Elbow to be sized to connect to 400mm suction piping directly or by means of an eccentric reducer as shown in the construction drawings.

E30.3.2 The following pumps were used as the basis of design. Compliant alternatives in accordance with B7, may be approved during tender.

(a) Flowserve 12MN14A FR6A – 330mm Impeller.

(b) KSB SPNC300-350 – 335mm Impeller.

(c) Flygt 12x12x15 NSY – 333mm Impeller.

(d) Approved Equal in accordance with B7.

E30.3.3 Unspecified Materials

(a) All unspecified materials shall be selected specifically for their suitability considering their duty. Unless otherwise specified herein, all materials and equipment shall conform to the appropriate Standard Specifications of the American Society for Testing Materials, referred to as the ASTM Standards except where a higher standard is specifically called herein. Where alternate materials are being offered the bidder shall refer to the material by ASTM standard number.

(b) The various materials used in the construction of the equipment shall be of the best quality and particularly suited to the requirements. Materials shall conform in general to the composition, physical characteristics and methods of treatment required by the specifications of the American Society for Testing Materials in so far as they apply and as specified herein.

E30.3.4 General Requirements:

(a) Castings to be free from flaws and imperfections and machined surfaces finished true.

(b) Round off inside and outside corners and edges of all castings.

(c) Provide means to prevent nuts and bolts from becoming loose (pins, spring or friction washered fasteners).

(d) Obtain written permission of the Contract Administrator to patch, plug, shim or employ other means of overcoming defects, discrepancies or errors in manufacturing.

(e) Statically and dynamically balance all rotating components as an assembled unit in accordance with ISO 1940 G6.3.

(f) Pump supplier to provide installation instructions, in accordance with the manufacturer's requirements, including details for anchor bolts, frames and other items to be cast into concrete work, prior to the installation of the equipment.

(g) Supplier to provide appurtenances, fittings, connecting piping, framing, accessories and anchor bolts not herein or elsewhere specifically mentioned or included, but necessary for the operation of the equipment package.

E30.3.5 Casing:

(a) Cast iron conforming to ASTM Specification A48 or A278, for Gray Iron Castings, Class 30 or approved equal in accordance with B7.

(b) Casing shall be rated for 1.5 times working pressure.

(c) Eyebolts or hooks shall be provided for lifting.

(d) Centrifugal volute type design of ample thickness and rigidity to withstand stresses due to hydraulic forces, weight of piping, erection loads, operating and testing.

(e) Inside water passages shall be smooth and free from any significant projections that would hinder the flow of any solid waste.

(f) Proportion casings so change in energy of the sewage from the kinetic form, as it leaves the impeller, to the pressure form as it leaves the casing will take place gradually with minimum eddy formation or shock.

(g) Front head to permit equal distribution of sewage to all parts of the impeller without the use of stationary guides or vanes on the suction side of the impeller.

(h) Design to permit the removal of the rotating assembly without disturbing the suction and discharge piping.

(i) Provide a hand hole with bolted cover on the volute to permit access to the inside for cleaning and unclogging of the volute.

(j) Provide a tapped 10 millimetre (3/8") NPT hole on the top of the volute with a suitable length of brass pipe and a shut off ball valve to allow trapped air within the volute to be bled off.

(k) Shop test and provide certification that the fully assembled casing is successfully able withstand a hydrostatic test pressure of not less than 1.5 times the shut-off head of the largest impeller size as shown by the characteristic curve.

E30.3.6 Impeller:

(a) Impeller: cast iron conforming to ASTM Specification A48 or A278, for Gray Iron Castings, Class 30 or approved equal in accordance with Section B7 of the Tender. The cast iron shall contain not less than two (2) percent nickel.

(b) The impeller to be of the non-clog enclosed channel type.

(c) Design impeller to ensure smooth operation without cavitation in the operating range and with minimum vibration.

(d) Cast impeller in one piece and balance both statically and dynamically to ISO 1940 G6.3.

(e) Trim impeller over its full height if the impeller supplied has been trimmed from a larger impeller leaving no lip or protrusion around the bottom edge.

(f) Balance trimmed impeller after trimming.

(g) Cast impeller surface to be free from casting blemishes and finished to 250 RMS or better.

(h) Securely key the impeller to the tapered shaft and hold in place with an impeller nut.

(i) The impeller nut shall be dome shaped with a smooth face and blend into the hub so as not to allow any stringy material to accumulate around the nut. Hex shaped nuts shall not be used.

(j) Design the impeller and retaining nut so that the impeller cannot loosen on the shaft due to torque resulting from rotation.

E30.3.7 Backhead & Stuffing Box:

(a) Cast iron conforming to ASTM Specification A48 or A278, for Gray Iron Castings, Class 30 or approved equal in accordance with B7.

(b) Backhead shall be a separate piece from the volute casing.

(c) Backhead shall be designed to rigidly support the bearing frame and be a self centering and self-indexing fit with the volute casing to ensure proper alignment.

(d) Provide a minimum of two large openings opposite each other adjacent to the stuffing box to allow access for maintenance.

(e) Provide for external axial adjustment of the rotating element to maintain proper clearance between the impeller and front head wearing rings.

(f) Provide tapped 10 millimetre NPT inlet and vent holes complete with suitable lengths of brass pipe and full port shut-off ball valves on opposite sides of the stuffing box for seal water inlet and outlet.

(g) Provide a tapped drain hole on the stuffing box complete with pipe plug.

(h) Stuffing box shall be integral with the backhead and suitable for the use of a double mechanical cartridge seal.

E30.3.8 Clean Out Port:

(a) Clean out port to be located at center of pump.

(b) One hundred (100) millimetres (four (4) inches) diameter, minimum.

E30.3.9 Wear Rings:

(a) Provide removable wear rings of the axial or radial type for the front head and impeller.

(b) Wear Rings: fabricated from stainless steel conforming to ASTM Standard A296, for Corrosion-Resistant Iron Chromium, Iron-Chromium-Nickel, and Nickel-Base Alloy Castings for General Application, Grade CA-15, CA-40, or approved equal in accordance with B7.

(c) Impeller ring hardness to be at least 300 Brinell (RC 32.1).

(d) Casing wear ring to exceed impeller wear ring by at least 50 Brinell.

(e) Machine the rings for a close fit to minimize the leakage of sewage from the discharge to the suction.

(f) Attach the rings in such a way as to allow for ready adjustment or replacement and to prevent loosening under normal operation or under reverse pump rotation.

E30.3.10 Impeller Shaft Assembly

(a) Shaft Assembly: fabricated from steel conforming to ASTM A108, Grade 1045 or approved equal in accordance with B7.

(b) Shaft assembly to be of sufficient diameter to assure rigid support of the impeller and to transmit loads without slip, vibration or undue deflection at all operating speeds and loads.

(c) Accurately machine the shaft along its entire length and provide keyways at both ends.

E30.3.11 Bearings:

(a) Bearings: shall be of the heavy duty anti-friction type suitable for oil or grease lubrication. Radial bearings shall be of the self-aligning plain roller type, ball type, or tapered roller type and thrust bearings shall be of the tapered roller or angular contact type.

(b) Design bearings for a B-10 life of not less than 100,000 hours in accordance with AFBMA.

(c) Rigidly support bearings to counteract any possible tendency towards vibration.

(d) Grind and match duplex bearings, if used.

(e) Adapt lubrication of the bearings to the operation of the units without full-time attendance.

E30.3.12 Mechanical Seals:

(a) Mechanical Seals: double mechanical seals.

(i) Cartridge type.

(ii) Primary sealing mating faces to be silicon carbide to silicon carbide and secondary sealing mating faces to be carbon to silicon carbide or silicon carbide to silicon carbide.

(iii) As manufactured by John Crane, Durametallic, Burgmann, or approved equal in accordance with B7.

E30.3.13 Paint:

(a) Apply one prime coat of a rust inhibitive primer, a second adhesive prime coat and one finish coat of manufacturer's standard enamel to all exterior metal surfaces, except machined surfaces.

(b) Do not paint over nameplates.

E30.3.14 Drive Shaft Assembly

(a) Vertical hollow steel drive shaft with flexible coupling(s) to transmit power from the motor to the pump.

(b) Drive shaft and coupling(s) shall have a service factor of 2.5 to ensure ample capacity to transmit power continuously for all operating conditions with up to one (1) degrees of misalignment which may occur during or develop after installation and should accommodate any thermal expansion based on a temperature differential of one hundred (100) degrees Fahrenheit (37.8^{o} C).

(c) The drive shaft shall be sized for a full size pump impeller, regardless if a trimmed impeller is used.

(d) The shaft shall be of ample diameter to limit the deflection of shaft and impeller when installed in the pump casing to a minimum and to prevent vibration during acceleration, deceleration and running speeds.

(e) Shaft shall be machined with radiused re-entrant corners at changes of diameters and at keyways to minimize stress concentration and other causes of metal fatigue.

(f) The drive shaft assembly coupling arrangement shall permit easy removal of either the pump or motor without disturbing the other. Only one length of shaft shall be used between the pump and motor.

(g) Statically and dynamically balance the drive shaft to obtain vibration free operation. Design shaft to ensure a separation between the operating speed and the first harmonic frequency of the system (motor, couplings, shaft and pump) consistent with E30.1(f).

(h) The approximate elevations of the pump room floor, suction centre line, and motor room floor for the pumping station is shown inE30.6. The Bidder shall use this to approximate the drive shaft length for bidding purposes. Contractor shall confirm distances prior to manufacture.

(i) After award of this Contract, the Contractor shall be responsible to take exact measurements for final sizing of the drive shaft lengths.

E30.3.15 Drive Shaft Guard:

(a) Drive shaft guards, as supplied, shall be meet OSHA standards upon installation without requiring any modification. Installation by others.

(b) The drive shaft guards shall extend to the ceiling above the pumps.

E30.3.16 Shaft and Sleeve:

(a) Shaft sleeve where shaft passes through stuffing box: fabricated from 316L stainless steel conforming to ASTM A240 or approved equal in accordance with B7.

(b) Fit and securely fasten the shaft sleeve in place after shaft grinding.

(c) Seal shaft sleeve to prevent leakage between the sleeve and shaft.

(d) Extend shaft sleeve at least 2 millimetres above the top of the gland cover.

E30.3.17 Suction and Discharge

(a) Suction and discharge shall be flanged, faced and drilled to conform to ASME Specification B 16.1 Class 125.

(b) Provide a cast or fabricated 90º suction elbow with hand hole and cover plate fastened with bolts, to permit access to the suction side of the impeller for cleaning and inspection.

(c) Provide gauge connections tapped for 10 millimetre (3/8") NPT threaded pipe on each suction and discharge nozzle. Locate tapped connection close to flange ends. Provide pipe plugs in tapped holes.

E30.3.18 Bearing Frame

(a) Bearing Frame: cast iron conforming to ASTM Specification A48 or A278, for Gray Iron Castings, Class 30.

(b) The station includes existing shaft openings through floors and posts supporting bearings on the valve floor.

(c) Bearing frame shall rigidly support the motor adapter frame with a self-centering and self-indexing fit with the backhead to ensure proper alignment.

(d) Machine bearing frame for accurate and permanent bearing alignment.

(e) Completely enclose the shaft between the bearings.

(f) Provide lip type seals in contact with the shaft.

(g) Include grease fittings in the bearing frame for bearing lubrication.

E30.3.19 Pump Support

(a) Provide one (1) rigid support plate, or a cast suction elbow/cast stand combination for each pump. Pump support shall firmly support the entire weight of the pump and withstand the full motor torque. Submit pump support in accordance with E11 to be approved by contract Administrator prior to shipment.

(i) The pump support shall provide clear access to the cleanout ports on the suction elbow and the pump volute.

(b) The pump support should be suitable for mounting onto a concrete base using anchor bolts.

(i) The installation contractor will have the capability to modify the existing concrete base to suite the pump and pump support.

E30.4 Motor (MTRS-L01, MTR-L02 and MTR-L03) requirements:

(a) Motor General Requirements:

(i)	Enclosure:	Totally Enclosed Fan Cooled (TEFC)
(ii)	Power Supply:	600 VAC, 3-Phase, 60 Hz.
(iii)	Power Rating:	75 HP
(iv)	Power Factor:	0.80 PF Minimum
(v)	Efficiency:	Premium - 0.90 Minimum
(vi)	Winding Insulation:	Class F or Higher
(vii)	Nominal Speed:	1200 RPM

(viii) Windings: Copper
(ix) Motor Service Factor: 1.15
(x) Approvals: CSA, NEMA MG1
(xi) Starts per Hour Capability: 10
(xii) Inverter Duty Rated for Variable Frequency Drive (VFD) Compatibility.
(xiii) All motors shall be equipped with motor shaft grounding ring, suitable for VFD (inverter) application:
- AEGIS SGR Bearing Protection Ring;
- Or approved equal in accordance with B7.

(b) Power Cabling General Requirements:
(i) Include lugs for the connection of power cabling for #8 AWG or larger.
(ii) Include a power cable enclosure for terminating incoming field power cabling to motor cabling.

(c) Provide motor mount standoff with access to motor shaft;

(d) The motors shall be sized for a full size pump impeller, regardless if a trimmed impeller is used.

E30.5 Instruments General Requirements:

(a) All vibration and temperature instruments associated with the pumps, drive shafts and motors shall be supplied and installed by the pump supplier. Pump supplier shall provide a low voltage control enclosure mounted on each pump and each motor for terminating pump side instruments. Instruments shall be wired to terminal blocks within control enclosures.

(b) All instrument signals shall be capable of connecting directly to the PLC. Shaft bearing vibration sensors shall be wired to precision remote IO panel in the Lift Station Motor Room.

(c) All upper bearing instruments (vibration and temperature) shall be brought to a low voltage control enclosure located on the motor (separate from the power enclosure). The control enclosure shall not include any 600 VAC power connections within.

(d) Vibration Monitoring:
(i) Vibration monitoring to include sensors for XY directions for a total of 2 analog vibration instruments per pump and motor assembly.
(ii) 4-20mA loop powered.
(iii) Frequency range three (3) hertz to one thousand (1,000) hertz.
(iv) Sensor one hundred (100) mV/g.
(v) Cast aluminum NEMA 4 conduit elbow termination housing.
(vi) Terminal blocks for connection to field wiring.
(vii) Threaded bolted connection to machined flat spot on bearing housing.
(viii) Manufacturer: IMI Sensors (PCM Piezotronics).
(ix) Locations:
(a) P-L01 Motor Drive End Upper (VT-L010-1) Bearing Vibration;
(b) P-L01 Motor Drive End Lower (VT-L010-2) Bearing Vibration;
(c) P-L01 Pump Drive End Upper (VT-L010-3) Bearing Vibration;
(d) P-L01 Pump Drive End Lower (VT-L010-4) Bearing Vibration;
(e) P-L02 Motor Drive End Upper (VT-L020-1) Bearing Vibration;
(f) P-L02 Motor Drive End Lower (VT-L020-2) Bearing Vibration;
(g) P-L02 Pump Drive End Upper (VT-L020-3) Bearing Vibration;
(h) P-L02 Pump Drive End Lower (VT-L020-4) Bearing Vibration;

(i) P-L03 Motor Drive End Upper (VT-L030-1) Bearing Vibration;

(j) P-L03 Motor Drive End Lower (VT-L030-2) Bearing Vibration;

(k) P-L03 Pump Drive End Upper (VT-L030-3) Bearing Vibration; and

(l) P-L03 Pump Drive End Lower (VT-L030-4) Bearing Vibration.

(e) Temperature Monitoring:

(a) One hundred (100) ohm platinum 3-wire RTD.

(b) NEMA 4X connection head.

(c) Terminal blocks for connection to field wiring.

(d) Provide high temperature detection at the following locations:

(i) P-L01 Motor (TSH-L011) Winding Temperature;

(ii) P-L02 Motor (TSH-L021) Winding Temperature; and

(iii) P-L03 Motor (TSH-L031) Winding Temperature.

(e) Provide RTD temperature sensors and transmitters at the following locations:

(i) P-L01 Motor Drive End Upper (TE-L010-1, TT-L010-1) Bearing Temperature;

(ii) P-L01 Motor Drive End Lower (TE-L010-2, TT-L010-2) Bearing Temperature;

(iii) P-L01 Pump Drive End Upper (TE-L010-3, TT-L010-3) Bearing Temperature;

(iv) P-L01 Pump Drive End Lower (TE-L010-4, TT-L010-4) Bearing Temperature;

(v) P-L02 Motor Drive End Upper (TE-L020-1, TT-L020-1) Bearing Temperature;

(vi) P-L02 Motor Drive End Lower (TE-L020-2, TT-L020-2) Bearing Temperature;

(vii) P-L02 Pump Drive End Upper (TE-L020-3, TT-L020-3) Bearing Temperature;

(viii) P-L02 Pump Drive End Lower (TE-L020-4, TT-L020-4) Bearing Temperature;

(ix) P-L03 Motor Drive End Upper (TE-L030-1, TT-L030-1) Bearing Temperature;

(x) P-L03 Motor Drive End Lower (TE-L030-2, TT-L030-2) Bearing Temperature;

(xi) P-L03 Pump Drive End Upper (TE-L030-3, TT-L030-3) Bearing Temperature; and

(xii) P-L03 Pump Drive End Lower (TE-L030-4, TT-L030-4) Bearing Temperature.

E30.6 Training

E30.6.1 Training to be incorporated into the on-site program outlined in E43.

E30.6.2 Training to be by a manufacturer's representative. Allow for four (4) hours of on-site training by the representative.

E30.7 Relevant Elevations

Detail	Elevation
Motor Room	225.68 m
Pump Room	222.08 m

E30.8 Measurement and Payment

(a) Payment will be Lump Sum based on Form B, "Lift Pumping Equipment Supply (Pumps, Motors, Drive Shafts and Instruments), Spare Parts, and In-Person Factory Acceptance Testing". Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification, accepted and measured by the Contract Administrator.

(b) Payment shall be in accordance with the following payment schedule:

(i) Ten (10) percent upon approval of Shop Drawings.

(ii) Seventy (70) percent upon all pumping equipment received in Winnipeg.

(iii) Fifteen (15) percent upon completion of commissioning and pumps are in-service.

(iv) Five (5) percent upon providing training and O&M material.

E31. PUMPING EQUIPMENT SPARE PARTS

E31.1 Tools and Accessories:

(a) Provide special tools or accessories required for maintenance, adjustment, assembly or disassembly of the pumping equipment supplied.

E31.2 Spare Parts: Provide three (3) sets of full pumps rebuild kits. Provide special tools or accessories required for maintenance, adjustment, assembly or disassembly of the pumping equipment supplied.

(a) Each pump rebuild kit shall include:

(i) Qty 1 set of wear rings;

(ii) Qty 1 set of mechanical seals;

(iii) Qty 1 set1 of bearings;

(iv) Qty 1 impeller;

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

(vi) Hardware to install spare parts.

E31.3 Properly package spare parts to resist damage.

E31.4 Clearly identify package as to its contents.

E31.5 Spare parts shall be identical to those supplied in the pumps.

E31.6 Measurement and Payment:

E31.6.1 Payment for valves will be Lump Sum based on Form B, “Lift Pumping Equipment Supply (Pumps, Motors, Drive Shafts and Instruments), Spare Parts, and In-Person Factory Acceptance Testing”, as accepted and measured by the Contract Administrator.

E32. PUMPING EQUIPMENT IN-PERSON FACTORY ACCEPTANCE TESTING (FAT) TESTING

E32.1 General factory acceptance testing shall consist of the following:

(a) Factory Acceptance Testing (FAT) shall be carried out by the equipment manufacturer. Motor FAT to be unwitnessed provided all required testing reports and documentation is provided. Pump FAT shall be witnessed In-Person by City of Winnipeg personnel and/or City of Winnipeg representatives at no additional cost. A total of two (2) City of Winnipeg representatives (1 City Personnel and 1 Contract Administrator Personnel) shall be participating in In-Person witnessing of the FAT. The City reserves the right to request remote witnessing in place of in-person witnessing at no additional cost.

(i) If remote pump FAT witnessing is requested, the manufacturer shall complete all testing required and shall arrange for live video viewing of testing. The manufacturer is responsible for organizing and arranging the live video testing and for distributing video recordings of each test.

(ii) The costs of travel and accommodation for the two (2) City of Winnipeg representatives is not to be included in this contract. These costs are to be borne by the Contract Administrator.

(b) The In-Person FAT shall be carried out on one (1) FAT site visit. The equipment manufacturer shall arrange for FAT to be performed on all pumps during the single FAT site visit.

(c) Provide a minimum of fifteen (15) business days notice to the Contract Administrator prior to anticipated witness testing date.

(d) The Contractor shall furnish all power, labour, materials and properly calibrated instruments required for these tests. Instrument calibration shall be as specified in the Test Code of the Hydraulics Institute Standards.

(e) Allow for an escort at the testing facility for participating City of Winnipeg representatives, equipment pictures to be taken, along with testing equipment, tools and materials to carry

out testing. Make all equipment and labour accessible for participating personnel as directed.

(f) A minimum of five (5) business days prior to anticipated FAT date, submit test facility evidence of Canadian Certification, calibration certificates of all testing equipment to be used along with details on the test arrangement procedures. Submit detailed test procedures including the test layout and instrument test calibration certificate. Include equipment calibrations and test arrangement procedures in the Operation & Maintenance Manual.

E32.2 Pump factory acceptance testing shall consist of the following:

(a) The pumps shall be subject to unwitnessed hydrostatic tests in accordance with the Test Code of the Hydraulic Institute Standards. Certified test records shall be submitted to the Contract Administrator for review prior to pump shipment.

(b) Performance testing of a pump shall not be scheduled until satisfactory completion and submission of the certified records of the hydrostatic testing.

(c) Conduct pump tests in accordance with Hydraulic Institute Standards. All definitions for the purpose of testing shall be as set forth by Hydraulic Institute Standards.

(d) Pump test to be witnessed performance tested (In-Person FAT) as per Hydraulic Institute Standards 14.6 Grade 1B. Each pump shall be tested for:

(i) Flow Test: The pumps shall be tested to determine the head, capacity, efficiency, power, and vibration limit all in accordance with the Hydraulic Institute Standards. The pumps shall be tested at full rated speed and reduced speeds, as specified, over the ranges listed below. Vibration reading shall be recorded for each point tested and included with the test results. Vibration readings shall include FFT graphs for each point.

- Test six (6) evenly spaced (by flow) duty points between (and including) shutoff and runout. Do this at relative speeds of 100%, 90%, 80%, and 70%. Record motor TDH, efficiency, running currents and absorbed power usage at each flow rate. Absorbed power usage shall be obtained when power factor has been corrected to 0.95.
- Developing Certified Test Curve(s) (per Hydraulic Institute Standards) Showing Pump Performance.
- Vibration to be measured at each stage including FFT graphs for each point.
- Bearing temperature to be measured at each stage.
- If any signs of cavitation or incipient cavitation occur over the specified operating range of the pumping unit, the unit may be rejected.
- A test report which includes certified performance curve in showing head in metres, capacity in litres per second, efficiency, speed, power in kilowatts, and vibrations shall be furnished to the Engineer for approval. The Contractor shall include sample calculations, raw data, calibration curves and/or certificates, and assumptions in the report.

(ii) Fixed head curve: At each of the speeds above, record at least one (1) of the six (6) data points at 12m TDH. Use these data points to produce a “fixed head curve” at 12m TDH, varying speed for each pump from 70 – 100%. Data collected at each duty point is to match (i).

(iii) Complete a NPSH (Cavitation) testing with methods and allowable tolerances in accordance with Hydraulic Institute Standards at full speed, corrected for difference in atmospheric conditions between testing location and project site. For each pump test the design duty points given in E30.3.1 and the worst-case duty points at flow run-out.

(e) The approval of the Engineer of the results of the shop tests is not to be construed as being final approval of the pumping unit. Final approval will be given subject to the satisfactory installation and operation in place of this equipment, as demonstrated by Field Performance Tests specified hereinafter.

(f) All FAT to be performed is to be provided prior to testing and include pump rated specification and acceptable tolerances with pass/fail indicators.

E32.3 Motor factory acceptance testing (unwitnessed) to be completed as per ANSI/NETA ATS-2021, NEMA MG 1-2021, and manufacturers requirements with the intent to test the compliance of the motors without causing damage to the equipment. Testing shall consist of the following at minimum for each motor:

(a) Run Test at Full Voltage and Full Speed.

(b) Running Current at Motor Speed tests at:

(i) 100% Load.

(ii) 75% Load.

(iii) 50% Load.

(iv) 40% Load.

(v) 30% Load.

(c) Full Load Steady State Current.

(i) High Potential Test.

(ii) Noise and Vibration Test.

(iii) Insulation Resistance Test.

(iv) Winding Resistance Test.

(v) Partial Discharge Test.

(vi) Surge Test.

(vii) Power Factor Test.

(viii) Temperature Rise Test at the rated service factor of the motor for the duration applicable to a continuously rated machine using the resistance method.

E32.4 Instrument factory acceptance testing shall consist of the following:

(a) All instruments to be provided with calibration certificates:

E32.5 At no additional cost, make any adjustments or changes required by the participating City of Winnipeg representatives such that each pump and associated equipment will pass every test. Final acceptance by the City of Winnipeg representatives will be a conditional requirement prior to pump shipments from the factory.

E32.6 All factory acceptance tests shall be documented, dated and signed by the testing technician(s) with electronic copies submitted to Contract Administrator for approval prior to shipments from the factory. Include test results in the Operation & Maintenance Manual.

E32.7 Any failure to meet the requirements of the Specifications shall be corrected promptly by the Contractor after which the pump shall be retested. If, after correction and retesting, the pump still fails to meet the requirements of the Specifications, it may be rejected.

E32.8 Do not ship pump or motor to site until:

(a) Shop tests for both are completed.

(b) Shop test reports have been submitted to Contract Administrator.

(c) Compliance with performance requirements has been demonstrated.

(d) Contract Administrator has given approval for shipping to proceed.

(e) Contract Administrator has given approval of Torsional Frequency Analysis results pursuant to E32.11.

E32.9 All FAT to be performed is to be provided prior to testing and include rated specification, acceptable tolerances with pass fail indicators. All FAT documents and testing procedures are to be provided to the Contract Administrator at least 4 weeks ahead of actual FAT. The Contract Administrator will provide comments on the FAT documents which the supplier must review and revise accordingly.

E32.10 FAT reports are to indicate nominal values and acceptable tolerances in additional to as-found testing results.

E32.11 Shop Tests:

(a) Pursuant to E36, 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.

E32.12 Installation and Field Tests:

(a) Installation:

(i) All equipment and material shall be installed in a workmanlike manner, in accordance with the manufacturer’s recommendations.

(ii) Install in accordance with the manufacturer’s requirements, as provided by the Pump Supplier, including details for anchor bolts, frames and other items to be cast into concrete work, prior to the installation of the equipment.

(iii) The Contractor shall install the equipment where shown on the Drawings and in strict accordance with the manufacturer’s instructions and in compliance with applicable local, provincial and federal codes and regulations.

(iv) The Contractor shall provide concrete and grout, final piping and electrical connections and other appurtenances not herein or elsewhere specifically mentioned or included, but necessary for the installation, operation and testing of the equipment, without additional payment.

(v) All possible precautions should be taken to ensure proper alignment of equipment shafts and pipe connections to avoid transmission of piping weight reactions to the equipment at pipe connections or equipment damage due to misalignment.

(vi) Comply with requirements of Hydraulic Institute Standards for installation of all pumps.

(b) Field tests will be performed on each pumping unit as soon as possible after the Contractor has inspected the installation. Pump supplier is to provide the services of a qualified technical representative to be present for the field tests and verify correct installation of the pumps. 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 raw sewage with a density taken to be 1.00 kilogram per litre.

(c) Measurements shall be taken by a qualified representative of the Pump Manufacturer. Prepare a report including all testing data presented graphically in the same units as the shop test results and submit to the Contract Administrator.

(d) 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.

(e) If the Contract Administrator is not satisfied with the procedure of the field 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 themself. 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.

E32.13 Field Commissioning

(a) The pump manufacturer representative shall be required to attend site for three (3) separate site visits, each four (4) hours in duration to assist with commissioning activities.

E32.14 Measurement and Payment

(a) Pumping Equipment In-Person Factory Acceptance Testing (FAT) Testing shall be paid under Contract Price Lump Sum for "Lift Pumping Equipment Supply (Pumps, Motors, Drive Shafts and Instruments), Spare Parts, and In-Person Factory Acceptance Testing"

E33. PROCESS GATE VALVES

E33.1 Reference Standards

(a) American Water Works Association (AWWA), American National Standards Institute (ANSI)/American society of Mechanical Engineers (ASME).

(b) ANSI/ASME Bl.20.1, Pipe Threads, General Purpose (Inch).

E33.2 Resilient Seated Gate Valves:

E33.2.1 Description

(a) Three (3) four hundred (400) millimetre gate valves – Manually actuated [HV-L011, HV-L021, HV-L031], Rising Stem;

(b) Three (3) three hundred (300) millimetre gate valves – manually actuated [HV-L013, HV-L023, HV-L033], Rising Stem;

(c) One (1) four hundred fifty (450) millimetre gate valve – Manually actuated [HV-L300], Rising Stem, Chain wheel-operated;

(d) One (1) four hundred (400) millimetre gate valve – Manually actuated [HV-L310], Rising Stem, Chain wheel-operated;

(e) Two (2) three hundred (300) millimetre gate valves – manually actuated [HV-L413, HV-L423], to be installed within the bypass vault in accordance with contract drawings. Non-rising stem.

E33.2.2 Specification

(a) Metal seated solid wedge gate valve, ductile iron body with flanged ends; bronze trimmed, ductile iron wedge; 316 stainless steel stem, double O-ring stem seals, 316 stainless steel fasteners, internal and external fusion-bonded epoxy coating on body and wedge.

(b) The valves shall conform to AWWA C500.

(c) Gate valves to be equipped with stems as specified in E33.2.1, screws and yokes and complete with handwheels. Direction of opening shall be counter clockwise and shall be clearly stamped or indicated with raised letters and arrow.

(d) Body material: Ductile Iron to ASTM-525 or 526.

(e) Stem: Non-Rising stem and Rising stem as specified in E33.2.1, one (1) piece stainless steel.

(f) Disc: Bronze trimmed, ductile iron wedge.

(g) End connections: flanged to ANSI B16.1, Class 125 with holes straddling centreline.

(h) Packing and gaskets: non-asbestos.

(i) Fusion bonded epoxy coating to AWWA C-550 shall be applied to the ferrous surfaces in contact with water.

(j) All fasteners, nuts and bolts shall be stainless steel.

(k) Manufacturer's nameplate shall be attached to the valve body with stainless steel Fasteners.

(l) Knife gate valves are not acceptable.

(m) Acceptable manufacturers – one (1) of the following:

(i) Mueller Canada; or

(ii) Approved equal in accordance with Section B7.

E33.3 Valve Operators

(a) Supply valve operators or actuators for all types of valves specified as follows:

(b) Supply removable manually operated hand wheels for all gate valves except:

(i) HV-L300 and HV-L310 to include chain wheel

- Handwheel direct-mount type complete with chain.
- Galvanized or cadmium-plated.
- Manufacturers and Products: Clow Corp.; Figure F-5680; Walworth Co.; Figure 804; GA Industries.

(c) Ensure that each valve and operator is of suitable construction and rating for the long term service with the fluid or product being conveyed and at the pressure and operating frequencies required by the relevant service;

(d) The allowable pull on a manual operator to open or close the valve shall be less than or equal to two hundred seventy (270) N (sixty (60) pound force). Manual operators shall operate in a clockwise motion to close the valve. For valves with greater than two hundred seventy (270) N (sixty (60) pound force), install spur gear actuators;

(e) Supply cast iron hand wheels clearly marked with a flow directional arrow and the word "open" cast in relief on the rim. Provide hand wheels greater than three hundred (300) millimetres (twelve (12) inches) in diameter for all valves greater than two hundred (200) millimetres (eight (8) inches) and four hundred fifty (450) millimetres (eighteen (18) inches) in diameter for larger valves as required to allow for manual operation. In confined areas, furnish smaller hand wheels with higher ratio gearing of the valve to compensate; and

(f) Supply steel pipe Tee wrenches with socket to suit nut dimensions.

E33.4 General Requirements

(a) Where there is an applicable recommended standard for the design, construction and testing of a valve and/or actuator, e.g., AWWA, CGA, CSA etc., equipment to be supplied under this section will refer to this standard. Comply with these requirements for all equipment supplied in all regards. Where specifically requested, provide certificates of compliance with the applicable standards.

(b) Where it is not intended to supply equipment or valves to a specific standard, the Specification will indicate a reference product. Provide flanges as specified for all flanged valves for the line into which they are to be installed. As a minimum standard a Class one hundred twenty-five (125) pound rating will be required.

(c) The Contractor shall ensure that the valve end connections are compatible with pipe material in which the valve is installed.

(d) Do not install valves dissimilar with piping to avoid galvanic corrosion.

(e) All packing, gaskets, seats, diaphragms, lubricants, etc., shall be suitable for the intended operating conditions.

(f) Supply all valves free of asphalt varnish or other non-potable protective coatings if it is intended for potable water service. Mark valves with size, pressure rating and manufacturer on a corrosion resistant nameplate mounted on the body.

(g) Equip the valve with a disc position indicator and a direction of flow indicator where applicable.

E33.5 Shop Drawings and Submittals

(a) Submit submittals in accordance with Section 01 33 00- Submittal Procedures.

(b) Product Data:

(i) Submit manufacturer's instructions, printed product literature and data sheets for all valves and include product characteristics, performance criteria, physical size, finish and limitations.

(c) Shop Drawings:

(i) Submit Shop Drawings in accordance with Section 01 30 00 – Submittal Procedures

(ii) Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

(d) Spare Parts

(i) Provide list of recommended spare parts for City's follow-up.

(e) Submit close-out submittals in accordance with Section 01 78 00- Closeout Submittals.

E33.6 Execution

(a) Test AWWA valves in the shop in accordance with American Water Works Association requirements. A certified test report shall be submitted.

(b) On completion of installation and testing, submit the manufacturer's certification of the correctness of the installation to the Contract Administrator.

(c) Install chain wheel and guide assemblies or chain lever assemblies on manually operated valves over 2057 mm above finished floor. Where chains hang in normally traveled areas, use appropriate “L” type tie-back anchors.

E33.7 Measurement and Payment:

E33.7.1 Payment will be Lump Sum based on Form B, “Process Gate Valves, Process Check Valves, Process Plug Valves and Process Mechanical Work”, as accepted and measured by the Contract Administrator.

E34. PROCESS CHECK VALVES:

E34.1 Reference Standards

(a) American Water Works Association (AWWA), American National Standards Institute (ANSI)/American society of Mechanical Engineers (ASME).

(b) ANSI/ASME Bl.20.1, Pipe Threads, General Purpose (Inch).

E34.2 Process Check Valves:

E34.2.1 Description

(a) Three (3) three hundred (300) millimetre check valves with “hold-open” device [CV-L012, CV-L022, CV-L033];

E34.2.2 Specification

(a) The valves shall be designed, manufactured, tested and certified to American Water Works Association Standard ANSI/AWWA C508.

(b) The valves shall have flanges with drilling to ANSI B16.1, Class 125 with holes straddling centreline.

(c) Check valve to be rapid closure rubber flapper (RF) type with a forty-five (45) degree seating face suitable for horizontal installation.

(d) The valves will be specified with a “hold open” device

(e) The valve body shall be full flow equal to nominal pipe diameter at all points through the valve. The top access port shall be full size, allowing removal of the disc without removing the valve from the line. The access cover shall be domed in shape to provide flushing action over the disc for operating in lines containing high solids

content. A threaded port with pipe plug shall be provided in the access cover to allow for field installation of a mechanical disc position indicator.

(f) The disc shall be of one-piece construction, precision molded with an integral O- ring type sealing surface and reinforced with alloy steel.

(g) The valve body and cover shall be constructed of ASTM A536 Grade 65-45-12 ductile iron.

(h) The disc shall be precision molded Buna-N (NBR), ASTM D2000-BG. Optional disc material includes Viton, EPDM, Hypalon.

(i) Hinge pin to be stainless steel (303/316).

(j) The exterior and interior of the valve shall be coated with an AWWA C-550 approved fusion bonded epoxy coating.

(k) All valves shall be hydrostatically tested and seat tested to demonstrate zero (0) leakage. The manufacturer shall provide test certificates, dimensional Drawings, parts list Drawings and Operation and Maintenance Manuals.

(l) Submit Shop Drawings of check valves in accordance with Section 01 33 00 – Submittal Procedures.

(m) Approved check valve manufacturers:

(i) American Valve Company;

(ii) Clow Canada;

(iii) Dezurik;

(iv) ValMatic

(v) Mueller Canada; or

(vi) Approved equal in accordance with Section B7.

E34.3 General Requirements

(a) Where there is an applicable recommended standard for the design, construction and testing of a valve and/or actuator, e.g., AWWA, CGA, CSA etc., equipment to be supplied under this section will refer to this standard. Comply with these requirements for all equipment supplied in all regards. Where specifically requested, provide certificates of compliance with the applicable standards.

(b) Where it is not intended to supply equipment or valves to a specific standard, the Specification will indicate a reference product. Provide flanges as specified for all flanged valves for the line into which they are to be installed. As a minimum standard a Class one hundred twenty-five (125) pound rating will be required.

(c) The Contractor shall ensure that the valve end connections are compatible with pipe material in which the valve is installed.

(d) Do not install valves dissimilar with piping to avoid galvanic corrosion.

(e) All packing, gaskets, seats, diaphragms, lubricants, etc., shall be suitable for the intended operating conditions.

(f) Supply all valves free of asphalt varnish or other non-potable protective coatings if it is intended for potable water service. Mark valves with size, pressure rating and manufacturer on a corrosion resistant nameplate mounted on the body.

(g) Equip the valve with a disc position indicator and a direction of flow indicator where applicable.

E34.4 Shop Drawings and Submittals

(a) Submit submittals in accordance with Section 01 33 00- Submittal Procedures.

(b) Product Data:

(i) Submit manufacturer's instructions, printed product literature and data sheets for all valves and include product characteristics, performance criteria, physical size, finish and limitations.

(c) Shop Drawings:
  (i) Submit Shop Drawings in accordance with Section 01 30 00 – Submittal Procedures
  (ii) Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

(d) Spare Parts
  (i) Provide list of recommended spare parts for City's follow-up.

(e) Submit close-out submittals in accordance with Section 01 78 00- Closeout Submittals.

E34.5 Execution

(a) Test AWWA valves in the shop in accordance with American Water Works Association requirements. A certified test report shall be submitted.

(b) On completion of installation and testing, submit the manufacturer's certification of the correctness of the installation to the Contract Administrator.

E34.6 Measurement and Payment:

E34.6.1 Payment will be Lump Sum based on Form B, “Process Gate Valves, Process Check Valves, Process Plug Valves and Process Mechanical Work”, as accepted and measured by the Contract Administrator.

E35. PROCESS PLUG VALVES

E35.1 Reference Standards

(a) American Water Works Association (AWWA), American National Standards Institute (ANSI)/American society of Mechanical Engineers (ASME).

(b) ANSI/ASME Bl.20.1, Pipe Threads, General Purpose (Inch).

E35.2 Eccentric Plug Valves:

E35.2.1 Description

(a) One (1) four hundred fifty (450) millimetre plug valve – suitable for electrically (on/off) actuated [XV-L412];

(b) One (1) four hundred (400) millimetre plug valve – suitable for electrically (on/off) actuated [XV-L422];

E35.2.2 Specification

(a) Non-lubricated type rated 1208 kPa CWP, drip-tight shutoff with pressure from either direction, cast or ductile iron body, exposed service flanged ends per ANSI B16.1 or grooved ends in accordance with AWWA C606 for rigid joints, buried service mechanical joint ends, unless otherwise shown.

(b) Plug cast or ductile iron with round or rectangular port of 100% of connecting pipe area and coated with Buna-N , seats welded nickel, stem bearing lubricated stainless steel or bronze, stem seal multiple V-rings, or U-cups with O-rings of nitrile rubber, grit seals on stem.

(c) Provide external and internal fusion-bonded epoxy coating.

(d) Electrically Actuated – See E14.

(e) Acceptable manufacturers and products:
  (i) Val-Matic; 5600F
  (ii) DeZurik; Style PEF
  (iii) Homestead; Series 120
  (iv) Milliken; Millcentric Series 600

E35.3 General Requirements

(a) Where there is an applicable recommended standard for the design, construction and testing of a valve and/or actuator, e.g., AWWA, CGA, CSA etc., equipment to be supplied under this section will refer to this standard. Comply with these requirements for all equipment supplied in all regards. Where specifically requested, provide certificates of compliance with the applicable standards.

(b) Where it is not intended to supply equipment or valves to a specific standard, the Specification will indicate a reference product. Provide flanges as specified for all flanged valves for the line into which they are to be installed. As a minimum standard a Class one hundred twenty-five (125) pound rating will be required.

(c) The Contractor shall ensure that the valve end connections are compatible with pipe material in which the valve is installed.

(d) Do not install valves dissimilar with piping to avoid galvanic corrosion.

(e) All packing, gaskets, seats, diaphragms, lubricants, etc., shall be suitable for the intended operating conditions.

(f) Supply all valves free of asphalt varnish or other non-potable protective coatings if it is intended for potable water service. Mark valves with size, pressure rating and manufacturer on a corrosion resistant nameplate mounted on the body.

E35.4 Shop Drawings and Submittals

(a) Submit submittals in accordance with Section 01 33 00- Submittal Procedures.

(b) Product Data:

(i) Submit manufacturer's instructions, printed product literature and data sheets for all valves and include product characteristics, performance criteria, physical size, finish and limitations.

(c) Shop Drawings:

(i) Submit Shop Drawings in accordance with Section 01 30 00 – Submittal Procedures

(ii) Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

(d) Spare Parts

(i) Provide list of recommended spare parts for City's follow-up.

(e) Submit close-out submittals in accordance with Section 01 78 00- Closeout Submittals.

E35.5 Execution

(a) Plug Valves:

(i) Test AWWA valves in the shop in accordance with American Water Works Association requirements. A certified test report shall be submitted.

(ii) On completion of installation and testing, submit the manufacturer's certification of the correctness of the installation to the Contract Administrator.

(b) Orientation of Electric Actuators: Orient electric actuators to satisfy the following:

(i) Direct viewing and access of actuator controls and monitoring devices such as handwheels, pilot lights, and pushbuttons, when:

- Valve is installed in horizontal runs of pipe having centerline elevations 1500 mm or less above the finished floor, or
- When valve is installed in vertical runs of pipe with centre of valve body at elevations 1500 mm or less above the finished floor,
- Unless otherwise shown.

(c) Limit interference with structures and with any other equipment or piping.

(d) Show valve position indicator from operating position.

(e) With drive shaft of manual override handwheel oriented perpendicular to piping axis.

E35.6 Measurement and Payment:

E35.6.1 Payment for valves will be Lump Sum based on Form B, “Process Gate Valves, Process Check Valves, Process Plug Valves and Process Mechanical Work”, as accepted and measured by the Contract Administrator.

E35.6.2 Payment for actuators will be according to D36 for standardized equipment.

E36. PROCESS MECHANICAL WORK

E36.1 Description

E36.1.1 This Specification covers the process piping, equipment, and materials for the Pumping Station Upgrade Project.

E36.1.2 The Contractor shall remove the existing pumping units, motors, piping, equipment and materials as required and install new pumping units, piping, equipment and materials as shown on the drawings or as indicated by the Contract Administrator.

E36.1.3 Mechanical drawings indicate general layout only. The Contractor is responsible for confirming all dimensions prior to manufacture of piping.

E36.1.4 All equipment and material shall be supplied by the Contractor.

E36.2 Materials:

E36.2.1 Pumping Units: Refer to E30.3.

E36.2.2 Pump Motors:

(a) Three (3) pump motors complete with driveshaft assemblies shall be supplied by the Contractor.

(b) Refer to Section E30.3 and coordinate with Division 26 – Electrical.

E36.2.3 Process Gate Valves: Refer to E31

(a) Gate valves shall be supplied by the Contractor.

E36.2.4 Process Check Valves: Refer to E34

(a) Process check valves shall be supplied by the Contractor.

E36.2.5 Process Actuated Plug Valves: Refer to Section E35

(a) Actuated plug valves shall be supplied by the Contractor.

E36.2.6 Carbon Steel Piping and Fittings:

(a) Pump Suction and Discharge Piping: All piping shall be ASTM A106/A106M Grade B Carbon steel extra heavy wall thickness.

(b) Fabricated fittings shall conform to ASTM A106/A106M Carbon Steel Grade B, extra heavy wall thickness.

(c) Steel fittings shall be ASTM A234 Grade B Carbon Steel, extra heavy wall thickness. Dimensions shall be to ANSI B16.9.

(d) Steel flanges shall be ASTM A105, slip-on or weld-neck, dimensions to ANSI B16.5, 150#, flat-face.

(e) Drains and vents, DN50 and smaller:

(i) Thredolet, carbon steel, ASTM A105, 3000#.

(ii) Pipe, carbon steel ASTM A106-B, ERW, schedule 160, threaded ends.

(iii) Ball valve, full-port, 2-piece, NPT, 316 SS, RTFE seats, 1000 psi WOG at 200°F, blowout-proof stem, lockable lever handle.

(iv) 316 stainless steel threaded plug in valve outlet.

(f) Interior finish

(i) Carbon steel pipe, fittings and flanges shall be internally lined with shop-applied epoxy coating in accordance with AWWA C210. Holiday testing required.

(ii) Conform to manufacturer requirements regarding:

- Surface preparation including sand blasting.
- Conditions under which painting system can be applied.
- Prime and final coat thicknesses.

(iii) Acceptable products: Two (2) prime coats Devoe Bar Rust 236, 6 mil DFT per coat, with Devoe Devgrip 238 abrasion resistant finish coat, 6 mil DFT. Total lining 18 mil DFT, or approved equal in accordance with B7.

(iv) On mechanically-coupled pipe ends with ring adapters, interior finish shall be continuous over end of pipe and ring adapter, up to and including coupling gasket sealing surface.

(v) Contractor shall add additional flanged breaks as required to complete internal lining of pipe spools with elbows.

(g) Exterior finish

(i) Apply epoxy finish to the exterior of all carbon steel or ductile iron piping components in accordance with AWWA C210.

(ii) Provide a 1-year warranty from project substantial performance date for entire painting system. See D40.

(iii) Conform to manufacturer requirements regarding:

- Surface preparation including sand blasting.
- Conditions under which painting system can be applied.
- Prime and final coat thicknesses.

(iv) Piping shall be identified per existing identification standard indicating the product and direction of flow. Provide white lettering / arrows on piping painted black. Provide black lettering / arrows on all other background colours.

(v) The exterior final coat colour of all piping shall be as directed by the Contract Administrator

(h) Submit shop drawings in accordance with Section 01 33 00.

E36.2.7 Stainless Steel Pipe and Fittings

(a) Exposed/Submerged:

(i) Schedule 10S, Type 316L, conforming to ASTM A778, “as-welded” grade, straight-seam welded, conforming to ASME B36.19M;

(ii) Pickled and passivated per ASTM A380;

(b) Buried:

(i) Schedule 40S, ASTM A312/A312M, Type 316L, seamless or straight-seam welded, conforming to ASME B36.19M;

(ii) annealed, pickled, and passivated per ASTM A380;

E36.2.8 Large Diameter Flanges and Adaptor Flanges:

(a) Carbon Steel:

(i) Butt-Welded Systems: Forged carbon steel, ASTM A105/A105M, ASME B16.5 Class 150 or Class 300, slip-on or welding neck, 1.5 mm raised face; weld neck bore to match pipe internal diameter. Use weld neck flanges when abutting butt-weld fittings.

(ii) Bolting: Carbon steel ASTM A307, Grade A hex head bolts and ASTM A563, Grade A hex head nuts. Use 3 mm undersize bolting material for insulating flanges.

(b) Stainless Steel:

(i) Forged Stainless Steel: ASTM A182/A182M, Grade F316L, ASME B16.5 or B16.47 Class 150 or Class 300, slip-on or weld neck.

(ii) Raised face for Class 150 and Class 300. Flat face for flange connecting to ductile/cast iron Class 125 and Class 250 flanges.

(iii) Bolting to be Type 316 stainless steel, ASTM A320/A320M Grade B8M hex head bolts, ASTM A194/A194M Grade 8M hex nuts. Type 316 stainless steel flat washer under all bolt heads and nuts. Apply anti-galling compound to bolt threads.

(c) Submit shop drawings in accordance with Section 01 33 00.

E36.2.9 Joints & Couplings:

(a) General:

(i) Couplings shall be rated for working pressure not less than indicated in Piping Schedule for the service and not less than 1035 kPa.

(ii) Couplings shall be lined and coated with fusion-bonded epoxy in accordance with AWWA C213

(iii) Unless thrust restraint is provided by other means, couplings shall be harnessed in accordance with requirements of AWWA M11, and restrained with retainer bar or ring welded to pipe end, or as shown on Drawings.

(iv) Sleeve type couplings shall conform to AWWA C219 and shall be hydraulically expanded beyond minimum yield for accurate sizing and proofing of tensile strength.

(b) Grooved End Coupling:

(i) Rigid, except where joints are used to correct misalignment, to provide flexibility, or where shown, furnish flexible type.

(ii) Malleable iron ASTM A47 or ductile iron ASTM A536 housing, 1725 kPa working pressure, enamel coated. Couplings located outside shall be in stainless steel including bolts and nuts.

(iii) EPDM gaskets

(iv) Manufacturers and Products for Steel and Stainless Steel Pipe:

- Victaulic; Style 77 (flexible 300mm and smaller).
- Victaulic; Style 07 (rigid 300mm and smaller).
- Victaulic; Style LW07 (rigid 350mm and larger).

(c) Flexible Sleeve Type Coupling for Steel Pipe:

(i) Fusion-bonded epoxy-coated middle ring and followers, Type 304 stainless steel bolts and nuts, Buna N gaskets.

(ii) Manufacturers and Products:

- Dresser Piping Specialties; Style 38
- Smith-Blair, Inc.; Style 411.

E36.2.10 Link Seal

(a) EPDM rubber modular wall penetration seal designed for permanent sealing with all stainless hardware.

(b) Pressure rating: Up to 12 m head (1.3 bar)

(c) Sizing: Match manufacturer's recommendations for pipe size / penetration size ratio. Contractor responsible for confirming existing pipe dimensions on site.

(d) Approved Product: Link Seal by GPT or approved equal in accordance with B7.

E36.2.11 Pipe Supports and Hangers:

(a) Pipe supports and hangers to be as shown on the Drawings and in accordance with 05 50 00 and 23 05 29.

E36.2.12 PVC Water and Drain Piping:

(a) As per Section 22 13 16.16.

E36.2.13 Domestic water valves:

(a) As per Section 22 11 16.

E36.2.14 Plumbing Specialties and Accessories:

(a) As per Section 22 05 15

E36.2.15 Sump Pump:

(a) As per Section 22 10 10.

E36.2.16 Fasteners:

(a) Flange nuts and bolts shall be ASTM A193-B8M class 2 Type 316 stainless steel bolts, ASTM A194-8M Type 316 stainless steel extra heavy hex nuts coated with anti-galling compound.

(b) Anchors shall be Kwik-bolt or Rawl Stud ASTM A276, Type 316 stainless steel. Embedment depth and size, where not shown on the Drawings, to be as required for load being carried or resisted.

E36.2.17 Gaskets:

(a) Flange gaskets shall be full faced rubberized cloth gaskets, 3mm in thickness.

(b) Rubber gaskets for adaptor flanges shall conform to AWWA C111, Standard for Rubber-gasket Joints for Cast Iron and Ductile Iron Pressure Pipe and Fittings.

E36.2.18 Paint:

(a) As per Section 09 01 90.63

E36.3 Construction Methods:

E36.3.1 General:

(a) Install the new station piping and pumping equipment as indicated in this specification and shown on the Drawings. Make no changes, revisions or substitutions to the layout without obtaining written approval from the Contractor Administrator.

(b) Be aware of and contend with the wastewater in the existing force main when preparing to make the required piping modifications.

(c) Prior to pumping unit installation, provide a portable sewage pump and discharge hose to remove remaining wastewater in the wet well. The wastewater shall be directed to the upstream manhole or to a sewage hauler for disposal.

E36.3.2 Flow Control and Temporary By-Pass Pumping:

(a) Provide flow control measures and temporary by-pass pumping in accordance with E10.

E36.3.3 Locating Ground Services:

(a) The contractor shall be responsible for locating all services.

(b) Costs for locating the services shall be considered to incidental to the Contract Work

E36.3.4 Existing Pump Level Controls and Alarms:

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

E36.3.5 Pumping Units and Piping Installation:

(a) The existing pumping station contains two (2) pumps complete with motors and related piping. These pumps will be replaced with three (3) new pumps complete with new motors and new drive shafts, bases, suction elbows, and related spare parts in accordance with E30 and E31.

(b) Remove all existing piping as indicated in the Specifications and on the Drawings and replace with new piping.

(c) The Contractor will provide the installation plan to the Contract Administrator at least seven (7) days prior to commencement for approval.

(d) After new pumps and piping have been installed; all pipes and pipe welds shall be painted in accordance with E36.2.6 Carbon Steel Piping & Fittings.

E36.3.6 Miscellaneous Metal Fabrications:

(a) As per 05 50 00 and 05 14 10

E36.3.7 Paint:

(a) As per Section 09 01 90.63

E36.3.8 Cleanup:

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

E36.3.9 Replacement of Water Service:

(a) The existing water service piping shall be replaced inside the lift station to the service entrance. The water service from the station to the curb stop is to be exposed by the contractor and inspected by the contract administrator to determine whether it must be inspected. Work to be in accordance with CW 2110. The Contractor shall reuse the existing water meter. The Contractor is responsible to supply and install a reduced pressure backflow preventer to Section 22 05 15 and as shown on the drawings.

E36.4 Measurement and Payment:

E36.4.1 Payment will be based on Form B, “Process Mechanical Work”, as accepted and measured by the Contract Administrator.

E37. STANDBY NATURAL GAS GENERATOR EQUIPMENT SUPPLY (GEN-L72, ATS-L72 AND LDB-L72)

E37.1 Reference Standards

(a) American Petroleum Institute (API)
  (i) API Std. 570-2012 Piping Inspection Code 5nd Edition.

(b) Canadian Environmental Protection Act (CEPA)
  (i) CCME PN 1326-[2008], Environmental Code of Practice for Aboveground and Underground Storage Tank Systems for Petroleum Products and Allied Petroleum Products.

(c) CSA Group (CSA)
  (i) CSA 282 Emergency Electrical Power Supply for Buildings
  (ii) CSA-B139-[09], Installation Code for Oil Burning Equipment.

(d) International Organization for Standardization (ISO)

(e) ISO 3046-1-[2002], Reciprocating Internal Combustion Engines - Performance - Part 1: Declarations of Power, Fuel and Lubricating Oil Consumptions, and Test Methods - Additional requirements for engines for general use.

(f) National Electrical Manufacturers Association (NEMA)
  (i) NEMA MG 1-[2006(R2007)], Motors and Generators.

(g) Underwriters' Laboratories of Canada (ULC)
  (i) CAN/ULC-S601-[07], Standard for Shop Fabricated Steel Aboveground Horizontal Tanks for Flammable and Combustible Liquids.
  (ii) ULC-S603-[00], Standard for Steel Underground Tanks for Flammable and Combustible Liquids.

E37.1.1 The following generators were used as the basis of design. Compliant alternatives in accordance with B7, may be approved during tender.

(a) Generac SG/MG 300.

(b) Approved Equal in accordance with B7.

E37.2 Product Data:

(a) Provide manufacturer's printed product literature, specifications and data sheets for power generators and include product characteristics, performance criteria, physical size, finish and limitations.

E37.3 Shop Drawings:

(a) Submit drawings stamped and signed by professional engineer registered or licensed in Manitoba, Canada and include:

(i) Engine: make and model, with performance curves.
(ii) Alternator: make and model.
(iii) Voltage regulator: make, model and type.
(iv) Automatic transfer switch: make, model and type.
(v) Manual bypass switch: make and model.
(vi) Battery: make, type and capacity.
(vii) Battery charger: make, type and model.
(viii) Alternator control panel: make and type of meters and controls.
(ix) Governor type and model.
(x) Automatic engine room ventilation system.
(xi) Cooling air requirements in m^3 /s.
(xii) British standard or DIN rating of engine.
(xiii) Flow diagrams for:
(xiv) Natural gas fuel.
(xv) Cooling air.
(xvi) Dimensioned drawing showing complete generating set mounted on steel base, including vibration isolators, exhaust system, drip trays, and total weight.
(xvii) Continuous full load output of set at 0.8 PF lagging.

(b) Description of set operation including:

(i) Automatic starting and transfer to load and back to normal power, including time in seconds from start of cranking until unit reaches rated voltage and frequency.
(ii) Manual starting.
(iii) Automatic shut down and alarm on:

- Overcranking.
- Overspeed.
- High engine temp.
- Low lube oil pressure.
- Short circuit.
- Alternator over voltage.
- Lube oil high temperature.
- Over temperature on alternator.

(iv) Manual remote emergency stop to be triggered by gas alarm.

E37.4 Closeout Submittals

(a) Provide operation and maintenance data for diesel generator for incorporation into manual specified in Section [01 78 00 - Closeout Submittals].

(b) Include in Operation and Maintenance Manual instructions for particular unit supplied and not general description of units manufactured by supplier and:

(i) Operation and maintenance instructions for engine, alternator, control panel, automatic transfer switch, manual bypass switch, battery charger, battery, fuel system, engine room ventilation system, exhaust system and accessories, to permit effective operation, maintenance and repair.

(ii) Technical data:

- Illustrated parts lists with parts catalogue numbers.
- Schematic diagram of electrical controls.
- Flow diagrams for: Fuel system, Lubricating oil, Cooling system.
- Certified copy of factory test results.
- Maintenance and overhaul instructions and schedules.
- Precise details for adjustment and setting of time delay relays or sensing controls which require on site adjustment.

E37.5 Delivery, Storage, and Handling

(a) Deliver, store and handle materials in accordance with manufacturer's written instructions.

(b) Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

(c) Packaging Waste Management: remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

E37.6 Maintenance Material Submittals

(a) Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

(b) Include:

(c) [2] fuel filter replacement elements.

(d) [2] lube oil filter replacement elements.

(e) [2] air cleaner filter elements.

(f) [2] sets of fuses for control panel.

(g) Special tools for unit servicing.

E37.7 System Description

(a) Generating system consists of:

(i) Natural gas engine.
(ii) Alternator.
(iii) Alternator control panel.
(iv) Battery charger and battery.
(v) Automatic engine room ventilation system.
(vi) Fuel supply system.
(vii) Exhaust system with **hospital grade silencer**.
(viii) Steel mounting base.
(ix) Synchronizing panel.
(x) Manual by-pass switch.

(b) System designed to operate as an emergency system

(c) Capacity:

(i) Rated continuous power in kW at rated speed, after adjustment for system losses in auxiliary equipment necessary for engine operation; to be calculated as follows: Rated continuous output = Generator kW divided by Generator efficiency at full load Under following site conditions:

- Altitude: 232 m.
- Ambient temperature: 40 degrees C.

- Relative humidity: 0 - 95%.

(ii) Engine overload capability 110% of continuous output for 1 hour within 12 hours period of continuous operation.

(d) Cooling System:

(i) Air cooled: air cooling duct enveloping cylinder walls with pressure cooling by engine driven blower.

(ii) To maintain manufacturer's recommended engine temperature range at 10% continuous overload in ambient temperature of 40 degrees C.

(iii) Block heater: thermostatically controlled lube oil or liquid coolant heater connected to line side of automatic transfer switch to allow engine to start in room ambient [0] degrees C.

(iv) Switch and fuse in heater circuit, mounted in engine-alternator control cubicle and fed from line side of automatic transfer switch.

(e) Governor: mechanical hydraulic with:

(i) Steady state speed band of plus or minus 0.5%.

(ii) Speed regulation no load to full load 5% maximum.

(iii) Electronic [load sharing] type, electric actuator, speed droop externally adjustable from isochronous to 5%, temperature compensated with steady state speed maintenance capability of plus or minus 0.25%.

(f) Lubrication system:

(i) Pressure lubricated by engine driven pump.

(ii) Lube oil filter: replaceable, full flow type, removable without disconnecting piping.

(iii) Lube oil cooler.

(iv) Engine sump drain valve.

(v) Oil level dip-stick.

(g) Starting system:

(i) Positive shift, gear engaging starter 12 or 24V dc.

(ii) Cranking limiter to provide [trois (3)] cranking periods of 10s duration, each separated by [5] s rest.

(iii) [Lead acid], 12 or 24V storage battery with sufficient capacity to crank engine for 1 min at 0 degrees C without using more than 25% of ampere hour capacity.

(iv) Battery charger: constant voltage, solid state, two stage from trickle charge at standby to boost charge after use.

- Regulation: plus or minus 1% output for plus or minus 10% input variation.
- [Automatic boost for 6 hours every 30 days].
- Equipped with dc voltmeter, dc ammeter and on-off switch.
- Minimum charger capacity: [7] A.

(h) Vibration isolated engine instrument panel with:

(i) Lube oil pressure gauge.

(ii) Lube oil temperature gauge.

(iii) Lube oil level gauge.

(iv) Coolant temperature gauge.

(v) Coolant level gauge.

(vi) Running time meter: non-tamper type.

(i) Guards to protect personnel from hot and moving parts.

(i) Locate guards so that normal daily maintenance inspections can be undertaken without their removal.

(j) Drip tray.

E37.8 Alternator

(a) Alternator: to NEMA MG1

(b) Rating: 3 phase, 600 V, 4 wire, 300 kW, 60 Hz, at 0.8 PF.

(c) Output at 40 degrees C ambient:
  (i) 100% full load continuously.
  (ii) 110% full load for 1 hour.
  (iii) 150% full load for 1 minute.

(d) Revolving field, brushless, single bearing.

(e) Drip proof.

(f) Amortisseur windings.

(g) Synchronous type.

(h) Dynamically balanced rotor permanently aligned to engine by flexible disc coupling.

(i) Exciter: permanent magnet

(j) NEMA class H insulation on windings.

(k) Voltage regulator: thyristor controlled rectifiers with phase controlled sensing circuit

(l) Alternator: capable of sustaining 300% rated current for period for 10 second permitting selective tripping of down line protective devices when short circuit occurs.

E37.9 Control Panel

(a) Totally enclosed ventilated Code gauge metal panel mounted on unit constructed of channel or angle iron frame finished in enamel over corrosion resistant primer, complete with hinged door

(b) Instruments: Color Touch Screen Display
  (i) Resistive Color Touch Screen
  (ii) Sunlight Readable (1400 NITS)
  (iii) Easily Identifiable Icons
  (iv) Multi-Lingual
  (v) On Screen Editable Parameters
  (vi) Key Function Monitoring
  (vii) Three Phase Voltage, Amperage, kW, kVA, and
  (viii) kVAR
  (ix) Selectable Line to Line or Line to Neutral
  (x) Frequency
  (xi) Engine Speed
  (xii) Engine Coolant Temperature
  (xiii) Engine Oil Pressure
  (xiv) Engine Oil Temperature
  (xv) Battery Voltage
  (xvi) Hourmeter
  (xvii) Warning and Alarm Indication
  (xviii) Diagnostics
  (xix) Maintenance Events/Information

(c) Voltmeter selector switch, rotary, panel mounting, [round notched handle,][four position, labelled "Off-Phase A-Phase B-Phase C"].

(d) Ammeter selector switch, rotary, maintained contacts, panel mounting, designed to prevent opening of current circuits, round notched handle, four position labelled "OFF- Phase A-Phase B-Phase C"].

(e) Instrument Transformers

(i) Potential-dry type for indoor use:

- Ratio: [600] to 120.
- Rating: [600] V, 60Hz, BIL 10 kV.

(f) Current-dry type for indoor use:

- Ratio: 400 to 5.
- Rating: [600] V, 60Hz, BIL 10 kV.
- Positive action automatic short-circuiting device in secondary terminals.

E37.10 Controls

(a) Engine start button.

(b) Selector switch: Off-Auto-Manual - Test full load test no load.

(c) Engine emergency stop button and provision for remote emergency stop button.

(d) Alternator output breaker:

(i) Circuit breaker: bolt-on, moulded case, temperature compensated for 40 degrees C ambient, dual thermal-magnetic trip.

(ii) Circuit breaker, solid state sensing with:

- Frame containing breaker contacts, arc quenchers, quick- make, quick-break, spring-loaded overcenter switching mechanism, mechanically trip free from handle.
- Static sensor: current monitors detect overload, short-circuit and ground-fault currents, and send these signals through solid-state circuits to static sensor which acts to trip breaker. Adjustable for current values and time of tripping.
- Auxiliary contacts minimum rating shall be 125 VDC, 5 A

(e) Generator Load bank breaker

(i) Circuit breaker shall be bolt-on, moulded case

(ii) Static sensor: current monitors detect overload, short-circuit and ground-fault currents, and send these signals through solid-state circuits to static sensor which acts to trip breaker. Adjustable for current values and time of tripping.

(iii) Flux-transfer shunt trip- magnetic tripping device actuated by signal from static sensor to open breaker contacts. Requires external source of power.

(iv) Provide two (2) terminals along for field connection of auxiliary contacts that are pre-wired to breaker shunt trip positions (Positive and Negative).

(f) Voltage control rheostat: mounted on inside of control panel.

(g) Operating lights, panel mounted:

(i) "Normal power" pilot light.

(ii) "Emergency power" pilot light.

(iii) Green pilot lights for breaker on and red pilot lights for breaker off.

(h) Solid state indicator lights for alarm with [1 set] manually reset NO/NC contacts wired to terminal block for remote annunciation on:

(i) Low fuel level.

(ii) Low battery voltage.

(iii) Ventilation failure.

(iv) Low coolant temperature.

(i) Solid state controller for automatic shutdown and alarms with [1 set] manually reset NO/NC contacts wired to terminal block for remote annunciation on:

(i) Engine overcrank.

(ii) Engine overspeed.

(iii) Engine high temperature.

(iv) Engine low lube oil pressure.

(v) Short circuit.

(vi) AC over voltage.

(j) Lamp test button.

(k) Synchronization and load sharing.

(l) Provision for remote monitoring.

(m) Remote Monitoring: In addition to contacts for remote start and damper control, the generator control system shall provide five (5) programmable 120V dry contact output relays to the building BMS as to indicate the following generator alarms:

(i) Generator Running

(ii) Generator Alarm/Fault

(iii) Generator Warning

(iv) Low Fuel Level

(v) Fuel Tank Leak

E37.11 Generator Load Bank (LDB-L72)

(a) Ratings

(i) The total capacity of the load bank shall be rated 300 kW at 600 Volts, 3-Phase, 3-Wire, 60 Hertz, at unity Power Factor and 75 kW minimum load step resolution.

(ii) The load bank shall be designed for continuous duty cycle operation with no limitations. The load bank shall operate in an ambient temperature of -28°C to 49°C (-20°F to 120°F).

(b) Material and Construction

(i) The load bank shall be outdoor weatherproof construction, suitable for installation on a concrete pad or structural base. All exterior fasteners shall be stainless steel. The load bank shall include forklift channels in the base for lifting.

(ii) The load bank shall be constructed of heavy gauge of aluminized steel per ASTM A463. Aluminized steel provides superior corrosion protection and extended service life, with a better tolerance to high heat exposure compared to the more common galvanized steel.

(iii) The main input load bus, load step relays, fuses, and blower/control relays shall be located within the load bank enclosure. A thermostatically controlled heater shall be located within the control section to provide protection to the control devices from the effects of moisture and condensation.

(iv) Airflow throughout the load bank shall be horizontal. Intake openings shall be designed to prevent objects greater than 0.50″ diameter from entering the unit.

(v) The load bank exhaust hood shall be angled downward. The exhaust hood shall be constructed of non-corrosive aluminized steel or aluminum.

(vi) The load bank enclosure shall have a baked polyester powder-coated finish with a film thickness of 2.8 +/- 0.4 mils per coat.

(vii) Load elements shall be contained in an integral resistor case. Resistors can be individually removed for inspection or service.

(viii) The load bank shall be of riveted construction. Riveted provides a stronger framework.

Remote-controlled contactors switch groups of load elements. Contactor coils are rated 120 V. Contactors shall be located in a separate NEMA 250, Type 3R enclosure within a load bank enclosure, accessible from the exterior through bolt-on panels with stainless steel hardware.Resistive Load Elements

(ix) Load elements shall be Avtron Helidyne, helically wound chromium alloy rated to operate at approximately ½ of maximum continuous rating of wire. Elements must be fully supported across the entire length within the air stream by segmented ceramic insulators on stainless steel rods. Element supports shall be designed to prevent a short circuit to adjacent elements or to ground.

(x) The change in resistance due to temperature shall be minimized by maintaining conservative watt densities.

(xi) The overall tolerance of the load bank shall be –0% to +5% kW at rated voltage. A –5%, +5% rating allows the load bank to deliver less than rated kW and shall not be used. The load bank must deliver full rated kW at rated voltage.

(xii) The resistors shall not require a cool-down period. Failure shutdown of the cooling fan during the operation of the resistors shall not shorten their life expectancy.

(c) Cooling

(i) The load bank shall be cooled by integral TEFC or TEAO motor(s) which is direct coupled to the cooling fan blade. The fan motor must be electrically protected against overload using a motor overload device and short circuit protected using three (3) current limiting fuses with an interrupting rating of 200K A.I.C.

(ii) The fan blade is to be an airfoil design constructed from aluminum or non-corroding material.

(d) Protective Devices

(i) A differential pressure switch shall be provided to detect air loss. The switch shall be electrically interlocked with the load application controls to prevent load from being applied if cooling air is not present.

(ii) An over-temperature switch shall be provided to sense the load bank exhaust in the resistor case assembly. The switch shall be electrically interlocked with the load application controls to remove load from being applied in the event of an over-temperature condition.

(iii) To provide for major fault protection, branch fuses shall be provided on all three phases of switched load steps above 50 kW. Branch fuses shall be the current limiting type with an interrupting rating of 200K A.I.C.

(iv) The exterior of the load bank shall have appropriate warning/caution statements on access panels.

(v) The fan motor shall be separately protected by motor overload and short-circuit devices.

(e) Control Systems – Digital Controls

(i) A robust purpose-designed microprocessor-based module with industrial connectors and LED status display shall be installed in the load bank. The module shall connect with Voltage and Current Transformers to obtain real-time monitoring of the load bank at a sampling rate of at least 28.8kHz. The module shall have large flash memory, which allows remote upgrading and space for configuration data and calibration maps. Non-volatile RAM provides 500 event history log time stamped by the onboard real-time clock.

(ii) Usage counters shall provide information on individual contactor operation, element run times, overall power-on time, load-on time, and kWh. Load monitoring checks each phase for faulty contactors, blown fuses, or faulty elements. Faults are logged with a visual indication via a blinking stop lamp and warning code. Automatic detection senses the supply-on-test voltage, frequency, phase, and phase rotation.

(iii) The module shall have a load correction facility, which shall compensate for any voltage drop on supply.

(iv) The module shall balance the usage of each load element to increase the life of the load bank.

(v) An HMI Hand-Held controller shall also be provided with a 10-meter cable for operator interface with all functionality faults and features. When carrying out full-load testing, one page will show the three-phase measurements of voltage (V), frequency (Hz), current (A), power (both kW and kVA), and power factor (Cos ø).

(vi) Site Load Correction shall be provided for maintaining a minimum load steps on the generator set. The controller shall monitor the connected downstream loads and shall automatically add or subtract load steps in response to building load changes as to maintain a minimum load level on the generator set. The controller shall be able to account for its own load. The setpoint shall be able to be adjusted by means of an external switch with up to twelve individual set points. A remote contact closure

is required for activation and transfer of control. Three separate current transformers shall be supplied loose for mounting and sensing of downstream loads.

(vii) Switchgear Interface: The load bank shall have provisions to interface with the switchgear critical power management system. This shall be done through Modbus Ethernet.

(f) Documentation

(i) Installation and operation manuals shall be provided with the equipment and shall include complete details for the installation, commissioning, operation, troubleshooting, and maintenance of the load bank.

(ii) The manuals shall include the electrical schematic and interconnect drawings for the power and control wiring for the load bank and all control devices.

(iii) A complete parts list with part numbers, device identification, and rating shall be included in the manuals. The original manufacturer's name and part number shall be included in the parts listing.

(iv) The manuals shall be provided electronically on a USB drive

(g) Quality Control

(i) The load bank shall be fully tested using a test specification written by the supplier. Tests shall include electrical functional testing, verifying conformance to assembly drawings and specifications. Each load step shall be cold resistance checked to verify the proper calibration of resistive load steps and proper ohmic value.

(ii) The manufacturer shall maintain this data on file for inspection purposes by the purchaser. Tests using high-potential equipment shall be performed to ensure the isolation of the load circuits from the control circuits and to determine the isolation of the load circuits from the load bank frame. Tests of all safety circuits shall be performed to verify conformance to the specification.

(iii) All electrical circuits shall have a high potential insulation resistance test performed at twice rated voltage plus 1000 VAC to assure insulation integrity.

(iv) All quality control test equipment shall be regularly maintained and calibrated to traceable national standards.

(v) The Company’s Quality System shall be at least ISO9001:2015 Certified.

(h) Qualifications of Manufacturer

(i) The load bank shall be manufactured by a firm regularly engaged in the manufacture of load banks and who can demonstrate at least twenty-five (25) years of experience with at least twenty-five (25) installations of load banks similar or equal to the ones specified herein.

(ii) The manufacturer shall have a written Quality Control procedure available for review by the purchaser, which shall document all phases of operations, engineering, and manufacturing.

(iii) Manufacturer must have field service capabilities with service personnel having a minimum of an Associate Degree in Electrical Engineering.

(iv) A 2-year warranty shall be provided for both the resistors and the load bank.

(v) Acceptable manufacturers:

(i) Avtron Power Solutions, LLC; or

(ii) Approved equal in accordance with Section B7.

E37.12 Automatic Transfer Switch (ATS-L72)

(a) Section 26 36 23

E37.13 Steel Mounting Base

(a) Complete generating set mounted on structural steel base of sufficient strength and rigidity to protect assembly from stress or strain during transportation, installation and under operating conditions on suitable level surface.

(b) Assembly fitted with vibration isolators and control console resiliently mounted.

(i) Spring type isolators with adjustable side snubbers and adjustable for levelling.

(c) Sound insulation pads for installation between isolators and concrete base.

E37.14 Exhaust System

(a) Heavy duty industrial mounted exhaust silencer with condensate drain, plug and flanged welded couplings.

(b) Heavy duty flexible exhaust pipe with flanged couplings as required.

(c) Fittings and accessories as required.

(d) Expansion joints: stainless steel, corrugated, of suitable length, to absorb both vertical and horizontal expansion.

E37.15 Fuel System

(a) Fuel pressure gauge and vent alarm.

(b) Primary and Secondary Fuel Shutoff

(c) Renewable cartridge filter.

(d) Fire valve.

(e) Isolating valves on lines serving auxiliaries.

(f) Low fuel level alarm for remote indication.

E37.16 Cooling Air System

(a) Engine ventilating system to be controlled by HVAC control panel in generator building and include:

(i) 2x recirculating damper assembly with modulating motors.

(ii) Cold air inlet damper assembly with modulating motor.

(iii) Air discharge damper with modulating motor.

(iv) Combustion air inlet damper assembly with open/close motor.

(v) Replaceable air intake filters.

E37.17 Equipment Identification

(a) Provide equipment identification in accordance with Section 26 05 01 - Common Work Results for Electrical.

(b) Control panel:

(i) Size 4 nameplates for controls including alternator breakers and program selector switch.

(ii) Size 3 nameplates for meters, alarms, indicating lights and minor controls.

E37.18 Fabrication

(a) Shop assemble generating unit including:

(i) Base.

(ii) Engine [and radiator].

(iii) Alternator.

(iv) Control panel.

(v) Battery and charger.

E37.19 Finishes

(a) Apply finishes in accordance with Section 26 05 01 - Common Work Results for Electrical.

(b) Alternator control cubicle: paint inside, exterior to match engine and alternator.

(c) Exhaust and inlet air hoods international orange.

(d) Other ducts and racks grey.

(e) Supply 0.25 L of grey touch-up enamel.

E38. GENERATOR EQUIPMENT IN-PERSON FACTORY ACCEPTANCE TESTING AND FIELD TESTING

E38.1 General factory acceptance testing shall consist of the following:

(a) Factory Acceptance Testing (FAT) shall be carried out by the equipment manufacturer. Generator FAT shall be witnessed In-Person by City of Winnipeg representatives at no additional cost. A total of two (2) City of Winnipeg representatives (1 City Personnel and 1 Contract Administrator Personnel) shall be participating in In-Person witnessing of the FAT. The City reserves the right to request remote witnessing in place of in-person witnessing at no additional cost.

(i) If remote Generator FAT witnessing is requested, the manufacturer shall complete all testing required and shall arrange for live video viewing of testing. The manufacturer is responsible for organizing and arranging the live video testing and for distributing video recordings of each test.

(ii) The costs of travel and accommodation for the two (2) City of Winnipeg representatives is not to be included in this contract. These costs are to be borne by the Contract Administrator.

(b) The In-Person FAT shall be carried out on one (1) FAT site visit. The equipment manufacturer shall arrange for FAT to be performed on all generator equipment during the single FAT site visit.

(c) Provide a minimum of fifteen (15) business days notice to the Contract Administrator prior to anticipated witness testing date.

(d) The Contractor shall furnish all power, labour, materials and properly calibrated instruments required for these tests. Instrument calibration shall be as specified in the Test Code of the Hydraulics Institute Standards.

(e) Allow for an escort at the testing facility for participating City of Winnipeg representatives, equipment pictures to be taken, along with testing equipment, tools and materials to carry out testing. Make all equipment and labour accessible for participating personnel as directed.

(f) A minimum of five (5) business days prior to anticipated FAT date, submit test facility evidence of ANSI Certification, calibration certificates of all testing equipment to be used along with details on the test arrangement procedures. Submit detailed test procedures including the test layout and instrument test calibration certificate. Include equipment calibrations and test arrangement procedures in the Operation & Maintenance Manual.

E38.2 Factory test generator set including engine, alternator, control panels, transfer switch and accessories in presence of Contract Administrator and City of Winnipeg Staff.

E38.3 Notify Contract Administrator ten (10) working days in advance of date of factory test.

E38.4 Test procedure:

(a) Prepare blank forms and check sheet with spaces to record data and at top of first sheet record:

(b) Date.

(c) Generator set serial no.

(d) Engine, make, model, serial no.

(e) Alternator, make, model, serial no.

(f) Voltage regulator, make and model.

(g) Rating of generator set, kW, kVA, V, A, r/min, Hz.

(h) Mark check sheet and record data on forms in duplicate as test proceeds.

(i) Contract Administrator's signature on completed forms to indicate concurrence in results of test.

E38.5 Non Running Test and Checks recording the following:

(a) Angular shaft alignment.

(b) Resistance of alternator windings.

(c) All electrical and mechanical safety guards in place.

(d) All mountings are secured.

(e) Control Panel is installed.

(f) All fluids at normal operating levels.

E38.6 Stepped load Running Test: The generator shall be tested at 25% load for thirty (30) minutes, 50% load for thirty (30) minutes and 75% load for thirty (30) minutes and 100% load for 2.5 hours to determine generator operation. Each tested load shall be maintained at 0.8 power factor. Record oil level prior to starting stepped load test and after testing has been completed. Record the following at every fifteen (15) minute intervals.

(a) Time of reading.

(b) Area/Room temperature (°C) where test is being performed.

(c) Generator kW and kVA output along with revolutions per minute (RPM).

(d) Alternator Voltage, Amperage and Frequency for each phase.

(e) Power Factor (PF).

(f) Power in kW indicated and calculated.

(g) Run time meter.

(h) Lubricant oil pressure (kPA) and temperature (°C).

(i) Engine and exhaust temperature (°C).

(j) Sound (dB).

(k) Battery charger voltage and current.

(l) Battery voltage.

(m) Alternator cooling air outlet temp.

E38.7 Next install continuous strip chart recorders to record frequency and voltage variations during load switching procedures. Each load change delayed until steady state conditions exist. Allow for two (2) minutes at 0% load before starting each application. Switching increments shall be maintained at 0.8 power factor and include:

(a) 0% load to 25% load to 0% load.

(b) 0% load to 25% load to 50% load to 75% load to 100% load to 50% load to 0% load.

(c) 0% load to 50% load to 100% load to 50% load to 0% load.

(d) 0% load to 75% load to 0% load.

(e) 0% load to 100% load to 0%o load.

(f) 0% load to 100% load to 25% to 0% load.

E38.8 Demonstrate Generator Operation for:

(a) Automatic starting of generator and automatic transfer of load on failure of normal power.

(b) Operation of manual bypass switch.

(c) Manual start up and stop operation.

(d) Automatic shut down of engine on resumption of normal power (including generator cooldown).

(e) Proper operation of battery charger and batteries.

(f) That battery charger reverts to high rate charge after cranking.

(g) Operation of auxiliary contacts (running, alarm/fault, etc.)

(h) Operation of Generator breaker status contacts.

E38.9 Test Generator shutdown and preventing generator from starting by:

(a) auxiliary input(s) to generator controller.

(b) Overcranking.

(c) Overspeed.

(d) Alternator over voltage.

(e) Low battery voltage, or no battery charge.

(f) Manual remote emergency stop.

E38.10 Test Generator shutdown and preventing generator from starting (without subjecting engine/alternator to these excesses) for the following:

(a) High engine temp.

(b) Low lube oil pressure.

(c) High alternator temperature.

(d) Short circuit.

E38.11 Installation

(a) Locate generating unit and install as indicated.

(b) Install fuel supply system as indicated in CSA-B139

(c) Install ventilating air duct system as indicated.

(d) Pipe muffler drains to nearest floor drain.

(e) Complete wiring and interconnections as indicated.

(f) Start generating set and test to ensure correct performance of components.

E38.12 Field Quality Control

(a) Perform tests in accordance with Section 26 05 01 - Common Work Results for Electrical.

(b) Notify Contract Administrator [10] working days in advance of test date.

(c) Provide fuel for testing and leave full tanks on acceptance.

(d) Demonstrate:

(i) Unit start, transfer to load, retransfer to normal power, unit shut down, on "Automatic" control.

(ii) Unit start and shut down on "Manual" control

(iii) Unit start and transfer on "Test" control.

(iv) Unit start on "Engine start" control.

(v) Operation of manual bypass switch.

(vi) Operation of automatic alarms and shut down devices.

(e) Perform a four-hour load test using a portable test bank. Perform test for four hours with load applied in 20% steps every 30 minutes until full load is applied and one hour at 100% full load. At end of test run, check battery voltage to demonstrate battery charger has returned battery to fully charged state.

E38.13 Maintenance - Clearances

(a) Provide clearance around systems, equipment and components for observation of operation, inspection, servicing, maintenance and as recommended by manufacturer.

E38.14 Site Commissioning

(a) The Generator manufacturer representative shall be required to attend site for two (2) separate site visits, each four (4) hours in duration to assist with commissioning activities along with Manitoba Inspections & Technical Services compliance.

E38.15 Measurement and Payment:

E38.15.1 Payment will be based on Form B, "Generator Supply, Factory Acceptance Testing, Installation", as accepted and measured by the Contract Administrator.

(a) Payment shall be in accordance with the following payment schedule:

(i) Ten (10) percent upon approval of Shop Drawings.

(ii) Seventy (70) percent upon all generator equipment received in Winnipeg.

(iii) Fifteen (15) percent upon completion of commissioning of all generator equipment.

(iv) Five (5) percent upon successful Manitoba Inspections & Technical Services compliance and all generator equipment is in-service.

E39. MECHANICAL AND BUILDING SERVICES WORK

E39.1 Scope of Work:

(a) Provide new ventilation, cooling and heating system in accordance with the drawings and specifications, including but not limited to the following:

(i) Demolition of the existing supply fan, associated ductwork, control wiring and unit heaters.

(ii) Supply and installation of new supply and exhaust fans, duct heater and appurtenances. See Sections 23 34 00 and 23 82 39.23.

(iii) Supply and installation of new wall mounted air conditioner for the main floor. See Section 23 81 23.

(iv) Supply and installation of mixing section with dampers and controls. See Section 23 33 15, Division 40 and drawings.

(v) Supply and installation of new, insulated ductwork. See Section 23 07 13 and Section 23 31 13, and Section 23 31 30.

(vi) Supply and installation of new outdoor air and exhaust openings complete with new louvers. See Section 23 37 20.

(vii) Supply and installation a new electric unit heaters. See Section 23 82 39.23.

(viii) Supply and installation fire extinguishers as shown on plan drawings and Section 21 44 00.

(ix) Complete testing, adjusting and air balancing for HVAC equipment. See Section 23 05 93.

(x) Start-up commissioning and testing in accordance with section 01 91 13 – General Commissioning Requirements.

E39.2 Measurement and Payment:

E39.2.1 Payment will be based on Form B, "Mechanical and Building Services Work", as accepted and measured by the Contract Administrator.

E40. EXISTING PUMPING STATION OPERATION DURING CONSTRUCTION

E40.1 The facility related to the Work is critical to the transport of wastewater for the City of Winnipeg. Under no condition shall the station pumping be shut down without prior written permission from the Contract Administrator.

E40.2 The Contractor is advised that the pumping station will be allowed to be taken out of operation only after the Contractor's schedule of activities to complete the Work is approved by the Contract Administrator. The Contractor shall plan his/her construction activities to allow for the

minimum amount of disruption time to normal operating status of the station. Temporary bypass pumping in accordance with E10 is required when the station is not in operation.

E40.3 The Contractor shall cooperate with and provide full access at all times for City personnel to carry out maintenance and operational duties.

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

E41. TEMPORARY SHUTDOWN OF THE LIFT STATION

E41.1 All shutdowns must be reviewed and approved by the Contract Administrator prior to the shutdown. Prepare and submit shutdown plans to Contract Administrator a minimum of fifteen (15) Working Days prior to proposed shutdown, with the estimated date included in the Contractor's by-pass pumping plan. The by-pass pumping plan and OSS submittals shall be issued ten (10) Working Days prior to the planned shutdown and commencement of Work Shutdown plans must a minimum include:

(a) Location and duration of shutdown;

(b) Purpose/description of the planned shutdown;

(c) List of all relevant stakeholders;

(d) Risks and contingency planning;

(e) Outline of shutdown plan;

(f) Monitoring requirements;

(g) Key data and elevations;

E41.2 There will be four (4) OSS plans required for the project as follows:

(a) OSS 1 – Temporary Electrical Switchover, such that the Generator Building electrical meter can be moved to a temporary pole.

(b) OSS 2 – Force Main Tie-Ins, such that a single force main is taken offline to install bypass valves.

(c) OSS 3 – Trial Bypass Pumping, to test the bypass pumping operations.

(d) OSS 4 – Permanent Bypass Pumping, to put the station in permanent bypass pumping so the Lift Station equipment can be replaced.

E41.3 All gate operation and other control relating to the wastewater process will be by the City.

E41.4 The Contractor shall monitor the upstream system at all times to ensure the stored level of wastewater will not exceed the critical basement elevation.

E41.5 Water and Waste Department, Collection System personnel will be available to aid the Contractor for shutdown of the wastewater pumping station to facilitate transition of station pumping to the Contractor's temporary pumping system.

E41.6 Coordination of the lift station shutdown and any associated Work described herein is incidental to Temporary By-Pass Pumping.

E42. COMMISSIONING

E42.1 The Manufacturer's Technical Representative, installation Contractor and Contract Administrator shall jointly commission all mechanical, electrical, automation and instrument equipment in accordance with the written procedure for commissioning. The installation Contractor will provide sufficient manpower for the duration of the commissioning period. The installation Contractor will make necessary adjustments during commissioning to ensure fully functioning equipment.

(a) The Contract Administrator will request that the equipment be operated to demonstrate that it performs as specified. If the Contract Administrator notes deficiencies in the installation,

the deficiency will be corrected immediately by the installation Contractor. The installation Contractor will advise the Contract Administrator, in writing, when the deficiencies have been corrected. If the Contract Administrator notes deficiencies in the supplied products, the deficiency shall be corrected immediately by this Contractor.

(b) Deficiencies of a serious nature, as determined by the Contract Administrator, shall be corrected by the manufacturer's representative.

E42.2 The following equipment will be required to include separate completed commissioning forms:

(a) Generator.

(b) All instruments. For common instruments such as temperature transmitters, it will be acceptable to utilize one (1) commissioning form.

(c) All PLC I/O Cards.

(d) All HVAC Controllers.

(e) All Dampers (including Actuators).

(f) All HVAC Fans.

(g) All Motor Control Centres (including Motor Starters).

(h) All Standalone Motor Starters.

(i) All Lift Pump VFDs.

(j) All Lift Pumps (including Motors).

(k) All Outdoor Lighting Systems.

(l) All Emergency Lighting Systems.

(m) All Disconnect Switches.

(n) All 120/240V/208V Panelboards.

(o) All 600V Panelboards.

(p) All Single-Phase Transformers.

(q) Customer Service Termination End.

(r) Automatic Transfer Switch.

(s) Load Bank.

(t) Main Motor Control Centre Power Meter.

(u) All HVAC Heaters.

(v) Heat Recovery Unit.

(w) Air Conditioning Unit.

(x) PLC System (including Communications, Local & PLC Mode, Pump Duties).

(y) NEWPCC and SEWPCC Motorized Valve Control Panel.

E42.3 Provide the services of a qualified Manufacturer’s technical representative to be present at the commissioning of each piece of equipment supplied under this Contract to perform the following:

(a) Inspect the equipment to ensure they have been properly installed in accordance with the manufacturer’s instructions. If the installation is not in order, the technical representative shall provide instruction for the installation Contractor. The equipment shall be started and run, and adjustments made at this time;

(b) Conduct visual, electrical and operational testing to ensure fully functioning equipment.;

(c) Check for unusual vibration or noises;

(d) Verify signals are received at PLC system;

(e) Ensure proper equipment settings are applied; and

(f) Inspect and document equipment readings such as current draw, voltage, electrical resistance, instrument readings and temperature.

(g) Ensure proper equipment settings are applied.

E42.4 Initial Start-Up Inspection and Testing

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

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

(c) Provide the services of a qualified technical representative of each equipment provided to be present during commissioning under this Contract to perform the following:

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

(ii) Conduct visual, electrical and operational testing to ensure fully functioning equipment.

(iii) Check for unusual vibration or noises.

(iv) Verify equipment signals are received at the PLC and on SCADA.

(v) Ensure relevant equipment settings are adjusted to match setting letters.

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

(d) Promptly correct any deficiencies with the equipment at Contractor's own expense to the Contract Administrator's satisfaction.

E42.5 City of Winnipeg commissioning forms must be used. Forms are provided in Appendix C. The forms provided are subject to change prior to commissioning. The Contractor shall ensure equipment is captured on separate commissioning forms unless the appropriate commissioning form lists multiple equipment. All commissioning forms are to be completed with the Contract Administrator representatives on site along with the appropriate trades.

E42.6 After the equipment has been installed and prior to final acceptance, protect the equipment from damage. Ensure that protection measures are to the satisfaction of the Contract Administrator.

E42.7 Measurement and Payment

(a) The costs associated with "Testing and Initial Startup Inspection" and "Commissioning" are to be included in the Lump Sum Payment for each respective equipment to be tested and commissioned. No separate payment shall be made for Initial Start-Up and Testing.

(b) The costs associated with Commissioning shall be included in respective Lump Sum bid items in Form B. No separate payment will be made for Commissioning. All costs associated with this item of Work including travel expenses, accommodations, meals and wages shall be inclusive in the lump sums.

E43. TRAINING

E43.1 Training sessions shall be in accordance with 01 91 13.18 and shall be documented and include the following as a minimum.

(a) Functional description of equipment operation;

(b) Identification of components and their purpose;

(c) Facility overview and review of Process & Instrumentation Diagrams;

(d) Confirmation of operating parameters and machine limits;

(e) Review of routine maintenance procedures and maintenance supplies;

(f) Pump and motor operations and maintenance information;

(g) Operations and maintenance information for the seal water flushing systems;

(h) Operations and maintenance information for VFDs;

(i) Operations and maintenance information for electrical equipment and systems;

(j) Operations and maintenance information for HVAC and building mechanical systems, including damper and ventilation controls using light switches;

(k) Generator operations and maintenance information;

(l) Trouble shooting procedures, limits of operator and maintenance competence;

(m) Long-term maintenance procedures, including anticipated overhaul frequencies; and

(n) Disconnection and removal of motors, drive shafts and pumps for maintenance Work.

(o) Training by standardized equipment vendors as listed in E43.3.

E43.2 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.

(a) Training shall be provided in one (1) session for operation staff and one (1) session for maintenance staff.

E43.3 Training for standardized equipment shall be conducted on Site, in conjunction with commissioning. The Contractor shall provide a qualified instructor as well as the necessary course materials.

(a) Training shall be provided in one (1) session for operation staff and one (1) session for maintenance staff.

(b) Training to include PLC, MCC, and VFD training by a representative of the standardized vendor in accordance with E13.7

(c) Training to include electric actuator basic O&M and configuration & service training by a representative of the standardized vendor in accordance with E14.11

(d) Training to include instrumentation training by a representative of the standardized vendor in accordance with E16.7

E43.4 Provide a total of five (5) hardcopy training manuals in 3-ring binders along with an electronic copy for attendees of each session. Provide the material in PDF format to the Contract Administrator for review at least two (2) weeks prior to the sessions. Binders/material to include training materials provided in all training sessions by all parties including the contractor:

(a) As listed by Contractor in E43.1

(b) As listed by standardized equipment vendors in E43.3.

E43.5 Measurement and Payment

(a) Training will be measured on a fixed fee basis at the Contract Unit Price for “Training” as shown in Form B: Prices, for supplying all Documents and for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

(b) fifty percent (50%) upon submission and approval of draft training plan materials;

(c) fifty percent (50%) upon completion of all training activities.

E44. TEMPORARY SURFACE RESTORATION AND MAINTENANCE

E44.1 Further to CW 1130, where permanent surface restorations cannot be made due to cold weather, the Contractor shall temporarily restore surfaces as follows:

(a) backfill and level boulevards and grassed areas to match existing surface elevations,

(b) cap excavations in concrete pavement with a 100 millimetre thick layer of concrete for “Temporary Restoration of Utility Pavement Cuts” as specified in CW 3310,

(c) cap excavations in sidewalk pavement with a 50 millimetre thick layer of concrete for “Temporary Restoration of Utility Pavement Cuts” as specified in CW 3310,

(d) insulate temporary concrete where required during 48hr curing period,

(e) where curb has been removed as part of the pavement cut pour temporary curb using "Concrete for Temporary Restoration of Utility Pavement Cuts" as specified in CW 3310.

(f) remove all temporary pavements prior to permanent restorations.

E44.2 The Contractor shall monitor and maintain temporarily restored surfaces as required until permanent restoration is complete.

E44.3 If, in the opinion of the Contract Administrator, temporarily restored surfaces are not being adequately maintained or were not properly constructed and pose a danger to the public, maintenance or reconstruction will be done by the City forces with no advance notification to the Contractor.

E44.4 Backfill Under Temporary Surface Restorations

(a) Use class 2 backfill in excavation under temporary street pavement and sidewalk where Class 3 backfill cannot be jetted and flooded due to cold weather.

(b) Class 2 backfill may be compacted in 600mm lifts where backhoe operated pneumatic plate compactors are used.

(c) Jet and flood Class 2, Class 3 and Class 5 backfilled excavations in spring when ground is not frozen prior to permanent restoration.

E44.5 All costs associated with the maintenance or reconstruction of temporary pavement incurred by the City shall be deducted from future payments to the Contractor.

E44.6 Temporary Surface Restorations shall be considered incidental to the Works of this Contract and no separate payment will be made for this item.

E45. SNOW CLEARING

E45.1 All required snow clearing shall be performed by the Contractor at his own expense.

E45.2 The Contractor will be required to perform snow clearing and sanding operations on City streets and sidewalks within the Site where access to City snow clearing and sanding crews is blocked due to construction activities or where construction activities have created unsafe, icy conditions.

E45.3 Snow built-up on sidewalks and roadway shall be maintained to the condition of the surrounding sidewalks and roadways.

E46. CONCRETE CURB RENEWALS

E46.1 Construct concrete curb renewal in accordance with CW 3240. Restore curb to match existing. Barrier curb and modified barrier curb will be considered as same for this Contract, and no differentiation will be made for measurement and payment. Concrete curb renewal shall be paid for at the Contract Unit Price for "Concrete Curb Renewals".

E47. 200 MM PARTIAL SLAB PATCHES

E47.1 Construct full depth partial slab patches in accordance with CW 3230.

E47.2 Measurement and Payment

E47.2.1 Full depth partial slab patches shall be paid for at the Contract Lump Sum Price for "200 mm Partial Slab Patches".

E47.2.2 Pavement removal shall be incidental to the works. No separate payment shall be made for this item.

E47.2.3 Base Granular shall be considered incidental to the works. No separate payment item shall be made for this item.

E47.2.4 No differentiation will be made for class of patch. No separate measurement of payment will be made for Drilled Dowels or Tie Bars, the cost for which shall be paid for at the Contract Unit Price for “200 mm Partial Slab Patches”.

E48. 75 MM ASPHALTIC CONCRETE PAVEMENT WORKS

E48.1 Construct asphaltic concrete pavement works in accordance with CW 3410.

E48.2 Measurement and Payment

E48.2.1 Asphaltic Concrete Pavement Works are estimated at a quantity of 150 square meters.

E48.2.2 Base Granular shall be considered incidental to the works. No separate payment item shall be made for this item.

E48.2.3 Pavement removal shall be incidental to the works. No separate payment shall be made for this item.

E48.2.4 Asphaltic concrete pavement works shall be paid for at the Contract Unit Price for “Asphaltic Concrete Pavement Works”.

E49. 100 MM CONCRETE SIDEWALKS

E49.1 Construct concrete sidewalks in accordance with CW-3325.

E49.2 Measurement and Payment

E49.2.1 Pavement removal shall be incidental to the works. No separate payment shall be made for this item.

E49.2.2 Base Granular shall be considered incidental to the works. No separate payment item shall be made for this item.

E49.2.3 Concrete sidewalks shall be paid for at the Contract Unit Price for “100 mm Concrete Sidewalks”.

E50. SODDING

E50.1 Place sod in accordance with CW-3510 and SD-243.

E50.2 Measurement and Payment

E50.2.1 Sodding quantities are estimated at 180 square meters.

E50.2.2 Preparation of the finished topsoil surface shall be completed in accordance with Specification CW-3540. Supply and installation of topsoil shall be paid for at the Contract Unit Price for “Sodding”.

E50.2.3 Sodding shall be paid for at the Contract Unit Price for “Sodding”.

E51. EXCAVATION AND BACKFILL

E51.1 All excavation and backfill to be according to CW 2030

(a) See sections E8.2.4, E9.2.8,E9.3.5, E21.8, E22.2.1, E26.3.4, E44.4 for classes and types.

E51.2 Measurement and Payment

E51.2.1 Payment will be based on Form B, “Excavation and Backfill”, as accepted and measured by the Contract Administrator.

(a) No differentiation will be made for class of backfill. All backfill for the contract shall be included in Contract Lump Sum Price for “Excavation and Backfill”.

(b) No differentiation will be made for type of excavation. All excavation for the contract shall be included in Contract Lump Sum Price for “Excavation and Backfill”.

(c) No separate payment will be made for disposal of unsuitable materials and shall be incidental to the work.

E52. OPERATIONS & MAINTENANCE MANUALS

E52.1 An electronic draft copy of the operation and maintenance manuals shall be submitted (word version, if available) two (2) weeks prior to Substantial Performance of the Work for review and comments. Submission of individual data will not be accepted unless directed by the City. Make changes and incorporate the Contract Administrator's review comments as required and re-submit as directed by the Contract Administrator.

E52.2 After review and acceptance by the City, five (5) hard copies and one electronic (PDF) copy of the final operation and maintenance manuals shall be submitted. The final electronic copy shall be provided on a flash memory drive.

E52.3 Manuals are to incorporate the training manuals in E43.

E52.4 The following shall be included as part of the Operations and Maintenance (O&M) Manuals:

(a) Title Sheet, labelled 'Windsor Park Operation & Maintenance Instructions', Containing Project Numbers & Name (S-1306 – Windsor Park Lift Station 2025 Upgrades).

(b) Tab A – Contactor Information
  (i) Contractor name and address.
  (ii) Contractor contact representative with phone number and email.
  (iii) All Sub-Contractors names, addresses and contact information.

(c) Tab B – Warranty
  (i) Letter of Warranty, signed and dated to include warranty start date, warranty end date, Contractor warranty information.
  (ii) Descriptions of work/parts that are covered under warranty and warranty durations.

(d) Tab C – Products and Shop Drawings
  (i) Copy of all approved / as-constructed Shop Drawings.

(e) Tab D – Spare Parts & Tools
  (i) Provide instructions for handling and storage of spare parts.
  (ii) Provide a listing of any special tools required to operate and/or maintain the products.
  (iii) Provide a listing of all spare parts included with pictures of each part, part numbers, quantities and practical life spans.

(f) Tab E – Certified Factory Test Results
  (i) Calibration of equipment used for testing procedures and test procedure arrangements.
  (ii) Copy of all approved tests and documented information test forms completed at the factory, each test shall be signed by the Contractor representative and dated.
  (iii) Factory inspection and verification reports/forms.
  (iv) Any additional performance reports.
  (v) Copy of current edition of factory certification for CSA and/or cUL compliance for Canadian Approval.

(g) Tab F – Commissioning Forms
  (i) Type written commissioning forms for all equipment commissioned.

(h) Tab H – Maintenance Activities

(i) Spare Tab

(j) Spare Tab