



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 61-2018

**2018 NORTHEAST EXCHANGE DISTRICT STREET RENEWALS – JAMES AVENUE
AND WATERFRONT DRIVE**

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

TABLE OF CONTENTS

PART A - BID SUBMISSION

Form A: Bid	1
Form B: Prices	4
Form G1: Bid Bond and Agreement to Bond	13
Form G2: Irrevocable Standby Letter of Credit and Undertaking	15

PART B - BIDDING PROCEDURES

B1. Contract Title	1
B2. Submission Deadline	1
B3. Site Investigation	1
B4. Enquiries	1
B5. Confidentiality	1
B6. Addenda	2
B7. Substitutes	2
B8. Bid Components	3
B9. Bid	4
B10. Prices	4
B11. Disclosure	5
B12. Qualification	5
B13. Bid Security	6
B14. Opening of Bids and Release of Information	6
B15. Irrevocable Bid	7
B16. Withdrawal of Bids	7
B17. Evaluation of Bids	8
B18. Award of Contract	8

PART C - GENERAL CONDITIONS

C0. General Conditions	1
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PART D - SUPPLEMENTAL CONDITIONS

General

D1. General Conditions	1
D2. Scope of Work	1
D3. Contract Administrator	2
D4. Contractor's Supervisor	2
D5. Ownership of Information, Confidentiality and Non Disclosure	2
D6. Notices	3
D7. Furnishing of Documents	3

Submissions

D8. Authority to Carry on Business	3
D9. Safe Work Plan	4
D10. Insurance	4
D11. Performance Security	4
D12. Subcontractor List	5
D13. Detailed Work Schedule	5

Schedule of Work

D14. Commencement	5
D15. Working Days	6
D16. Restricted Work Hours	6
D17. Work By Others	6
D18. Sequence of Work	6
D19. Substantial Performance	7
D20. Total Performance	7
D21. Liquidated Damages	7

D22. Scheduled Maintenance	8
Control of Work	
D23. Job Meetings	8
D24. Prime Contractor – The Workplace Safety and Health Act (Manitoba)	8
D25. The Workplace Safety and Health Act (Manitoba) – Qualifications	8
Measurement and Payment	
D26. Payment	8
Warranty	
D27. Warranty	9
Form H1: Performance Bond	10
Form H2: Irrevocable Standby Letter of Credit	12
Form J: Subcontractor List	14

PART E - SPECIFICATIONS

General

E1. Applicable Specifications and Drawings	1
E2. Geotechnical Report	1
E3. Protection Of Existing Trees	2
E4. Traffic Control	4
E5. Traffic Management	5
E6. Pedestrian Safety	5
E7. Water Obtained From the City	5
E8. Surface Restorations	5
E9. Patching of Existing Pavement	5
E10. Partial Depth Patching of Existing Joints	7
E11. Full Depth Saw-Cutting	8
E12. Soft Excavation to Expose Underground Utilities	8
E13. Pruning of Existing Trees	8
E14. Tree Vaults	9
E15. Soil Cells	11
E16. Unit Paving	12
E17. Exterior Metal Fabrication	14
E18. Exterior Metal Painting	17
E19. Exterior Site Carpentry	20
E20. Information Panel	21
E21. Site Furnishings	22
E22. Planting Medium & Finished Grading	23
E23. Sodding	25
E24. Tree & Shrub Plantings	26
E25. Landscape Maintenance	30
E26. Cast-in-Place Concrete	32
E27. Electrical Work	39

Appendix 'A' - Geotechnical Report

Appendix 'B' – Safe Excavation and Safety WATCH Guidelines

PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 2018 Northeast Exchange District Street Renewals – James Avenue and Waterfront Drive

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, March 16, 2018.

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

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

B3. SITE INVESTIGATION

B3.1 Further to C3.1, the Bidder may view the Site without making an appointment.

B4. ENQUIRIES

B4.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.

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

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

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

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

B5. CONFIDENTIALITY

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

- (a) was known to the Bidder before receipt hereof; or
- (b) becomes publicly known other than through the Bidder; or
- (c) is disclosed pursuant to the requirements of a governmental authority or judicial order.

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

B6. ADDENDA

- B6.1 The Contract Administrator may, at any time prior to the Submission deadline, issue addenda correcting errors, discrepancies or omissions in the Bid Opportunity, or clarifying the meaning or intent of any provision therein.
- B6.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.
- B6.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/bidopp.asp>
- B6.2.2 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B6.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B7. SUBSTITUTES

- B7.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.
- B7.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B7.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.
- B7.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;
 - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
 - (c) identify any anticipated cost or time savings that may be associated with the substitute;
 - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;
 - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.
- B7.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his/her sole discretion grant approval for the use of a substitute as an "approved equal" or as an "approved alternative", or may refuse to grant approval of the substitute.
- B7.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, to the Bidder who requested approval of the substitute.

- B7.6.1 The Contract Administrator will issue an Addendum, disclosing the approved materials, equipment, methods and products to all potential Bidders. The Bidder requesting and obtaining the approval of a substitute shall be responsible for disseminating information regarding the approval to any person or persons he/she wishes to inform.
- B7.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B7.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/her Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B17.
- B7.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B8. BID COMPONENTS

- B8.1 The Bid shall consist of the following components:
- (a) Form A: Bid;
 - (b) Form B: Prices, hard copy;
 - (c) Bid Security
 - (i) Form G1: Bid Bond and Agreement to Bond, or
Form G2: Irrevocable Standby Letter of Credit and Undertaking, or
a certified cheque or draft;
- B8.2 Further to B8.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B7.
- B8.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely.
- B8.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.
- B8.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid.
- B8.4.2 A hard copy of Form B: Prices must be submitted with the Bid. If there is any discrepancy between the Adobe PDF version of Form B: Prices and the Microsoft Excel version of Form B: Prices, the PDF version shall take precedence.
- B8.5 Bidders are advised not to include any information/literature except as requested in accordance with B8.1.
- B8.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B17.1(a).
- B8.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B8.8 Bids shall be submitted to:
- The City of Winnipeg
Corporate Finance Department
Materials Management Division

185 King Street, Main Floor
Winnipeg MB R3B 1J1

B9. BID

- B9.1 The Bidder shall complete Form A: Bid, making all required entries.
- B9.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, his/her name shall be inserted;
 - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
 - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
 - (d) if the Bidder is carrying on business under a name other than his/her own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.
- B9.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B9.2.
- B9.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.
- B9.4 Paragraph 13 of Form A: Bid shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, it shall be signed by the Bidder;
 - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
 - (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, shall be affixed;
 - (d) if the Bidder is carrying on business under a name other than his/her own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.
- B9.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.
- B9.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

B10. PRICES

- B10.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B10.1.1 For the convenience of Bidders, and pursuant to B8.4.2 and B17.4.2, an electronic spreadsheet Form B: Prices in Microsoft Excel (.xls) format is available along with the Adobe PDF documents for this Bid Opportunity on the Bid Opportunities page at the Materials Management Division website at <http://www.winnipeg.ca/matmgt/>
- B10.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.
- B10.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

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

B11. DISCLOSURE

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

B11.2 The Persons are:

- (a) N/A

B12. QUALIFICATION

B12.1 The Bidder shall:

- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba; and
- (b) be financially capable of carrying out the terms of the Contract; and
- (c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.

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

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

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

- (a) have successfully carried out work similar in nature, scope and value to the Work; and
- (b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and
- (c) have a written workplace safety and health program if required pursuant to The Workplace Safety and Health Act (Manitoba);

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

- (a) Written confirmation of a safety and health certification meeting SAFE Work Manitoba's SAFE Work Certified Standard (e.g., COR™ and SECOR™) or
 - (i) a copy of their valid Manitoba COR certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Certificate of Recognition (COR) Program administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or
 - (ii) a copy of their valid Manitoba SECOR™ certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Small Employer Certificate of Recognition Program (SECOR™) administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program or

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

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

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

B13. BID SECURITY

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

- (a) a bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in the form included in the Bid Submission (Form G1: Bid Bond and Agreement to Bond); or
- (b) an irrevocable standby letter of credit, in the amount of at least ten percent (10%) of the Total Bid Price, and undertaking issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form included in the Bid Submission (Form G2: Irrevocable Standby Letter of Credit and Undertaking); or
- (c) a certified cheque or draft payable to "The City of Winnipeg", in the amount of at least fifty percent (50%) of the Total Bid Price, drawn on a bank or other financial institution registered to conduct business in Manitoba.

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

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

B13.1.3 The Bidder shall sign the Bid Bond.

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

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

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

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

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

B14. OPENING OF BIDS AND RELEASE OF INFORMATION

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

- B14.1.1 Bidders or their representatives may attend.
- B14.1.2 Bids determined by the Manager of Materials, or his/her designate, to not include the bid security specified in B13 will not be read out.
- B14.2 Following the submission deadline, the names of the Bidders and their Total Bid Prices (unevaluated, and pending review and verification of conformance with requirements) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>
- B14.3 After award of Contract, the name(s) of the successful Bidder(s), their address(es) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>
- B14.4 The Bidder is advised that any information contained in any Bid may be released if required by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law or by City policy or procedures (which may include access by members of City Council).
- B14.4.1 To the extent permitted, the City shall treat as confidential information, those aspects of a Bid Submission identified by the Bidder as such in accordance with and by reference to Part 2, Section 17 or Section 18 or Section 26 of The Freedom of Information and Protection of Privacy Act (Manitoba), as amended.

B15. IRREVOCABLE BID

- B15.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.
- B15.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly executed and the performance security furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid.

B16. WITHDRAWAL OF BIDS

- B16.1 A Bidder may withdraw his/her Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.
- B16.1.1 Notwithstanding C23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.
- B16.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 13 of Form A: Bid, and only such person, has authority to give notice of withdrawal.
- B16.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:
- (a) retain the Bid until after the Submission Deadline has elapsed;
 - (b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 13 of Form A: Bid; and
 - (c) if the notice has been given by any one of the persons specified in B16.1.3(b), declare the Bid withdrawn.
- B16.2 A Bidder who withdraws his/her Bid after the Submission Deadline but before his/her Bid has been released or has lapsed as provided for in B15.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative

Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

B17. EVALUATION OF BIDS

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

- (a) compliance by the Bidder with the requirements of the Bid Opportunity, or acceptable deviation therefrom (pass/fail);
- (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B12 (pass/fail);
- (c) Total Bid Price;

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

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

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

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

B17.4.2 The electronic Form B: Prices and the formulas imbedded in that spreadsheet are only provided for the convenience of Bidders. The City makes no representations or warranties as to the correctness of the imbedded formulas. It is the Bidder's responsibility to ensure the extensions of the unit prices and the sum of Total Bid Price performed as a function of the formulas within the electronic Form B: Prices are correct.

B18. AWARD OF CONTRACT

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

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

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

- (a) the prices exceed the available City funds for the Work;
- (b) the prices are materially in excess of the prices received for similar work in the past;
- (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;
- (d) only one Bid is received; or
- (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.

B18.3 The Work of this Contract is contingent upon Council approval of sufficient funding in the 2018 Capital Budget. If the Capital Budget approved by Council does not include sufficient funding for the Work, the City will have no obligation to award a Contract.

B18.4 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B17.

B18.4.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his/her Bid upon written request to the Contract Administrator.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

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

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of:

- (a) Pavement Reconstruction
 - (i) James Avenue from Lily Street to Waterfront Drive.
 - (ii) Intersection of Waterfront Drive and McDermot Avenue
- (b) Pavement Rehabilitation
 - (i) Waterfront Drive from Lombard Avenue to George Avenue.
- (c) Streetscaping
 - (i) James Avenue from Lily Street to Waterfront Drive.
 - (ii) Waterfront Drive from Lombard Avenue to George Avenue.
- (d) Electrical
 - (i) James Avenue from Lily Street to Waterfront Drive.
 - (ii) North Winnipeg Parkway – along Waterfront Drive from Pacific Avenue to Galt Avenue.
- (e) Asphalt Pathway Construction
 - (i) North Winnipeg Parkway – along Waterfront Drive from Pacific Avenue to Galt Avenue.

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

- (a) Pavement Reconstruction
 - (i) Remove Existing Pavement;
 - (ii) Excavation;
 - (iii) Removal of Sidewalk;
 - (iv) Remove and abandon existing drainage infrastructure;
 - (v) Construct new drainage infrastructure;
 - (vi) Placement of geotextile fabric;
 - (vii) Placement and compaction of base and subbase material;
 - (viii) Construction of 150mm barrier curb and gutter;
 - (ix) Construction of 150mm modified barrier curb and gutter;
 - (x) Construction of 200mm reinforced concrete pavement;
 - (xi) Placement of asphalt pavement Type 1A; and
 - (xii) Construct new sidewalk
- (b) Pavement Rehabilitation
 - (i) Pavement renewal;
 - (ii) Curb renewal; and
 - (iii) Sidewalk renewal
- (c) Streetscaping
 - (i) Remove existing paving stone;
 - (ii) Place paving stone;

- (iii) Construct tree vaults;
 - (iv) Construction of Silva Cell soil retention system;
 - (v) Placement of trees; and
 - (vi) Site Furnishings
- (d) Electrical
- (i) Construction of cast in place concrete piles;
 - (ii) Placement of conduits and wire; and
 - (iii) Installation of pole and lights
- (e) Asphalt Pathway Construction
- (i) Excavation;
 - (ii) Placement of geotextile fabric;
 - (iii) Placement and compaction of base and subbase material;
 - (iv) Mill existing asphalt near tie ins;
 - (v) Placement of asphalt pavement Type 1A; and
 - (vi) Regrade embankment and placement of sod

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is WSP Canada Group Limited, represented by:

Vilko Maroti, C.E.T., P.Eng.
Manager, Urban Centres Manitoba, Transportation

Telephone No. 204 272 2030

Email Address Vilko.Maroti@wsp.com

D3.2 At the pre-construction meeting, Vilko Maroti, C.E.T., P.Eng. will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D3.3 Bids Submissions must be submitted to the address in B8

D4. CONTRACTOR'S SUPERVISOR

D4.1 At the pre-construction meeting, the Contractor shall identify his/her designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D4.2 At least two (2) business days prior to the commencement of any Work on the site, the Contractor shall provide the Contract Administrator with a phone number where the supervisor identified in D4.1 or an alternate can be contacted twenty-four (24) hours a day to respond to an emergency.

D5. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

D5.1 The Contract, all deliverables produced or developed, and information provided to or acquired by the Contractor are the property of the City and shall not be appropriated for the Contractors own use, or for the use of any third party.

D5.2 The Contractor shall not make any public announcements or press releases regarding the Contract, without the prior written authorization of the Contract Administrator.

D5.3 The following shall be confidential and shall not be disclosed by the Contractor to the media or any member of the public without the prior written authorization of the Contract Administrator;

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

- (b) the Contract, all deliverables produced or developed; and
- (c) any statement of fact or opinion regarding any aspect of the Contract.

D5.4 A Contractor who violates any provision of D5 may be determined to be in breach of Contract.

D6. NOTICES

D6.1 Except as provided for in C23.2.2, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the Contractor shall be sent to the address or facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid.

D6.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D6.3 D6.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator identified in D3.1.

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

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

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

The City of Winnipeg
Legal Services Department
Attn: Director of Legal Services
Facsimile No.: 204-947-9155

D6.5 Bids Submissions must not be submitted to this facsimile number. Bids must be submitted in accordance with B8.

D7. FURNISHING OF DOCUMENTS

D7.1 Upon award of the Contract, the Contractor will be provided with three (3) complete sets of the Bid Opportunity. If the Contractor requires additional sets of the Bid Opportunity, they will be supplied to him/her at cost.

SUBMISSIONS

D8. AUTHORITY TO CARRY ON BUSINESS

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

D9. SAFE WORK PLAN

- D9.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.
- D9.2 The Safe Work Plan shall be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgmt/safety/default.stm>

D10. INSURANCE

- D10.1 The Contractor shall provide and maintain the following insurance coverage:
- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability, broad form property damage cover 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) an all risks Installation Floater carrying adequate limits to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of any installation.
- D10.2 Deductibles shall be borne by the Contractor.
- D10.3 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in the C4.1 for the return of the executed Contract.
- D10.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D11. PERFORMANCE SECURITY

- D11.1 The Contractor shall provide and maintain performance security until the expiration of the warranty period in the form of:
- (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; or
 - (b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or
 - (c) a certified cheque or draft payable to "The City of Winnipeg", drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.
- D11.1.1 Where the performance security is in the form of a certified cheque or draft, it will be deposited by the City. The City will not pay any interest on certified cheques or drafts furnished as performance security.

D11.2 If the bid security provided in his/her Bid was not a certified cheque or draft pursuant to B13.1(c), the Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site and in no event later than the date specified in the C4.1 for the return of the executed Contract.

D12. SUBCONTRACTOR LIST

D12.1 The Contractor shall provide the Contract Administrator with a complete list of the Subcontractors whom the Contractor proposes to engage (Form J: Subcontractor List) at or prior to a pre-construction meeting, or 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 the C4.1 for the return of the executed Contract.

D13. DETAILED WORK SCHEDULE

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

D13.2 The detailed work schedule shall consist of the following:

- (a) a critical path method (C.P.M.) schedule for the Work;
- (b) a Gantt chart for the Work based on the C.P.M. schedule; and

D13.3 Further to D13.2(a), the C.P.M. schedule shall clearly identify the start and completion dates of all of the following activities/tasks making up the Work as well as showing those activities/tasks on the critical path:

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

SCHEDULE OF WORK

D14. COMMENCEMENT

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

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

- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence of authority to carry on business specified in D8;
 - (ii) evidence of the workers compensation coverage specified in C6.15;
 - (iii) the twenty-four (24) hour emergency response phone number specified in D4.2.
 - (iv) the Safe Work Plan specified in D9;
 - (v) evidence of the insurance specified in D10;
 - (vi) the performance security specified in D11;
 - (vii) the subcontractor list specified in D12;
 - (viii) the detailed work schedule specified in D13.
- (b) the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.

D14.3 The Contractor shall not commence the Work on the Site before May 1, 2018, and shall commence the Work on Site no later than May 22, 2018, as directed by the Contract Administrator and weather permitting.

D15. WORKING DAYS

D15.1 Further to C1.1(jj);

D15.1.1 The Contract Administrator will determine daily if a Working Day has elapsed and will record his/her assessment. On a weekly basis the Contract Administrator will provide the Contractor with a record of the Working Days assessed for the preceding week. The Contractor shall sign each report signifying that he/she agrees with the Contract Administrator's determination of the Working Days assessed for the report period.

D15.1.2 Work done to restore the Site to a condition suitable for Work, shall not be considered "work" as defined in the definition of a Working Day.

D15.1.3 When the Work includes two or more major types of Work that can be performed under different atmospheric conditions, the Contract Administrator shall consider all major types of Work in determining whether the Contractor was able to work in assessing Working Days.

D16. RESTRICTED WORK HOURS

D16.1 Further to clause 3.10 of CW 1130, the Contractor shall require written permission forty-eight (48) hours in advance from the Contract Administrator for any work to be performed between 2000 hours and 0700 hours, or on Saturdays, Sundays, Statutory Holidays and or Civic Holidays.

D17. WORK BY OTHERS

D17.1 Work by others on or near the Site will include but not necessarily be limited to:

- (a) City of Winnipeg Water and Waste – Water and Waste will be performing a watermain renewal along James Avenue in 2018;
- (b) Manitoba Hydro – Manitoba Hydro will adjust manhole frame and covers within project limits during construction as well as place road crossing conduit during excavation.
- (c) BellMTS – BellMTS will adjust manhole frame and covers within project limits during construction.
- (d) Pumphouse Development – Work for the pumphouse development will take place on James Avenue during construction.

D18. SEQUENCE OF WORK

D18.1 Further to C6.1, the sequence of work shall be as follows:

D18.1.1 The Work shall be divided into three (3) phases . Each Phase shall be subdivided into stages. Stages are further subdivided into major items of work.

D18.1.2 **Phase I** – Waterfront Drive from Lombard Avenue to George Avenue

- (a) **Stage I** – Waterfront Drive from Bannatyne Avenue to George Avenue
 - (i) Pavement Rehabilitation as described in D2.2(b);
 - (ii) Streetscaping as described in D2.2(c)
- (b) **Stage II** – Waterfront Drive from Lombard Avenue to Bannatyne Avenue
 - (i) Pavement Rehabilitation as described in D2.2(b);
 - (ii) Streetscaping as described in D2.2(c)

- D18.1.3 **Phase II** – James Avenue Reconstruction – Lily Street to Waterfront Drive
- (i) Pavement Reconstruction as described in D2.2(a)
 - (ii) Streetscaping as described in D2.2(c)
 - (iii) Electrical as described in D2.2(d)
- D18.1.4 **Phase III** – North Winnipeg Parkway along Waterfront Drive from Pacific Avenue to Galt Avenue
- (i) Asphalt Pathway Construction as described in D2.2(e)
 - (ii) Electrical as described in D2.2(d)
- D18.1.5 Immediately following the completion of the asphaltic concrete works of each phase, the Contractor shall clean up the Site and remove all plant, surplus material, waste and debris, other than that left by the City or other Contractors.

D19. SUBSTANTIAL PERFORMANCE

- D19.1 The Contractor shall achieve Substantial Performance within Fifty (50) consecutive Working Days of the commencement of the Work as specified in D14.
- D19.2 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 re-inspected.
- D19.3 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.

D20. TOTAL PERFORMANCE

- D20.1 The Contractor shall achieve Total Performance within Fifty Five (55) consecutive Working Days of the commencement of the Work as specified in D14.
- D20.2 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 re-inspected.
- D20.3 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.

D21. LIQUIDATED DAMAGES

- D21.1 If the Contractor fails to achieve 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) Substantial Performance – Three Thousand dollars (\$3,000.00);
 - (b) Total Performance – One Thousand Five Hundred dollars (\$1,500.00).
- D21.2 The amounts specified for liquidated damages in D21.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve Substantial Performance or Total Performance by the days fixed herein for same.

D21.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D22. SCHEDULED MAINTENANCE

D22.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

- (a) Crack Sealing as specified in CW 3250;
- (b) Landscape Maintenance as specified in E25;

D22.2 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

D23. JOB MEETINGS

D23.1 Regular weekly job meetings will be held at the WSP office located at 111-93 Lombard Avenue. 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.

D23.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

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

D24.1 Further to C6.24, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

D25. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

D25.1 Further to B12.4, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety and Health Act (Manitoba). At any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require updated proof of compliance, as set out in B12.4.

MEASUREMENT AND PAYMENT

D26. PAYMENT

D26.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D27. WARRANTY

- D27.1 Notwithstanding C13.2, the warranty period shall begin on the date of Total Performance and shall expire two (2) years thereafter unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.

FORM H1: PERFORMANCE BOND
(See D11)

KNOW ALL MEN BY THESE PRESENTS THAT

_____ ,
(hereinafter called the "Principal"), and

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

_____ dollars (\$_____)

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

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

BID OPPORTUNITY NO. 61-2018

2018 Northeast Exchange District Street Renewals – James Avenue and Waterfront Drive
which is by reference made part hereof and is hereinafter referred to as the "Contract".

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

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

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

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

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

_____ day of _____, 20_____ .

SIGNED AND SEALED
in the presence of:

(Witness as to Principal if no seal)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

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

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

(Date)

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

RE: PERFORMANCE SECURITY – BID OPPORTUNITY NO. 61-2018

2018 Northeast Exchange District Street Renewals – James Avenue and Waterfront Drive

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

(Name of Contractor)

(Address of Contractor)

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

_____ Canadian dollars.

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

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

Partial drawings are permitted.

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

(Address)

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

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

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

(Date)

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

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

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

(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

FORM J: SUBCONTRACTOR LIST
 (See D12)

2018 Northeast Exchange District Street Renewals – James Avenue and Waterfront Drive

<u>Portion of the Work</u>	<u>Name</u>	<u>Address</u>
Supply of Materials		
Concrete		
Asphalt		
Base Course and Sub Base		
Underground Materials (Catch Basins, Frame and Covers)		
Paving Stone		
Pedestrian Lighting		
Wood		
Tree Grates		
Silva Cells		
Sod / Trees		
Installation / Placement		
Concrete		
Asphalt		
Base Course and Sub Base		
Underground Materials (Catch Basins, Frame and Covers)		
Paving Stone		
Pedestrian Lighting		
Wood		
Tree Grates		
Silva Cells		
Sod / Trees		

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

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

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
C-00	COVER SHEET	A1
C-01	JAMES AVENUE LILY STREET TO WATERFRONT DRIVE STA 1+000 TO STA 1+150	A1
C-02	JAMES AVENUE LILY STREET TO WATERFRONT DRIVE STA 1+150 TO STA 1+215.63	A1
C-03	WATERFRONT DRIVE LOMBARD AVENUE TO JAMES AVENUE	A1
C-04	WATERFRONT DRIVE JAMES AVENUE TO GEORGE AVENUE	A1
C-05	NORTH WINNIPEG PARKWAY PACIFIC AVENUE TO GALT AVENUE A.T. PATH EXTENSION	A1
L1.1	JAMES FROM LILY TO BERTHA – BERTHA FROM JAMES TO MARKET MATERIALS & PLANTING PLAN	A1
L1.2	JAMES FROM BERTHA TO WATERFRONT MATERIALS & PLANTING PLAN	A1
L1.3	WATERFRONT PEDESTRIAN CROSSINGS MATERIALS PLAN	A1
L1.4	WATERFRONT MULTI-USE PATH EXTENSION MATERIALS PLAN	A1
L2.1	JAMES AVE. NORTH SIDEWALK SECTIONS	A1
L2.2	JAMES AVE. SECTIONS	A1
L3.1	BENCH DETAILS	A1
L3.2	WOOD, METAL & HARDSCAPE DETAILS	A1
L3.3	HARDSCAPE DETAILS	A1
L3.4	HARDSCAPE & SOFTSCAPE DETAILS	A1
L3.5	HARDSCAPE & SOFTSCAPE DETAILS	A1
E1.0	JAMES AVENUE LILY STREET TO WATERFRONT DRIVE ELECTRICAL RECONSTRUCTION	A1
E1.1	JAMES AVENUE LILY STREET TO WATERFRONT DRIVE ELECTRICAL RECONSTRUCTION	A1
E1.2	JAMES AVENUE LILY STREET TO WATERFRONT DRIVE ELECTRICAL RECONSTRUCTION	A1

E2. GEOTECHNICAL REPORT

- E2.1 Further to C3.1, the geotechnical report is provided to aid the Contractor's evaluation of the pavement structure and/or existing soil conditions. The geotechnical report is contained in Appendix 'A'.

E3. PROTECTION OF EXISTING TREES

E3.1 Description

E3.1.1 This Specification shall cover the protection of existing tree groups and individual trees during construction. The Work to be done under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work hereinafter specified.

E3.2 Construction Methods

E3.2.1 The Contractor will field-verify the presumed limits of work indicated on the Drawings, and flag all trees that require pruning or removal to facilitate the work, subject to the Contract Administrator's approval. Above ground clearance for overhanging branches in the work zone must be anticipated. No trees may be removed or pruned without written approval from the Contract Administrator.

E3.2.2 Trees within or adjacent to a construction area that are not approved for removal by the Contract Administrator must be protected during construction by means of a barrier surrounding a "Tree Protection Zone" described herein.

E3.2.3 No objects may be attached to trees protected by City of Winnipeg by-laws without written authorization by the City of Winnipeg.

E3.2.4 No City of Winnipeg tree or tree protected by a City of Winnipeg by-law may be removed without the written permission of the City of Winnipeg.

E3.3 Tree Protection Zone

E3.3.1 The following is a chart showing optimal distances for determining a Tree Protection Zone. Distances are to be measured from the outside edge of the tree base toward the drip line, and may be limited by an existing paved surface, provided that surface remains intact through the construction period.

Some site conditions may dictate the need for a smaller Tree Protection Zone. The City of Winnipeg Urban Forestry Branch must be notified in these instances. Forestry will determine if the smaller TPZ is acceptable in the specific circumstance and advise of any additional tree protection or removal requirements.

Table 1 – Tree Protection Zones

Trunk Diameter at Breast Ht. (DBH)	Minimum Protection Distances Required
<10 cm	2.0m
11-40cm	2.4m
41-50cm	3.0m
51-60cm	3.6m
61-70cm	4.2m
71-80cm	4.8m
81-90cm	5.4m
91-100cm+	6.0m

E3.4 Tree Protection Barriers

E3.4.1 Fenced enclosures shall be erected around individual trees and tree stands to keep crowns and branching structure clear from contact by equipment, materials, and activities; to preserve roots and soil condition in an intact and non-compacted state; and to identify the Tree Protection Zone in which no soil disturbance is permitted and activities are restricted, unless otherwise approved by the Contract Administrator.

E3.4.2 Barrier Material: plastic UV stabilized, high density polyethylene web snow fence, international orange colour, 1.22 meter height, or approved equal.

E3.4.3 Barrier Material Supports: rolled steel T-bar fence posts driven min. 600mm below grade.

- E3.4.4 Tree strapping material will be installed on individual trees, in accordance with CW1140, where Work will be completed within the Tree Protection Zone. Wood strapping material having a minimum thickness of 25mm and minimum length of 2440mm around tree trunks in a manner that will not harm the trees. Do not use nails or other fasteners that penetrate into trees. The width of strapping should suit the size of the tree being protected. Length of strapping may be reduced to suit tree being protected as approved by the Contract Administrator.
- E3.4.5 Tree protection barriers are to be erected prior to the commencement of any construction or grading activities on the site and are to remain in place throughout the entire duration of the project. The applicant shall notify the City of Winnipeg prior to commencing any construction activities to confirm that the tree protection barriers are in place.
- E3.4.6 All supports and bracing used to safely secure the barrier should be located outside the Tree Protection Zone. All supports and bracing should minimize damage to roots.
- E3.4.7 No grade change, storage of materials or equipment is permitted within this area. The tree protection barrier must not be removed without the written authorization of the City of Winnipeg.
- E3.5 The Contractor shall take the following precautionary steps to prevent damage from construction activities to existing trees:
- (a) The Contractor shall not stockpile materials and soil or park vehicles and equipment on boulevards within 2 metres of trees.
 - (b) Where authorized, operation of equipment within the dripline of the trees shall be kept to the minimum required to perform the work required. Equipment shall not be parked, repaired, refuelled; construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines of trees. The dripline of a tree shall be considered to be the ground surface directly beneath the tips of its outermost branches. The Contractor shall ensure that the operations do not cause flooding or sediment deposition on areas where trees are located.
 - (c) Take precautions to ensure tree limbs overhanging the Site are not damaged by construction equipment. Contact the Forestry Branch for consultation on pruning of overhanging or damaged limbs and branches and other unanticipated problems with trees during construction of the Works.
- E3.6 Root Protection, Cutting and Care
- E3.6.1 Avoid cutting roots. If root cutting appears to be necessary, obtain approval from the Contract Administrator before proceeding. If required and approved, root pruning must be performed under the direction of the Forestry Branch.
- E3.6.2 Cut roots cleanly with sharp, sterilized hand tools to promote quick wound closure and regeneration.
- E3.6.3 Minimize damage by avoiding excavation during hot, dry weather.
- E3.6.4 Keep protected plants well watered before and after digging.
- E3.6.5 Cover exposed roots with approved temporary root cover material such as soil, mulch, or damp burlap immediately after exposure. Temporary root covers shall be kept damp as long as they are in place.
- E3.7 American elm trees are not to 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.
- E3.8 All damage to existing trees caused by the Contractor's activities shall be repaired to the requirements and satisfaction of the Contract Administrator and the Forestry Branch. Damages must be repaired by an individual with a Manitoba Arborist licence or by the Forestry Branch.

E3.9 The Forestry Branch will remove and replace any trees deemed to have died or that are dying due to damage from carelessness during construction. Removal and replacement costs will be determined by size, market price of the largest transplantable tree of same or different species and may include appraised value of existing tree as determined by current International Society of Arboriculture evaluation procedure presently used by Forestry Branch in conjunction with City Claims Branch. Estimated replacement cost of a 250 and 600mm diameter American elm on a boulevard based on an appraised value is approximately \$4,700.00 and \$27,000.00 respectively.

E3.10 Measurement and Payment

E3.10.1 Tree Protection will be measured on a lump sum basis and paid for at the Contract Unit price lump sum as "Tree Protection, Pruning, Root Pruning & Temporary Root Cover Material" in accordance with this specification and accepted by the Contract Administrator.

E4. TRAFFIC CONTROL

E4.1 Further to clauses 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 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.

E4.2 Notwithstanding E4.1, in accordance with the MTTC, the Contract Administrator shall make arrangements with the **Traffic Services Branch of the City of Winnipeg** to place, maintain, and remove all **regulatory signs** and traffic control devices authorized and/or required by the Traffic Management Branch in the following situations:

- (a) Parking restrictions,
- (b) Stopping restrictions,
- (c) Turn restrictions,
- (d) Diamond lane removal,
- (e) Full or directional closures on a Regional Street,
- (f) Traffic routed across a median,
- (g) 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.
- (h) Approved Designated Construction Zones with a temporary posted speed limit reduction. Traffic Services will be responsible for placing all of the advance signs and 'Construction Ends' (TC-4) signs. The Contractor is still responsible for all other temporary traffic control including but not limited to barricades, barrels and tall cones.

E4.2.1 An exception to E4.2 is the 'KEEP RIGHT/KEEP LEFT' sign (RB-25 / RB-25L) which shall be supplied, installed, and maintained by the Contractor at their own expense.

E4.2.2 Further to E4.2, where the Contract Administrator has determined that the services of the Traffic Services Branch are required, the City shall bear the costs associated with the placement of temporary traffic control devices by the Traffic Services Branch of the City of Winnipeg in connection with the works undertaken by the Contractor.

E5. TRAFFIC MANAGEMENT

E5.1 Further to clause 3.7 of CW 1130:

E5.1.1 The Contractor shall schedule construction activities to meet the following:

- (a) Waterfront Drive from Lombard Avenue to Bannatyne Avenue at least one northbound lane for local access and bus traffic shall be maintained along this street during construction.
- (b) Waterfront Drive from Bannatyne Avenue to George Avenue at least one southbound lane for local access traffic shall be maintained along this street during construction.
- (c) James Avenue from Lily Street to Waterfront Drive will be closed to all through traffic. The Contractor shall sign the street "Road Closed – No Exit" in accordance with the Manual of Temporary Traffic Control. Access to 104 James Avenue parking lot and 300 Waterfront Drive underground parkade must be maintained at all times.
- (d) Intersecting street and private approach access shall be maintained at all times.

E5.1.2 Should the Contractor be unable to maintain an existing access to a residence or business, he/she shall review the planned disruption with the business or residence and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 48 hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access.

E5.1.3 Pedestrian and ambulance/emergency vehicle access must be maintained at all times.

E6. PEDESTRIAN SAFETY

E6.1 During the project, on James Avenue and Waterfront Drive, a temporary snow fence shall be installed where open excavation is present. The Contractor shall be responsible for maintaining the snow fence in a proper working condition. No measurement for payment shall be made for this work.

E6.2 Continuous accessible sidewalk access on James Avenue and Waterfront Drive must be maintained on one side of the street at all times.

E7. WATER OBTAINED FROM THE CITY

E7.1 Further to clause 3.7 of CW 1120, the Contractor shall pay for all costs, including sewer charges, associated with obtaining water from the City in accordance with the Waterworks and Sewer By-laws.

E8. SURFACE RESTORATIONS

E8.1 Further to clause 3.3 of CW 1130, when Total Performance is not achieved in the year the Contract is commenced, the Contractor shall temporarily repair any Work commenced and not completed to the satisfaction of the Contract Administrator. The Contractor shall maintain the temporary repairs in a safe condition as determined by the Contract Administrator until permanent repairs are completed. The Contractor shall bear all costs associated with temporary repairs and their maintenance.

E9. PATCHING OF EXISTING PAVEMENT

DESCRIPTION

E9.1 General

E9.1.1 This specification covers patching of existing concrete pavement in preparation for an asphalt overlay.

E9.1.2 Referenced Standard Construction Specifications

- (a) CW 3110 – Sub-Grade, Sub-Base and Base Course Construction.
- (b) CW 3130 – Supply and Installation of Geotextile Fabrics.
- (c) CW 3410 – Asphaltic Concrete Pavement Works.

MATERIALS

E9.2 Crushed Sub-Base Material

- E9.2.1 Crushed Sub-base material will have a maximum aggregate size of 50 millimetre and be supplied in accordance with Section 2.1 of CW 3110.

E9.3 Geotextile Fabric

- E9.3.1 Geotextile fabric will be supplied in accordance with Section 2 of CW 3130.

E9.4 Asphalt Material

- E9.4.1 Asphalt material will be Type 1A and will be supplied in accordance with Sections 5 and 6 of CW 3410.

CONSTRUCTION METHODS

E9.5 General

- E9.5.1 Remove existing concrete pavement to a minimum width of 1.5 metres at locations as shown on the Drawings or as directed by the Contract Administrator in accordance with Section 3.1 of Specification CW 3110.
- E9.5.2 Excavate to a depth of 350 millimetres below the top of the existing pavement.
- E9.5.3 Compact existing sub-grade to a minimum of 95% Standard Proctor Density.
- E9.5.4 Place separation/reinforcement geotextile fabric in accordance with Specification CW 3130.
- E9.5.5 Place and compact crushed sub-base material in accordance with CW 3110 to a 300 millimetres compacted depth. Compact to a minimum of 100% Standard Proctor Density.
- E9.5.6 Place and compact asphalt material to a 50 millimetres compacted depth matching the top of the existing concrete pavement. Compact to an average of 95% percent of the 75 Blow Marshall Density of the paving mixture with no individual test being less than 90% percent.
- E9.5.7 Each layer must be levelled and accepted by the Contract Administrator before the succeeding layer may be placed.
- E9.5.8 Additional excavation and placement of sub-base material beyond the identified pavement structure will be completed in accordance with CW 3110 as directed by the Contract Administrator.

MEASUREMENT AND PAYMENT

E9.6 Pavement Patching

- E9.6.1 Pavement patching will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Pavement Patching". The area to be paid for will be the total number of square metres of pavement patched in accordance with this specification, accepted and measured by the Contract Administrator.

E10. PARTIAL DEPTH PATCHING OF EXISTING JOINTS

DESCRIPTION

E10.1 General

E10.1.1 This specification covers the Partial Depth Patching of existing concrete pavement joints.

E10.2 Referenced Standard Construction Specifications

- (a) CW 3230 – Full-Depth Patching of Existing Slabs and Joints
- (b) CW 3410 – Asphalt Concrete Pavement Works

MATERIALS

E10.3 Asphalt Materials

E10.3.1 Asphalt material will be Type 1A supplied in accordance with Sections 5 and 6 of CW 3410.

E10.4 Tack Coat

E10.4.1 Tack Coat will be undiluted SS-1 emulsified asphalt.

CONSTRUCTION METHODS

E10.5 Planing of Joints

E10.5.1 Plane existing joints designated by the Contract Administrator to a minimum depth of 50 mm and a maximum of depth 90 mm to remove ravelled or deteriorated concrete. Width of joint to be planed will vary with depth.

E10.5.2 Should the depth of joint deterioration exceed the maximum indicated, as determined by the Contract Administrator, the entire joint shall be renewed and paid for in accordance with CW 3230 as a full depth joint repair. Planing completed shall be paid for in accordance with Section 14.7 of this specification

E10.5.3 Dispose of material in accordance with Section 3.4 of CW 1130.

E10.6 Placement of Asphalt Material

E10.6.1 Prior to placement of asphalt material, the planed joint shall be swept or blow clean of any loose material.

E10.6.2 Apply Tack Coat uniformly on the entire surface of the planed joint. The application rate shall not exceed 0.23 litres per square metre. The planed joint shall be dry prior to applying the tack coat.

E10.6.3 Place and compact asphalt material in accordance with Section 9.3 of CW 3410 to the satisfaction of the Contract Administrator. The finished elevation of the patch shall be flush with surrounding pavement surface.

E10.6.4 Compact the asphalt material to an average 95% of the 75 blow Marshall Density of the paving mixture with no individual test being less than 90 %.

E10.6.5 Ensure that no traffic is allowed to travel over the patched area until the asphalt has cooled to atmospheric temperature.

MEASUREMENT AND PAYMENT

E10.7 Partial Depth Planing of Existing Joints

E10.7.1 Partial Depth Planing of Existing Joints will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Partial Depth Planing of Existing Joints". The

area to be paid for will be the total number of square metres of joints planed in accordance with this specification, accepted and measured by the Contract Administrator.

E10.8 Asphalt Patching of Partial Depth Joints

E10.9 Asphalt Patching of Partial Depth Joints will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Asphalt Patching of Partial Depth Joints". The area to be paid for will be the total number of square metres of joints patched in accordance with this specification, accepted, and measured by the Contract Administrator.

E11. FULL DEPTH SAW-CUTTING

E11.1 Complete full depth saw-cuts at the depth of the existing concrete pavement at locations as directed by the Contract Administrator.

E11.2 Measurement and Payment

E11.2.1 Full depth saw-cutting will be measured on a length basis and paid for at the Contract Unit Price per metre for "Full Depth Saw-Cutting". The length to be paid for will be the total number of metres of existing concrete pavement saw-cut in accordance with this specification, accepted and measured by the Contract Administrator.

E12. SOFT EXCAVATION TO EXPOSE UNDERGROUND UTILITIES

E12.1 Description

E12.1.1 This specification covers the soft excavation to expose underground utilities to determine the depth of the underground utility and whether it will interfere with the installation of proposed Works on site.

E12.1.2 These underground utilities include, but are not limited to, Manitoba Hydro cables, MTS cables, CPR, existing sewers, and existing watermains.

E12.2 Materials

E12.2.1 Backfill Material

(a) Backfill material for backfill of shafts after hydro-excavation has been completed shall consist of sand as per City of Winnipeg Standard Construction Specification CW 2030.

E12.3 Construction Methods

E12.3.1 Prior to commencement of any construction works adjacent to underground utilities, the Contractor shall use soft digging or hand excavation to expose the underground utilities.

E12.3.2 Once the elevation of the top of the pipe or duct has been determined the resulting excavation shall be backfilled with bedding sand to the elevation of the existing ground.

E12.4 Measurement and Payment

E12.4.1 Soft excavation to expose underground utilities will be considered incidental to the Work. No measurement and payment will be made within this section.

E13. PRUNING OF EXISTING TREES

E13.1 Description

E13.1.1 Provide all labour, materials, methods, equipment and accessories for pruning of existing trees within the limit of Work.

E13.2 Quality Assurance

- E13.2.1 Pruning shall be provided by a person with a Manitoba Arborists Certificate with demonstrable experience sourcing and Work.
- E13.2.2 Contact the City of Winnipeg Forestry Branch at 204-986-2004 to arrange an on site meeting to review trees to be pruned. Meeting to include the Contract Administrator.
- E13.3 Pruning Methodology
- E13.3.1 Prune horizontal and vertical within the limits of construction to ensure construction equipment can be operated without interfering with trees to remain.
- E13.3.2 Prune as required to remove dead, broken or damaged limbs.
- E13.3.3 Prune back to healthy growth while maintaining balanced crown shape.
- E13.3.4 Employ clean sharp tools.
- E13.3.5 Make cuts smooth and flush with outer edge of branch collar near the main stem or branch.
- E13.3.6 Cuts must be smooth and sloping to prevent accumulation of water on cut.
- E13.3.7 Do not leave little stumps ("horns") on trunks or main branches.
- E13.3.8 Prune according to accepted horticultural practices as outline in "The Pruning Manual", Publication No. 1505-1977 by Agriculture Canada.
- E13.4 Measurement and Payment
- E13.4.1 Tree pruning will be measured on a lump sum basis and paid for at the Contract Unit Price lump sum as "Tree Protection, Pruning, Root Pruning & Temporary Root Cover Material" in accordance with this specification and accepted by the Contract Administrator.

E14. TREE VAULTS

- E14.1 Description
- E14.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of tree vaults with precast concrete sidewalk panels and related excavation, granular drainage material, drainage pipe, non-woven geotextile, and planting medium.
- E14.2 Materials
- E14.2.1 Aggregate sub-base to CW3110.
- E14.2.2 Granular drainage material in accordance with specification CW3120 - Installation of Sub Drains.
- E14.2.3 Drainage pipe: 150mm dia. perforated PVC pipe.
- E14.2.4 Geotextile to CW3130.
- E14.2.5 Concrete materials and accessories in accordance with Specification CW 3310 – Portland Cement Concrete Pavement Works, to suit loads designed by Structural Engineer.
- E14.2.6 Precast Concrete Vault Cover
- (a) 1245 x 1242 x 150mm reinforced precast concrete vault cover, medium sandblast finish, to accommodate AASHTO HS-20 loading, including 4-19mm plastic lift rings and 4-19mm PVC pipe SCH 40 bottom, drilled thru.
- (b) Available from Barkman Concrete Ltd. Ph. 204-667-3310, or approved equal.
- E14.2.7 Planting medium in accordance with Planting Medium and Finished Grading specification.
- E14.3 Submittals
- E14.3.1 Prior to construction, submit samples of the following materials to the Contract Administrator:

- (a) Shop drawing for vault cover stamped by and Engineer.
- (b) Non-woven geotextile: 1 sq. m.

E14.3.2 Prior to installation, arrange for inspection and approval of the following materials by the Contract Administrator:

- (a) One (1) precast concrete vault cover.

E14.4 Construction Method

E14.4.1 The Contractor must ensure that all buried utilities and services are located and, if necessary, protected and exposed prior to any excavation in accordance with specification CW1120.

E14.4.2 Tree vault construction shall occur in tandem with soil cell construction. Refer to Soil Cell specification.

E14.4.3 Obtain approval of tree grate with frame mock-up from Contract Administrator prior to construction of tree vaults. Refer to Exterior Metal Fabrication specification.

E14.4.4 Excavate tree vaults to the dimensions and depth shown on the Drawings. Soft dig / day lighting process to be used in area of existing underground utilities. Ensure base of tree pit slopes to drain toward perforated drainage pipe (min 1.0% slope).

E14.4.5 Clear excavation of all construction debris, trash, rubble and any foreign material. Excavate and remove oil spills and other soil contamination sufficiently to remove the harmful material. Fill over excavations with approved fill and compact to the required subgrade compaction.

E14.4.6 All excavated material shall be disposed of off site in accordance with specification CW1130.

E14.4.7 Backfill between roadway base gravel and tree vault edge with compacted granular where required.

Install 200mm depth granular drainage material with drainage pipe in accordance with specification CW3120, and as shown on the Drawings. Ensure pipe has minimum 25mm cover of drainage course above and below. Tie drainage pipe into nearest catch basin (min 0.25% slope).

E14.4.8 Cover drainage course and sides of tree vault with geotextile in accordance with specification CW3120 and as shown on the Drawings.

E14.4.9 Install compacted soil mound and review with Contract Administrator. Install planting medium and trees. Refer to Tree & Shrub Plantings specification.

E14.4.10 Install vault covers on tree vault thickened edge. Remove debris from lip and/or grind down concrete as required to ensure vault covers do not wobble and are flush with adjacent surfaces.

E14.5 Measurement and Payment

E14.5.1 The construction of tree vaults shall be measured on a volume basis, and paid for at the Contract Unit Price per cubic metre as "Construction of Tree Vaults". The volume to be paid for shall be the total cubic metre area in accordance with this specification, accepted and measured by the Contract Administrator. Inclusive of excavation, aggregate sub-base, granular drainage material, geotextile and backfill. Over-excavation will not be paid.

E14.5.2 The supply and install of precast concrete vault covers shall be paid for on a unit each basis and paid for at the Contract Unit Price per unit as "Precast Concrete Vault Cover". The number of units to be paid for shall be the total number installed in accordance with this specification, accepted and measured by the Contract Administrator.

E14.5.3 The supply and install of drainage pipe shall be paid for on a lineal metre basis and paid at the Contract Unit Price per lineal metre as "Drainage Pipe". The length to be paid for shall

be the total length installed in accordance with this Specification and accepted and measured by the Contract Administrator.

E15. SOIL CELLS

E15.1 Description

E15.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of Soil Cells and related excavation, geotextile, aggregate sub-base, aggregate base, and silva cell system.

E15.2 Materials

E15.2.1 Geotextile to CW3130.

E15.2.2 Geogrid to CW3135.

E15.2.3 Aggregate sub-base to CW3110.

E15.2.4 Aggregate base to CW3110.

E15.2.5 Silva Cell System

(a) Silva Cell Unit: 1200 x 600 x 784 unit comprised of deck, base and posts.

(b) Root Barrier: Deeproot UB18-2 root barrier, per silva cell specifications.

(c) Pin, per silva cell specifications.

(d) Cable ties, per silva cell specifications.

(e) Silva cell system available from DeepRoot Canada Corp. ph.: 604-687-0899. Contact: Mike James.

E15.3 Construction Method

E15.3.1 Silva cell modules must be transported and stored on manufacturers pallets with pallet wrap intact until ready for installation. Pallets should be positioned on firm level base, so as not to impede traffic or work flow.

E15.3.2 The Contractor must ensure that all buried utilities and services are located and if necessary, protected and exposed prior to any excavation in accordance with specification CW1120.

E15.3.3 Excavate and confirm to the dimensions and depth shown on the Drawings, including provision for drainage and base course layer, allowing 200mm (8") additional clearance in length and width. Side walls of excavated pit to be clean, straight, and within 15° of vertical. Soft dig / day lighting process to be used in area of existing underground utilities. Ensure subgrade slopes to subdrain trench toward perforated drainage pipe system (min 2.0% slope).

E15.3.4 Clear excavation of all construction debris, trash, rubble and any foreign material. Excavate and remove oil spills and other soil contamination sufficiently to remove the harmful material. Fill over excavations with approved fill and compact to the required subgrade compaction.

E15.3.5 All excavated material shall be disposed of off-site in accordance with specification CW1130.

E15.3.6 Compact sub-grade in accordance with specification CW3110.

E15.3.7 Install reinforcement geotextile fabric in accordance with CW3130.

E15.3.8 Install perforated drainage pipe in accordance with specification CW3120, and as shown on the Drawings.

- E15.3.9 Install aggregate sub-base below silva cell system to the depths indicated in the Drawings and compact to a minimum of 95% of maximum dry density at optimum moisture content, in accordance with ASTM D 698 Standard Proctor Method.
- E15.3.10 Assemble and install silva cell system in accordance with manufacturers specifications.
- E15.3.11 Install geogrid. Geogrid to line perimeter of silva cell system with 150mm toe (outward from base) and 300mm excess (over top of deck).
- E15.3.12 Load planting medium into the silva cell system. Install planting medium in accordance with manufacturers specifications.
- E15.3.13 Install backfill in 200mm lifts to top of silva cell system.
- E15.3.14 Place geotextile over top of silva cell system, 450mm overlap past excavation.
- E15.3.15 Install root barrier directly adjacent to concrete edge restraint.
- E15.4 Measurement and Payment
- E15.5 The construction of soil cells shall be measured on a volume basis, and paid for at the Contract Unit Price per cubic metre as "Soil Cells". The volume to be paid for shall be the total cubic metre area installed in accordance with this specification, accepted and measured by the Contract Administrator. Inclusive of excavation, granular drainage material, geotextile, geogrid, aggregate sub-base, silva cell system and backfill. Over-excavation will not be paid.

E16. UNIT PAVING

E16.1 Description

- E16.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of unit paving as indicated on the Drawings.

E16.2 References

- E16.2.1 CW 3330 – Installation of Interlocking Paving Stones
- E16.2.2 CW 3335 – Installation of Interlocking Paving Stones on a Lean Concrete Base

E16.3 Materials

E16.3.1 Unit Pavers:

- (a) Pavers available from Barkman Concrete Ltd. Ph. 204-667-3310, or approved equal:
- (i) 300 x 151 x 100mm Boadway paver, mahogany colour.
 - (ii) 210 x 105 x 80mm Holland 8cm paver, desert buff colour.
 - (iii) 210 x 105 x 80mm Holland 8cm paver, mahogany colour.
 - (iv) 210 x 105 x 80mm Holland 8cm paver, ebony colour.
 - (v) 210 x 105 x 60mm Holland 6cm paver, charcoal colour.
 - (vi) 210 x 105 x 60mm Holland 6cm paver, natural colour.
 - (vii) 210 x 210 x 60mm Holland 6cm square paver, natural colour.
- (b) Unit pavers stockpiled from materials on site:
- (i) Munic pavers from sidewalk.
 - (ii) Holland 8cm paver, desert buff, mahogany and ebony from roadway.
- (c) 194 x 93 x 57mm Endicott clay brick paver, dark ironspot. Available from Alsip's Building Products and Services, or approved equal.

- E16.3.2 Bedding Sand: shall be fine aggregate to the requirements of specification CW3330.

- E16.3.3 Joint Sand: to the requirements of specification CW3330.

E16.3.4 Plastic Edge Support: Snapedge & spikes available from Barkman Concrete Ltd. Ph. 204-667-3310, or approved equal.

E16.4 Construction Method

E16.4.1 Contractor to verify the exact dimensions of unit pavers, brick pavers and stockpiled unit pavers, prior to the construction of blockouts in concrete sidewalk. Use physical samples of specified pavers when construction form work for blockouts.

E16.4.2 Contractor to review paving layout and patterns with Contract Administrator.

E16.4.3 Install concrete sidewalk w/blockouts, and roadway w/blockouts as specified on Drawings.

E16.4.4 Preparation of Sand Base

- (a) Remove all accumulated debris from blockouts.
- (b) Install bedding sand to the depths indicated on the Drawings and to CW3330.
- (c) Do not compact sand base prior to installing pavers.

E16.4.5 Installation of Unit Pavers

- (a) Unit pavers shall be installed in formed concrete blockouts and compacted subgrade in accordance with the specification CW3330 and CW3335, set in locations and patterns as shown on the Drawings. Spaces between joints shall be 5mm maximum and shall be uniform and consistent while maintaining true patterns as indicated on the Drawings.
- (b) Commence installation of pavers against edge to obtain straightest possible course for installation.
- (c) Pavers shall be cut with saw only to obtain true even undamaged edges. Chipped pavers are unacceptable.
- (d) Crews shall work on installed pavers, not on sand layer.
- (e) Install compacted sub base.
- (f) Place bedding sand over sub base or concrete and level.
- (g) Place pavers and spread and fine grade joint sand over paving surface and sweep into joints.
- (h) Sweep remaining sand over all paving areas and remove from site.
- (i) Replace at no extra cost all whole or cut stones marked as unacceptable.
- (j) Remove cracked, chipped, broken or otherwise damaged paving materials from Site immediately.
- (k) Upon completion, clean in accordance with manufacturers recommendations.

E16.5 Quality Assurance

E16.5.1 All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations, from the selection and production of materials, through to final acceptance of the Work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection of approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this specification.

E16.6 Measurement and Payment

E16.6.1 Unit Pavers will be measured on an area basis and will be paid for at the Contract Unit Price per square metre for the following items of Work, which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this specification. The area to be paid for shall be the total installed area of

each type of unit paving accepted and measured by the Contract Administrator. Inclusive of bedding sand, joint sand and plastic edge support.

(a) Items of Work:

- (i) Broadway Paver, Mahogany
- (ii) Holland 8cm Paver, Desert Buff
- (iii) Holland 8cm Paver, Mahogany
- (iv) Holland 8cm Paver, Ebony
- (v) Holland 6cm Paver, Charcoal
- (vi) Holland 6cm Paver, Natural
- (vii) Holland 6cm Square Paver, Desert Buff
- (viii) Munic paver Fom Stockpile
- (ix) Holland 8cm Paver, Desert Buff From Stockpile
- (x) Holland 8cm Paver, Mahogany From Stockpile
- (xi) Holland 8cm Paver, Ebony From Stockpile
- (xii) Clay Paver, Dark Ironspot

E17. EXTERIOR METAL FABRICATION

E17.1 Description

E17.1.1 Provide all labour, materials, methods, equipment and accessories for the fabrication and installation of Lily and James bench, Waterfront and James bench, parking screen fence c-channel posts, water level indicator, and tree grate frames.

E17.2 References

E17.2.1 American Society for Testing and Materials International, (ASTM)

- (a) ASTM A53/A53M-02, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Steamless.
- (b) ASTM A269-02, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- (c) ASTM B221-14 Specification for Aluminum and Aluminum-Alloy. Extruded Bars, Rods, Wire, Profiles, and Tubes.
- (d) ASTM A307-02, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- (e) ASTM F593-17 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

E17.2.2 Canadian Standards Association (CSA International).

- (a) CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel.
- (b) CAN/CSA-G164-M93(R1998), Hot Dip Galvanized or Irregularly Shaped Articles, or latest.
- (c) CAN/CSA-S16.1-01, Limit States Design of Steel Structures.
- (d) CSA W48-01, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
- (e) CSA W59-1989, R2001, Welded Steel Construction, Metal Arc Welding, Imperial Version.

E17.3 Materials

E17.3.1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.

- E17.3.2 Welding materials: to CSA W59.
- E17.3.3 Welding electrodes: to CSA W48 Series.
- E17.3.4 Hardware and anchor bolts: to ASTM F593-17.
 - (a) Anchor Bolts: stainless steel conc. wedge anchors.
 - (b) Carriage bolts: stainless steel.
 - (c) Stainless steel threaded rod.
 - (d) Stainless steel nut.
- E17.3.5 Leveling grout: contractor to provide a product for review by Contract Administrator.
- E17.3.6 Threaded rod anchor to concrete: Sika anchor fix-3 or fix-4.
- E17.3.7 Water Level Indicator Information Panel: Refer to Information Panel specification.
- E17.3.8 Parking Screen Fence, Lily and James Bench, and Waterfront and James Bench Wood: Refer to Site Carpentry Specification.
- E17.4 Finishes
 - E17.4.1 Lily and James Bench: hot dip galvanized following fabrication, to CAN/CSA-G164-M93.
 - E17.4.2 Waterfront and James Bench: hot dip galvanized following fabrication, to CAN/CSA-G164-M93.
 - E17.4.3 C-Channel Posts: to be painted in accordance with Exterior Metal Painting specification.
 - E17.4.4 Water level indicator: to be hot dip galvanized following fabrication to CAN/CSA-G164-M93 and then cleaned and painted in accordance with Exterior Metal Painting specification.
 - E17.4.5 Tree Grate Frame: hot dip galvanized following fabrication, to CAN/CSA-G164-M93.
- E17.5 Submittals
 - E17.5.1 Submit samples for the following:
 - (a) One (1) C-Channel post, full size, painted.
 - (b) One (1) 330 x 330 laser cut sample of water level indicator openings, full size, painted.
 - (c) One (1) tree grate frame, full sized.
 - E17.5.2 Submit Shop Drawings for the following:
 - (a) Lily and James bench.
 - (b) Waterfront and James bench.
 - (c) C-Channel post.
 - (d) Water Level Indicator: shop drawings to foundation and steel components. Shop drawing shall be sealed by a Structural Engineer licensed to practice in the province of Manitoba.
 - (e) Tree grate frame.
 - (f) Shop drawings to clearly indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number and size of anchors, supports, reinforcement, details and accessories.
 - (g) Indicate and list hardware and miscellaneous items.
 - (h) Provide templates, patterns, fixing diagrams as required.
 - (i) Indicate related, adjacent materials, and connections
 - E17.5.3 Contract Administrator to provide artwork for the following items, in digital format:
 - (a) Water Level Indicator.

E17.6 Delivery, Storage and Handling

- E17.6.1 Deliver materials, suitably packaged, clearly marked indicating manufacturer name and any other identifying symbols or information. Do not deliver materials long before they are required. Cause no delays to scheduling.
- E17.6.2 Cover materials with cellophane plastic or bubble wrap designed to protect surfaces without scratching or marring them during transport. Secure wrappings with appropriate tape or adhesives that are sturdy but can easily be removed at the site.
- E17.6.3 Leave protective covering in place until final cleaning of site. Provide instructions for removal of protective covering.
- E17.6.4 Store materials in a dry location off the ground, and prevent damage.
- E17.6.5 Materials that have been left unprotected, exposed to the elements, damaged or deemed unfit for use during storage and delivery will be rejected on site and shall be immediately replaced at no cost.

E17.7 Site Conditions

- E17.7.1 Make a careful examination of the site and structures and investigate all matters relating to the nature of the work to be undertaken, the means of access and egress, the rights and interests which may be interfered with during the construction of the Work.
- E17.7.2 Report any discrepancies or omissions to the Contract Administrator, who will issue written clarification. Oral interpretations or instructions are not acceptable.

E17.8 Construction Method

- E17.8.1 Obtain approval of submittals and shop drawings prior to ordering materials and commencing fabrication.
- E17.8.2 Do welding work in accordance with CSA W59.
- E17.8.3 Ensure exposed welds are continuous for length of each joint unless otherwise indicated. File or grind exposed welds smooth and flush.
- E17.8.4 Tree grate frame to be hot-dip galvanize after fabrication. No touch-up, welding, drilling or grinding will be accepted after galvanization.
- E17.8.5 De-grease and be-bur all sharp edges in the shop left behind after fabrication is complete, prior to galvanization.
- E17.8.6 Galvanizing: Prepare surface to ensure surface is free of grease, rust and scale.

E17.9 Installation

- E17.9.1 Erect metal work square, plumb, straight and true, accurately fitted, with tight joints and intersections.
- E17.9.2 Provide suitable and acceptable means of anchorage, such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- E17.9.3 Exposed fastening devices to match finish and be compatible with material through which they pass, per the Drawings.
- E17.9.4 Make field connections with appropriately sized stainless steel hardware.
- E17.9.5 Tree grate frame on tree vault thickened edge. Remove debris from lip and/or grind down concrete as required to ensure tree grate frames do not wobble. Remove debris from lip and/or grind down concrete as required to ensure tree grate frame is flush with adjacent surface. Do not grind galvanized frames.

E17.10 Acceptance

E17.10.1 Work will be accepted only if it is erected true to the design intent in conformation with shop drawings and site instructions.

E17.11 Measurement and Payment

E17.11.1 Lily and James Bench

- (a) The supply and installation of Lily and James bench shall be measured on a lump sum basis and paid for at the Contract Unit Price as "Lily and James Bench" in accordance with this specification and accepted by the Contract Administrator.

E17.11.2 Waterfront and James Bench

- (a) The supply and installation of Waterfront and James bench shall be measured on a lump sum basis and paid for at the Contract Unit Price as "Waterfront and James Bench" in accordance with this specification and accepted by the Contract Administrator.

E17.11.3 C-Channel Posts

- (a) The supply and install of c-channel posts shall be measured on a lineal metre basis and paid at the Contract Unit Price per lineal metre as "Parking Screen Fence". The length to be paid for shall be the total length installed in accordance with this specification, accepted and measured by the Contract Administrator.

E17.11.4 Water Level Indicator

- (a) The supply and installation of water level indicator shall be measured on a lump sum basis and paid for at the Contract Unit Price as "Water Level Indicator" in accordance with this specification and accepted by the Contract Administrator.

E17.11.5 Tree Grate Frame

- (a) The supply and installation of tree grate frames shall measured on a unit each basis and paid for at the Contract Unit Price per unit as "Tree Grate Frame". The number of units to be paid for shall be the total number installed in accordance with this specification, accepted and measured by the Contract Administrator.

E18. EXTERIOR METAL PAINTING

E18.1 Description

E18.1.1 Provide all labour, materials, methods, equipment and accessories for the painting of parking screen c-channel posts, and water level indicator.

E18.2 References

E18.2.1 Painting for Exterior Applications:

- (a) SSPC – Steel Structures Painting Council.
- (b) CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
- (c) CAN//CGSB-1.181-92, Ready-Mixed, Organic Zinc-Rich Coating.

E18.3 Materials

E18.3.1 Exterior Grade Paint Coatings for c-channel posts:

- (a) Tremclad 27048X 125 Flat Black, or approved equal, 2 coats or 2 mil min. thickness.

E18.3.2 Cleaner and Paint for Water Level Indicator:

- (a) Paint Prep Cleaner: Hi-Lite Solutions Aero-Green 4110 - Paint Prep Cleaner.
- (b) Primer: Sherwin Williams Pro-Cryl Universal Primer self cross-linking acrylic primer. 1 ct. Wet mils: 5.0 - 10.0 [Dry mils: 1.8-3.6].

- (c) Top Coat: Sherwin Williams Pro-Cryl Waterbased Alkyd Urethane Enamel. Exterior grade enamel with a urethane modified alkyd resin system. 2 cts. @ Wet mils: 4.0-5.0 [Dry mils: 1.4-1.7] per coat. Black, Semi-Gloss.

E18.4 Submittals

- E18.4.1 Submit two (2) copies of WHMIS MSDS - Material Safety Data Sheets for each paint product.
- E18.4.2 Submit samples of the following:
 - (a) One (1) C-Channel bollard, full size, painted.
 - (b) One (1) 330 x 330 laser cut sample of water level indicator openings, full size, painted.

E18.5 Coordination

- E18.5.1 Coordinate sheen of water level indicator top coat with top coat on structural columns at James Avenue Pumphouse.

E18.6 Quality Assurance

- E18.6.1 Painter shall be trained and qualified industrial metal painting professionals with more than five (5) years of experience. Shop must be ISO certified and fully equipped to prepare, prime and paint large scale structural metal members and deliver them to site for field erection.
- E18.6.2 All workmanship and all materials furnished and supplied under this specification shall be of the highest standards and are subject to close and systematic inspection and testing by the Contract Administrator including all operations, from the selection of materials, through to final acceptance of the Work.
- E18.6.3 Strict conformance to this specification will be enforced. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance the requirements of this specification.

E18.7 Construction Method

- E18.7.1 Ensure that sample is approved prior to proceeding.
- E18.7.2 Preparation, priming and painting of members shall be completed in the controlled environment of a paint shop if at all possible. If painting operations must occur in the field Contract Administrator to review the Work and work materials, prior to proceeding.
- E18.7.3 Debur and degrease metal surfaces using products approved by the paint manufacturer.
- E18.7.4 Cleaning of non galvanized metal:
 - (a) Conduct abrasive blasting to fully metal.
 - (b) Clean metal to white metal by dry abrasive blasting. Ensure surface is free of grease, rust, or scale.
 - (c) Review cleaned surface with Contract Administrator prior to proceeding with painting.
- E18.7.5 Cleaning of Galvanized Metal:
 - (a) Clean galvanized metal with paint prep cleaner.
 - (b) Review cleaned surface with Contract Administrator prior to proceeding with painting.
- E18.7.6 Apply paint within 12 hours of cleaning.
- E18.7.7 Paint shall be stored, thinned, handled, mixed and applied in accordance with SSPC-PA 1, Shop Field and Maintenance Coating of Steel, and per the express written specifications of the manufacturer.

- E18.7.8 Apply paint coats only when temperatures can be controlled or predicted to be within the manufacturers acceptable window. When there is a drop in temperature after the coating is applied adjust recoat time period per manufacturers specifications.
- E18.7.9 Paint shall be applied within 24 hours of completion of surface preparation.
- E18.7.10 Use spray gun system for main application and brushes of suitable size for field touch ups. Point spray gun at outside edges coating edges and seams thoroughly prior to coating remaining areas.
- E18.7.11 Touch-up runs and snags immediately while paint application is in progress.
- E18.7.12 Application related failures shall be corrected prior to the application of a subsequent coat.
- E18.7.13 Where excessive coating thickness produces 'Mud Cracking' coating shall be scraped back to bare metal, and sanded to a soundly bonded coating layer then reapplied to the specified thickness.
- E18.7.14 Apply as many coats as necessary to ensure even and proper coating of metal, to be reviewed and approved by the Contract Administrator.
- E18.8 Delivery to Site
- E18.8.1 Allow all painted members to fully cure before preparing for shipment.
- E18.8.2 Once fully cured wrap members in cellophane plastic or bubble wrap designed to protect finished surfaces without scratching or marring them during transport. Secure wrappings with appropriate tape or adhesives that are sturdy but can easily be removed at the site.
- E18.8.3 Deliver to site with equipment suitable for carrying steel loads and capable of hoisting steel members over other features into their final locations.
- E18.9 Touch-Ups
- E18.9.1 Ensure all welding work and mechanical fasteners are wiped clean and free of oil, debris and grit.
- E18.9.2 Apply touch-ups with appropriately sides brushes to get into all grooves and voids.
- E18.9.3 Thickness of touch-ups shall match thickness of adjacent paint.
- E18.9.4 Once all touch-ups are complete contact Contract Administrator for review and approval of metal work and coating.
- E18.10 Standard of Acceptance
- E18.10.1 Paint finishes shall be accepted if they meet the performance standards of the product supplier and match the sample accepted as the standard of performance at the commencement of painting.
- E18.10.2 Painted surfaces shall be warrantied against corrosion, peeling and general failure for two (2) years after date of total performance.
- E18.11 Final Acceptance
- E18.11.1 Provide the City of Winnipeg with maintenance manual inserts detailing products and methods used to achieve metal painting finishes.
- E18.11.2 Provide City of Winnipeg with one (1) gallon of each type of paint.
- E18.12 Measurement and Payment
- E18.12.1 C-Channel Posts
- (a) No payment will be made for the painting of c-channel posts. Painting of c-channel posts shall be considered incidental to the Contact Unit Price "Parking Screen Fence".
- E18.12.2 Water Level Indicator

- (a) No payment will be made for the painting of water level indicator. Painting of water level indicator shall be considered incidental to the Contact Unit Price "Water Level Indicator".

E19. EXTERIOR SITE CARPENTRY

E19.1 Description

- E19.1.1 Provide labour, materials, methods, equipment and accessories for the fabrication and installation of Lily and James bench, Waterfront and James bench, parking screen fence and modification to existing parking screen fence.

E19.2 References

E19.2.1 American Wood-Preservers' Association (AWPA)

- (a) AWPA M2, Standard for Inspection of Treated Wood Products.
- (b) AWPA M4, Standard for the Care of Preservative-Treated Wood Products

E19.2.2 American Society for Testing and Materials International, (ASTM)

- (a) ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- (b) ASTM A269, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
- (c) ASTM Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

E19.2.3 Canadian Standards Association (CSA International)

- (a) CSA B111, Wire Nails, Spikes and Staples
- (b) CSA O141 Softwood Lumber
- (c) CSA O80, Wood Preservation
- (d) CSA O80.20, fire-retardant treatment of lumber by pressure processes
- (e) CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel
- (f) CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles
- (g) CAN/CSA-S16.1, Limit States Design of Steel Structures.

E19.3 Materials

E19.3.1 White Oak Lumber Benches

- (a) white oak, kiln dried and sanded smooth sides faces and edges with a planed texture for bench planks, from a local source.

E19.3.2 Cedar Lumber - Fencing

- (a) Material: No. 2 western red cedar, mill run grade, rot resistant and colour consistent, FSC certified with a planed texture for decking and bench plank. Average moisture content 19% maximum. From one supplier and shipped by rail.

E19.3.3 Hardware

- (a) Benches
 - (i) Bolts, nuts, washers and threaded rods, stainless steel.
- (b) Fence
 - (i) Carriage bolts, nuts and washers, hot dipped galvanized.

E19.4 Submittals

- E19.4.1 Submit product data and samples for:

- (a) 0.6m long white oak, sanded.
- (b) 0.6m long No.2 western red cedar, sanded.

E19.5 Quality Assurance

- E19.5.1 Carpentry shall be performed by trained and qualified craftspeople with demonstrable experience sourcing and work.
- E19.5.2 Conduct a pre-installation meeting with the Contract Administrator to verify requirements.
- E19.5.3 Lumber Identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- E19.5.4 For products treated with preservative by pressure impregnation, submit following information certified by authorized signing officer of treatment plant:
 - (a) Information listed in AWPA.M2 and revisions specified in CAN/CSA-080 Series, Supplementary Requirement to AWPA Standard M2 applicable to specified treatment.
 - (b) Moisture content after drying following treatment with water-borne preservative.
- E19.5.5 All wood to be free of defects. Any warped, checked or bent materials will be rejected.

E19.6 Construction Method

- E19.6.1 Handle and use wood in a manner which will avoid damage or field fabrication causing alteration in original treatment.
- E19.6.2 Construct all work as indicated on the Drawings using adequate fastening methods to ensure solid durable finished work suitable for the purpose intended.
- E19.6.3 Do all fastening neatly, evenly and thoroughly.
- E19.6.4 Frame anchor, fasten, tie and brace members to provide necessary strength and rigidity. Install all members true to line, levels and elevations.
- E19.6.5 Set plumb and space uniformly. Countersink bolts where necessary to provide clearance for other work.

E19.7 Measurement and Payment

- E19.7.1 No payment will be made for the supply and installation of wood for Lily and James bench. The supply and installation of wood for Lily and James bench shall be considered incidental to the Contract Unit Price "Lily and James Bench".
- E19.7.2 No payment will be made for the supply and installation of wood for Waterfront and James bench. The supply and installation of wood for Waterfront and James bench shall be considered incidental to the Contract Unit Price "Waterfront and James Bench".
- E19.7.3 No payment will be made for the supply and installation of wood for the parking screen fence. The supply and installation of wood for the parking screen fence shall be considered incidental to the Contract Unit Price "Parking Screen Fence".
- E19.7.4 The supply and install of modifications to existing parking screen fence shall be measured on a lineal metre basis and paid at the Contract Unit Price per lineal metre as "Modification to Existing Parking Screen Fence". The length to be paid for shall be the total length installed in accordance with this specification, accepted and measured by the Contract Administrator.

E20. INFORMATION PANEL

- E20.1 Provide all labour, materials, methods, equipment and accessories for the supply and install of information panels.
- E20.2 Materials

- E20.2.1 High Pressure Laminate sign system, 0.75 inch thickness, exterior matte finish, complete with mounting holes to match support structures, Folia System as supplied by SH Immersive Environments, 1-800-363-5304 or approved alternate.
- E20.2.2 Mounting Hardware: tamper resistant stainless steel bolts, sized to suit threaded inserts on signs, length to suit threaded inserts and backer board thickness.
- E20.3 Submittals
- E20.3.1 Digital Proofs: Submit full colour digital proofs of information panels to Contract Administrator for review and approval.
- E20.3.2 High Pressure Laminate Samples: submit one 200 x 200 mm full scale, full colour digital laminated sample cropped from one of the trailhead signs, and one 200 x 200 mm full scale, full colour digital laminated sample cropped from one of the interpretive signs. These samples will be reviewed for resolution, registration, legibility, gloss, and colour match. Acceptable samples will be formally signed off by the Contract Administrator.
- E20.3.3 Artwork: to be provided in digital (EPS) format by the Contract Administrator. The artwork shall not be reproduced in any other form or in excess of the amount contracted for, except by written approval of the Contract Administrator. Such approval shall be sought through the City of Winnipeg Public Works Department.
- E20.4 Construction Methods
- E20.4.1 Quality Assurance
- (a) Sign production shall be performed by trained and qualified workers with a minimum of five (5) years experience, under controlled conditions.
- E20.4.2 Mounting Holes
- (a) Mounting hole locations must be accurately placed, within 2mm of the locations indicated on Artwork provided by Contract Administrator.
- E20.4.3 Installation
- (a) Confirm locations and orientation of signs with Contract Administrator prior to installation.
- (b) Install using approved hardware.
- E20.5 Measurement and Payment
- E20.5.1 The supply and installation of information panels shall be measured on a unit each basis, and paid for at the Contract Unit Price per unit as "Information Panel". The number of units to be paid for shall be the total number installed in accordance with this specification, accepted and measured by the Contract Administrator.

E21. SITE FURNISHINGS

- E21.1 Description
- E21.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and install of tree grates, benches, waste receptacles and bike racks.
- E21.2 Submittals
- E21.2.1 Submit product data and shop drawings for bench and waste receptacle. Indicate sizes, assembly, and installation details.
- E21.3 Materials
- E21.3.1 Tree Grate
- (a) 1219 x 1219mm Metropolitan tree grate model# R-8706-1A, excluding frame, grey iron finish. Available from Crozier Enterprises ph. 416-214-7727, or approved equal.

- E21.3.2 Bench
- (a) Victor Stanley Inc. Classic Series C-140 with centre arm rest, black powdercoated, IPE hardwood slats. Supplied by Victor Stanley inc., ph. 1-800-368-2573, or approved equal.
 - (b) Anchor Bolts: 6mm dia. x 200mm stainless steel anchor bolts.
- E21.3.3 Waste Receptacle
- (a) Dual stream waste receptacle, surface mounted. Waste receptacle available from Recycle Everywhere ph. 204-942-2284, or approved equal.
 - (b) Anchor: 6mm dia. x 100mm stainless steel anchor bolts.
- E21.3.4 Bike Rack
- (a) Lotlimit bike rack, part no. SL505, manufactured by mmcite, colour: silver. Standard subsurface mounts, distributed by Park Works Inc. ph.: 800-667-4264, or approved equal.
 - (b) Anchor Bolts: M12 stainless steel anchor bolts dia. to suit.
- E21.4 Construction Methods
- E21.4.1 All work is to be located and installed in accordance with the Drawings and manufacturers specifications.
- E21.4.2 All furnishings to be installed plumb and true to correct elevations and location, as directed by the Contract Administrator. The Contractor shall confirm proposed locations of all site furnishings with Contract Administrator prior to installation.
- E21.4.3 All furnishings to be carefully handled so that no parts will be bent, broken, or otherwise damaged. Contractor is responsible for replacing any damaged furnishings, prior to installation, at no cost to the City.
- E21.4.4 Install tree grate in galvanized tree grate frame. Tree grate to sit flush with top of frame lip.
- E21.5 Measurement and Payment
- E21.5.1 The supply and installation of site furnishings shall be paid for on a unit each basis each and paid for at the Contract Unit Price per unit for the Items of Work listed below. Price shall be payment in full for supplying materials and for performing the Work in accordance with this specification, accepted and measured by the Contract Administrator. Prices to include all mounting hardware.
- E21.5.2 Items of Work:
- (a) Tree Grate
 - (b) Bench
 - (c) Waste Receptacle
 - (d) Bike Rack

E22. PLANTING MEDIUM & FINISHED GRADING

- E22.1 Description
- E22.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of planting medium for tree vaults, soil cells, shrub beds, and sod areas.
- E22.2 References
- E22.2.1 Agriculture and Agri-Food Canada
- .1 The Canadian System of Soil Classification, Third Edition, 1998.
- E22.2.2 Canadian Council of Ministers of the Environment (CCME) Guidelines.

E22.2.3 The City of Winnipeg Standard Construction Specifications

- .1 CW 1130 – Site Requirements
- .2 CW 3540 – Topsoil and Finish Grading for Establishment of Turf Areas

E22.3 Submittals

E22.3.1 Submit 0.5kg sample of topsoil to National Testing Laboratory, or approved alternate, and indicate present use and intended use. Prepare and ship sample in accordance with Provincial regulations and testing laboratory requirements.

E22.3.2 Submit two (2) copies of soil analysis and recommendations for corrections to Contract Administrator.

E22.4 Quality Assurance

E22.4.1 Inform Contract Administrator of proposed source of materials to be supplied and provide a sample for review by Contract Administrator prior to installation.

E22.4.2 Testing of planting medium to be carried out and paid for by Contractor. Prepare and ship planting medium samples to approved laboratory in accordance with Provincial regulations and laboratory requirements, indicating intended use on each sample.

E22.4.3 Test planting medium for nutrients N, P, K, micronutrients, soluble salt content, pH value and OM (organic matter).

E22.4.4 Acceptance of planting medium is subject to an inspection of material and confirmation of test results. Do not commence soft landscaping work until Contract Administrator has accepted planting medium.

E22.5 Delivery, Storage and Handling

E22.5.1 Store materials in a dry area, protected from freezing, sedimentation and contamination.

E22.5.2 Deliver and store fertilizer in waterproof bags labeled with weight, analysis and name of manufacturer.

E22.6 Materials

E22.6.1 Planting Medium: In accordance with CW 3540 for topsoil except organic matter to be in the range of 5-10%.

E22.6.2 Peatmoss: deliver from partially decomposed fibrous or cellular stems and leaves of species of sphagnum mosses. Elastic and homogeneous, brown in colour. Free of wood and deleterious material that could prohibit growth. Shredded particle minimum size: 5 mm.

E22.6.3 Sand: hard fine silica sand, well washed and free of impurities, chemical or organic matter. Coarse texture, and to the following gradation:

<u>Particle Size (mm)</u>	<u>% Passing through Screen</u>
2.0	100%
1.0	95 to 100%
0.5	80 to 100%
0.25	0 to 30%
0.15	0 to 8%
0.075	0 to 1%

E22.6.4 Fertilizer: Synthetic start-up slow release fertilizer with a N-P-K analysis of 12-36-15 ratio at a rate of 4 kg per 100 m² which is 8 pounds per 100 sq ft.

E22.7 Construction Method

E22.7.1 Excavation

- (a) Excavate tree vaults by hand or using approved soft digging technology unless otherwise directed by Contract Administrator. Dispose of all rock, clay soils and other deleterious materials off Site.
- (b) Protect bottom of excavations against freezing.
- (c) Remove water that has entered the excavated tree pit prior to planting. Notify Contract Administrator if water source is groundwater.
- (d) Verify and obtain approval by Contract Administrator of tree vaults with geotextile prior to compacted soil mound and planting medium placement.

E22.7.2 Planting Medium Placement

- (a) Place planting medium in uniform layers over approved, unfrozen sub-grade, to the depth indicated on the Drawings.
- (b) Eliminate rough spots and low areas, Prepare a loose, friable bed, boot firm and level.

E22.7.3 Soil Amendments

- (a) Apply lime, sulphur, or other soil amendment at a rate determined and recommended from planting medium sample test.
- (b) Mix soil amendment well into full depth topsoil prior to application of fertilizer.

E22.7.4 Finished Grading and Rolling

- (a) Per CW3540.
- (b) Fine grade entire soil area to elevations as indicated on the Drawings. Eliminate rough spots and low areas Leave surfaces smooth, uniform and firm against foot printing with a fine loose texture.

E22.8 Surplus Material

E22.8.1 Dispose of unused planting medium off Site in accordance with CW1130.

E22.9 Cleaning

E22.9.1 Perform cleaning to remove accumulated environmental dirt from all paved surfaces of building faces. Remove surplus materials, rubbish, tools and equipment barriers.

E22.10 Measurement and Payment

E22.10.1 Supply and placement of planting medium in tree wells will not be measured. This item of Work shall be considered incidental to the cost of "Supply and Installation of Trees" performed in accordance with relevant Specifications and accepted by the Contract Administrator.

E22.10.2 Supply and placement of planting medium for tree vaults, soil cells and shrub beds shall be measured on a volume basis and paid for at the Contract Unit Price per cubic metre as "Planting Medium". The volume to be paid for shall be the total cubic metre area in accordance with this specification, accepted and measured by the Contract Administrator.

E22.10.3 Supply and placement of planting medium for sod areas will not be measured. This item of Work shall be considered incidental to the cost of "Sodding". No separate measurement or payment will be made.

E23. SODDING

E23.1 Description

E23.1.1 General

- (a) This specification shall amend and supplement City of Winnipeg Standard Construction Specification CW 3510 "Sodding", and covers all operations relating sod supply and installation, including preparation of finish grade, watering and rolling, and thirty (30) day maintenance.

- (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.

E23.2 References

E23.2.1 City of Winnipeg Standard Construction Specifications:

- (a) CW 3510 – Sodding
- (b) CW 3540 – Topsoil and Finished Grading

E23.2.2 City of Winnipeg Standard Details:

- (a) SD-243 – Sodding Details

E23.3 Materials

E23.3.1 General

- (a) The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification. All materials supplied under this Specification shall be subject to inspection and acceptance by the Contract Administrator.

E23.3.2 Turf Grass Sod

- (a) Turf grass sod shall conform to CW 3510.
- (b) Sod shall be a mixture of ninety-five percent (95%) Kentucky bluegrass, using equal proportions of any three (3) Class 2 cultivars, and five percent (5%) Creeping Red fescue.
- (c) Soil and fine grading shall conform to CW 3540 and Planting Medium & Finish Grading Specification.

E23.4 Construction Methods

E23.4.1 Installation of Topsoil and Finish Grading, Preparation of Finish Grade, Placement of Sod, Watering, Rolling and 30-Day Maintenance:

- (a) Install 75 mm topsoil in accordance with CW 3540.
- (b) Sod placement, watering and rolling and thirty (30) day maintenance shall conform to CW 3510-R9 and SD-243.

E23.5 Measurement and Payment

- E23.5.1 Turf Grass Sod will be measured on an area basis and paid for at the Contract Unit Price per square metre for “Sodding”. The area to be paid shall be the total square metre area in accordance with this specification, accepted and measured by the Contract Administrator.

E24. TREE & SHRUB PLANTINGS

E24.1 Description

- E24.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of trees, shrubs and wood chip mulch.

E24.2 References

E24.2.1 Agriculture and and Agri-Food Canada (AAFC)

- (a) Plant Hardiness Zones in Canada-2000.

E24.2.2 Canadian Nursery Landscape Association (CNLA)

- (a) Plant Canadian Standards for Nursery Stock-2001.

E24.2.3 Department of Justice Canada (JUS)

- (a) Plant Canadian Environmental Protection Act (CEPA), 1999, c. 33.
- (b) Transport of Dangerous Goods Act (TDGA), 1992, c.34.

E24.2.4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

- (a) Materials Safety Data Sheets (MSDS).

E24.3 Submittals

E24.3.1 Submit product data for:

- (a) Fertilizer.

E24.3.2 Submit samples for:

- (a) Wood mulch.

E24.4 Source Quality Control

E24.4.1 Obtain approval from Contract Administrator of plant material at source.

E24.4.2 Notify Contract Administrator of source of material at least seven (7) days in advance of shipment. No work under this Section is to proceed without approval.

E24.4.3 Acceptance of plant material at source does not prevent rejection on Site prior to or after planting operations.

E24.4.4 Plant material imported from other nations will not be accepted.

E24.4.5 Bare root plant material will not be accepted.

E24.5 Storage and Protection

E24.5.1 Coordinate the shipping of plants and excavation of tree vaults to ensure minimum time laps between digging and planting.

E24.5.2 Protect plant material from frost, excessive heat, wind and sun during delivery.

E24.5.3 Protect plant material from damage during transportation:

- (a) When delivery distance is less than 30 km and vehicle travels at speeds under 80 km/h, tie tarpaulins around plants or over vehicle box.
- (b) When delivery distance exceeds 30 km or vehicle travels at speeds over 80 km/h, use enclosed vehicle where practical.
- (c) Protect foliage and rootballs using anti-desiccants and tarpaulins, where use of enclosed vehicle is impractical due to size and weight of plant material.

E24.5.4 Protect stored plant material from frost, wind and sun as follows:

- (a) For balled and burlapped and wire basket rootballs, place to protect branches from damage. Maintain moisture level in root zones.

E24.5.5 Remove broken and damaged roots with sharp pruning shears. Make clean cut and cover cuts over 20mm (3/4") diameter with wound dressing.

E24.5.6 Keep roots moist and protect from sun and wind. Heel-in trees that cannot be planted immediately in shaded areas and water well.

E24.6 Scheduling

E24.6.1 Order plant material as soon as possible after award of contract to ensure plant availability. Request substitutes as required.

E24.6.2 Provide Contract Administrator a written schedule fourteen (14) days in advance of shipment of plant material. Schedule to include: quantity and type of plant material, shipping dates, arrival dates on Site, and planting dates.

E24.7 Warranty of Nursery Stock

- E24.7.1 For all plant material a two (2) year warranty period is required.
- E24.7.2 During the warranty period, upon written notification from the Contract Administrator, the Contractor warrants to replace and replant any nursery stock found dead and/or in poor condition as soon as possible thereafter, without cost to The City. "Poor Condition" shall be interpreted as meaning nursery stock on which branches are dead or dying, or have not shown satisfactory growth in leaves. Exempted is nursery stock damaged by accidental causes or vandalism, which stock shall be replaced at the cost of The City.
- E24.7.3 At the end of the two (2) year warranty period an inspection will be conducted by Contract Administrator.
- E24.7.4 Contact Administrator reserves the right to extend Contractor's warranty responsibilities for an additional one (1) year if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.
- E24.8 Replacements
- E24.8.1 During warranty period, remove and replace any plant material that has died or failed to grow satisfactorily, at no cost to the City, as directed by the Contract Administrator.
- E24.8.2 A two (2) year warranty period shall be required on all replacement plant material.
- E24.8.3 All replacement plant material shall be the same size and species as specified, and shall be supplied and planted in accordance with the original Drawings and Specifications.
- E24.8.4 Should the replaced plant material not survive, the Contractor will be responsible for a third replacement and a two (2) year warranty period shall be required.
- E24.9 Plant Material
- E24.9.1 Type of root preparation, sizing, grading and quality shall comply to the Canadian Standards for Nursery Stock.
- E24.9.2 Source of plant material: grown in Zone 3 only in accordance with Plant Hardiness Zones in Canada. Plant material must be planted in zone indicated as appropriate for its species.
- E24.9.3 Plant material free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.
- E24.9.4 Substitutions to plant material as indicated on planting plan are not permitted unless written approval has been obtained as to type, variety and size. Plant substitutions must be of similar species and of equal size as those originally specified.
- E24.9.5 Refer to Plant Specification List on the Drawings and the Drawings for species, quantities, size and quality of plant materials.
- E24.10 Water
- E24.10.1 Water free of impurities that would hinder plant growth. The Contractor shall provide water, so that all costs to provide water for the watering operation and all associated costs shall be borne by the Contractor. These costs may include hydrant permit and meter rental fees.
- E24.10.2 Further to clause 3.7 of CW 1120, the Contractor shall pay for all costs associated with obtaining water in accordance with the Waterworks By-law. Sewer charges will not be assessed for water obtained from a hydrant.
- E24.11 Planting Medium: backfill with planting medium as specified in Planting Medium Specification.
- E24.12 Tree Protection: Plastic, 13 mm \varnothing , nylon reinforced garden hose over guy wire.
- E24.13 Wood Chip Mulch: wood chip mulch varying in size from 50 mm to 75 mm and 5 to 20 mm thick, free of bark. Wood chip shall be mulched locally within 80 km of the Site.
- E24.14 Fertilizer: synthetic start-up slow release fertilizer with a N-P-K analysis of 12-36-15 ratio at a rate of 4 kg per 100 m² which is 8 pounds per 100 sq ft.

E24.15 Pre-Planting Preparation

- E24.15.1 Obtain approval from Contract Administrator of finish grading, and planting medium installation prior to commencing Work in this section.
- E24.15.2 Ensure plant material is acceptable to the Contract Administrator.
- E24.15.3 Remove damaged roots and branches from plant material with sharp clean equipment treating wounds as necessary to maintain plant health.
- E24.15.4 Apply anti-desiccant to deciduous trees in leaf in accordance with manufacturer's instructions.

E24.16 Plant Material Layout

- E24.16.1 Prepare planting beds. Refer to Planting Medium Specification.
- E24.16.2 For individual trees:
 - (a) Stake out locations of all trees and obtain approval from Contract Administrator prior to excavating tree pits.
 - (b) Excavate tree pits to depths and widths indicated on the Drawings.
 - (c) Remove rocks, roots, debris and toxic material from the tree pit.
- E24.16.3 For shrubs:
 - (a) Prepare planting beds. Refer to Planting Medium Specification.
 - (b) Lay out plants as indicated on the Drawings and ensure spacing as specified.
 - (c) Obtain Contract Administrator approval of plant layouts and make any necessary adjustments on Site.
- E24.16.4 Remove water that has entered the excavated tree pit prior to planting. Notify Contract Administrator if water source is groundwater.

E24.17 Planting

- E24.17.1 For jute burlap rootballs, cut away top one third of wrapping and wire basket without damaging rootball. Do not pull burlap or rope from under rootball.
- E24.17.2 For container stock or rootballs in non-degradable wrapping, remove entire container or wrapping without damaging rootball. Loosen rootball to encourage bonding with planting medium and subgrade.
- E24.17.3 Plant vertically in locations as indicated. Orient plant material to give best appearance in relation to structure, roads and walks.
- E24.17.4 Set plants and trees at elevations indicated on the drawings with no more than 50mm of soil above the root flair. Review with City Forestry representative and Contract Administrator when trees are on site, prior to installation.
- E24.17.5 For trees and shrubs:
 - (a) Backfill soil in 150 mm (6") lifts. Tamp each lift to eliminate air pockets. When two thirds of depth of planting pit has been backfilled, fill remaining space with water. After water has penetrated into soil, backfill to finish grade.
 - (b) Form watering saucer as indicated on the Drawings.
- E24.17.6 Water plant material thoroughly. Report extreme ponding in planters indicative of malfunctioning drains to the Contract Administrator immediately.
- E24.17.7 After soil settlement has occurred, fill with soil to finish grade.
- E24.17.8 Dispose of burlap, wire and container material off Site.

E24.18 Pruning

E24.18.1 Undertake corrective pruning after planting to eliminate torn and broken branches. Do not damage lead branches or remove smaller twigs along main branches. Do not prune to compensate for root loss.

E24.19 Mulching

E24.19.1 Obtain approval of planting placement from Contract Administrator before mulching material is applied.

E24.19.2 Ensure soil settlement has been corrected prior to mulching.

E24.19.3 Spread wood chip mulch as indicated on all planting beds. Spread mulch to minimum thickness of 75mm.

E24.20 Maintenance

E24.21 Maintain plant material from date of planting to the end of the warranty period. Refer to Landscape Maintenance Specification.

E24.22 Measurement and Payment

E24.22.1 Supply and installation of trees and shrubs shall be measured on a unit basis, and shall be paid for at the Contract Unit Price per unit for installed plants, as accepted and measured in the field by the Contract Administrator, for the following Items of Work, which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification.

E24.22.2 Items of Work:

(a) Trees

- (i) Brandon Elm
- (ii) Prairie Horizon Alder

(b) Shrubs

- (i) Dart's Gold Ninebark
- (ii) Miss Kim Lilac

E24.22.3 Wood chip mulch shall be measured on an area basis and paid for at the Contract Unit Price per square metre as "Wood Chip Mulch". The area to be paid for shall be the total square metre installed in accordance with this specification, accepted and measured by the Contract Administrator.

E25. LANDSCAPE MAINTENANCE

E25.1 Description

E25.1.1 Provide all labour, materials, methods, equipment and accessories for the maintenance of trees and shrubs following acceptance of the plant material to start warranty.

E25.1.2 In general, the Work shall include:

- (a) Fertilizing
- (b) Watering
- (c) Weed Control
- (d) Pest and disease Control
- (e) Winter Preparation

E25.1.3 Maintenance shall be performed on an as required basis.

E25.2 Maintenance and Warranty Period

- E25.2.1 Thirty (30) days after the planting installation has been completed, the Contract Administrator shall perform an inspection of the plant material to determine if the plant material is acceptable to start warranty.
- E25.2.2 The maintenance and warranty period shall begin following acceptance of plant material by Contract Administrator and shall be for a period of two (2) years.
- E25.3 Materials and Equipment
- E25.3.1 Materials shall conform to the requirements of related Specification sections.
- E25.3.2 Provide all equipment to properly execute Work. Maintain such equipment in a workable, safe condition while in use during this project.
- E25.3.3 Contract Administrator shall review equipment to be used to execute Work prior to execution.
- E25.4 Method
- E25.4.1 General
- (a) Provide watering service within 24 hours, weeding services within 48 hours of the request by the Contract Administrator. Monitor the Site and advise the Contract Administrator of conditions that might void the Contractor's warranty responsibilities.
 - (b) The Contractor shall maintain a log noting times, dates, equipment used, and quantity of materials used and areas treated for each maintenance application. Forms shall be provided by Contract Administrator. Submit log to Contract Administrator upon request. Contractor shall notify Contract Administrator of the exact time Contractor proposes to commence each application.
 - (c) Schedule operations in accordance with growth, health, weather conditions, and use of Site.
 - (d) Perform each operation continuously and completely within a reasonable time period.
 - (e) Store equipment and materials off Site.
 - (f) Collect and dispose of debris or excess material on the day the maintenance is undertaken.
- E25.4.2 Maintenance of Trees and Shrubs:
- (a) Fertilizing: Apply fertilizer only at frequency, ratio and rates as recommended by manufacturer. Water immediately after fertilizing. Apply fertilizer no later than May 30th of each maintenance year.
 - (b) Watering: Apply water as required to supplement rainfall and to maintain optimum growing conditions. In general, water once a week to achieve rates as indicated. Allow soil to adequately dry between watering to prevent over saturation without creating water stress. Subject to the above-noted requirements, the Contractor must water at least once a week between May 1st and October 15th inclusive. A complete record is to be kept of each series of waterings for all planted trees noting location and date of watering. This record is to be given to the Contract Administrator when requested. Apply 40 litres of water per 25 mm calliper per application using a deep root feeder or low pressure open flow nozzle and hose. The water stream must not gouge the soil and mulch.
 - (c) Weed Control: Inspect and undertake weed control weekly during the first year of maintenance and monthly during the second year. By hand, remove all weeds with their roots from tree pits and tree beds and dispose of off Site. When weeding operation is complete, replace and rake displaced mulch to its original condition.
 - (d) Pests and Diseases: Obtain written approval of Contract Administrator prior to using any pesticide. Control pests and disease through pruning or application of pesticides. Use species specific pesticides where possible. Use only pesticides of low mammalian toxicity. Strictly follow manufacturer's written instructions.

- (e) Pruning: The Contractor shall provide a person with a Manitoba Arborists Certificate for each work crew or Work Site. Prune as required to remove dead, broken or damaged limbs. Prune back to healthy growth while maintaining balanced crown shape. Employ clean sharp tools. Make cuts smooth and flush with outer edge of branch collar near the main stem or branch. Cuts must be smooth and sloping to prevent accumulation of water on cut. Do not leave little stumps ("horns") on trunks or main branches. Prune according to accepted horticultural practices as outline in "The Pruning Manual", Publication No. 1505-1977 by Agriculture Canada.
- (f) Winter Preparation: Ensure adequate moisture in tree root zones prior to freeze-up.

E25.5 Measurement and Payment

E25.5.1 Landscape maintenance shall be paid for on a lump sum basis for the items of work listed below. Price shall be payment in full for supplying all material and performing all operations herein described and all other items incidental to the Work included in this specification and accepted by the Contract Administrator.

Items of Work:

- (i) Landscape Maintenance Year 1
- (ii) Landscape Maintenance Year 2

E26. CAST-IN-PLACE CONCRETE

E26.1 Description

- (a) The Work covered under this Item shall include all concreting operations related to construction of cast-in-place concrete in accordance with this Specification and as shown on the Drawings.
- (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.

E26.2 Materials

E26.2.1 General

- (a) The Contractor shall be responsible for the supply, safe storage, and handling of all materials set forth in this Specification.

E26.2.2 Handling and Storage of Materials

- (a) All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with CSA Standard A23.1-14.

E26.2.3 Testing and Approval

- (a) All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes.
- (b) All materials shall be approved by the Contract Administrator at least seven (7) days before any construction is undertaken. If, in the opinion of the Contract Administrator, such materials in whole or in part, do not conform to the Specifications detailed herein or are found to be defective in manufacture or have become damaged in transit, storage, or handling operations, then such materials shall be rejected by the Contract Administrator and replaced by the Contractor at his own expense.

E26.2.4 Patching Mortar

- (a) The patching mortar shall be made of the same cementitious material and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not more than 1 part cement to 2 parts sand by damp loose volume. White Portland Cement shall be substituted for a part of the grey Portland Cement on exposed concrete in order to produce a colour matching the colour of the surrounding concrete, as determined by a trial patch. The quantity of mixing water shall be no more than necessary for handling and placing.

E26.2.5 Cement

- (a) Cement shall be Type HS or HSb, high-sulphate-resistant hydraulic cement, conforming to the requirements of CSA Standard A23.1-14.

E26.2.6 Concrete

(a) General

- (i) Concrete repair material shall be compatible with the concrete substrate.
- (b) The Contractor shall be responsible for the design and performance of all concrete mixes supplied under this specification. Either ready mix concrete or proprietary repair mortars, where applicable, may be used having the following minimum properties in accordance with CSA A23.1-04:
 - (i) Class of Exposure: S-1
 - (ii) Compressive Strength @ 28 days = 32 MPa
 - (iii) Water / Cementing Materials Ratio = 0.45
 - (iv) Air Content: Category 2 per Table 4 of CSA A23.1-04 (4-7%)
 - (v) Cement – shall be as specified in E14.2.5.
- (c) Mix design for ready mix concrete shall be submitted to Contract Administrator at least two weeks prior to concrete placing operations.
- (d) The workability of each concrete mix shall be consistent with the Contractor's placement operations. Self-compacting concrete may be used for the foundations.
- (e) Any proposed proprietary repair mortar shall be subject to the approval of the Contract Administrator and must meet or exceed the properties of the ready mix concrete.
- (f) The temperature of all types of concrete shall be between 15°C and 25°C at discharge. Temperature requirements for concrete containing silica fume shall be between 10°C and 18°C at discharge unless otherwise approved by the Contract Administrator.
- (g) Concrete materials susceptible to frost damage shall be protected from freezing.

E26.2.7 Aggregate

- (a) The Contractor shall be responsible for testing the fine and coarse aggregates to establish conformance to these specifications, and the results of these tests shall be provided to the Contract Administrator if requested. All aggregates shall comply with CSA A23.1.
- (b) Coarse Aggregate
 - (i) The maximum nominal size of coarse aggregate shall be sized to suit the Contractor's mix design. Gradation shall be in accordance with CSA A23.1, Table 11, Group 1. The coarse aggregate shall satisfy the Standard Requirements specified in CSA A23.1, Table 12, "Concrete Exposed to Freezing and Thawing".
 - (ii) Coarse aggregate shall consist of crushed stone or gravel or a combination thereof, having hard, strong, durable particles free from elongation, dust, shale, earth, vegetable matter or other injurious substances. Coarse aggregate shall be clean and free from alkali, organic or other deleterious matter; and shall have an absorption not exceeding 2.25%.

- (iii) The aggregate retained on the 5 mm sieve shall consist of clean, hard, tough, durable, angular particles with a rough surface texture, and shall be free from organic material, adherent coatings of clay, clay balls, and excess of thin particles or any other extraneous material.
 - (iv) Coarse aggregate when tested for abrasion in accordance with ASTM C131 shall not have a loss greater than 30%.
 - (v) Tests of the coarse aggregate shall not exceed the limits for standard for requirements prescribed in CSA A23.1, Table 12, for concrete exposed to freezing and thawing.
- (c) Fine Aggregate
- (i) Fine aggregate shall meet the grading requirements of CSA A23.1, Table 10, Gradation FA1.
 - (ii) Fine aggregate shall consist of sand, stone, screenings, other inert materials with similar characteristics or a combination thereof, having clean, hard, strong, durable, uncoated grains free from injurious amounts of dust, lumps, shale, alkali, organic matter, loam, or other deleterious substances.
 - (iii) Tests of the fine aggregate shall not exceed the limits for standard requirements prescribed in CSA A23.1, Table 12.

E26.2.8 Cementing Materials

- (a) Cementing materials shall conform to the requirements of CSA A3001.
- (b) Silica Fume
 - (i) Should the Contractor choose to include silica fume in the concrete mix design, it shall not exceed 8% by mass of cement.
- (c) Fly Ash
 - (i) Fly ash shall be Type C1 or Type F and shall not exceed 25% by mass of cement.
- (d) Cementitious materials shall be stored in a suitable weather-tight building that shall protect these materials from dampness and other destructive agents. Cementitious materials that have been stored for a length of time resulting in the hardening or formation of lumps shall not be used in the Work.

E26.2.9 Admixtures

- (a) Air entraining admixtures shall conform to the requirements of ASTM C260.
- (b) Chemical admixtures shall conform to the requirements of ASTM C494 or C1017 for flowing concrete.
- (c) All admixtures shall be compatible with all other constituents. The addition of calcium chloride, accelerators, and air-reducing agents will not be permitted, unless otherwise approved by the Contract Administrator.
- (d) Appropriate low range water reducing and/or superplasticizing admixtures shall be used in concrete containing silica fume. Approved retarders or set controlling admixtures may be used for concrete containing silica fume.
- (e) An aminocarboxylate based migrating corrosion inhibitor admixture shall be used in concrete that will be used as a repair material that will either be in contact with or adjacent to reinforcing steel in existing concrete. Proposed admixtures shall be subject to the approval of the Contract Administrator.

E26.2.10 Water

- (a) Water used for mixing concrete shall be clean and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances. It shall be equal to potable water in physical and chemical properties.

E26.2.11 Concrete Supply

- (a) Concrete shall be proportioned, mixed, and delivered in accordance with the requirements of CSA A23.1, except that the transporting of ready mixed concrete in non-agitating equipment will not be permitted unless prior written approval is received from the Contract Administrator.
- (b) Unless otherwise directed by the Contract Administrator, the discharge of ready mixed concrete shall be completed within 90 minutes after the introduction of the mixing water to the cementing materials and aggregates.
- (c) The Contractor shall maintain all equipment used for handling and transporting the concrete in a clean condition and proper working order.

E26.2.12 Reinforcing Steel

- (a) Reinforcing steel shall be deemed to include all reinforcing bars, tie-bars, and dowels.
- (b) All reinforcing steel shall conform to the requirements of CSA Standard G30.18, Grade 400 W, Billet-Steel Bars for Concrete Reinforcement. All reinforcing steel shall be new deformed billet steel bars. Reinforcing steel supply and installation will be incidental to construction of concrete foundation and no separate payment will be made.

E26.2.13 Miscellaneous Materials

- (a) Miscellaneous materials shall be of the type specified on the Drawings or approved by the Contract Administrator.

E26.3 Construction Methods

E26.3.1 Location and Alignment of Foundations

- (a) Foundation construction shall not commence until the Contractor has obtained clearance from the appropriate Utility Authorities.
- (b) Foundations shall be placed in the positions shown on the Drawings and as directed by the Contract Administrator in the field.
- (c) The deviation of the axis of any finished foundation shall not differ by more than 1 percent from the vertical.

E26.3.2 Buried Utilities

- (a) The Contractor shall exercise extreme caution when constructing the foundations in the vicinity of existing buried utilities and buildings. The Drawings show the approximate locations of existing buried utilities. The Contractor shall be responsible for obtaining the exact location of the buried utilities from the appropriate Utility Authorities prior to installing the foundations.
- (b) The proposed locations of the foundations may be changed by the Contract Administrator if they interfere with the buried utilities.
- (c) The Contractor shall be responsible for all costs that may be incurred for repair/rectification of any damage caused to the existing buried utilities as a result of the Contractor's operations in constructing cast-in-place concrete foundations, as determined by the Contract Administrator.

E26.3.3 Excavation

- (a) The Contractor is responsible for determining the excavation method at each foundation location.
- (b) Excavations for foundations shall be made with equipment designed to remove a core of the diameter shown on the Drawings, or hydro-jet excavation to a depth to bypass and/or expose adjacent utilities.
- (c) Upon reaching the required elevation, the bottom of the excavation shall be cleaned as directed by the Contract Administrator in the field.
- (d) All excavated material from the foundations shall be promptly hauled away from the Site to an approved disposal area as located by the Contractor.

- (e) Upon completion of the cleaning out of the bottom to the satisfaction of the Contract Administrator, the reinforcement and anchor bolts shall be set in place and the concrete poured immediately. Under no circumstances shall a hole be left to stand open after boring has been completed.

E26.3.4 Sleeving

- (a) Timber or steel sleeving shall be used to temporarily line the bore to prevent bulging or caving of the walls and to protect men at work in the bore.
- (b) The sleeving shall be designed by the Contractor and constructed to resist all forces that may tend to distort it.
- (c) The sleeving shall be withdrawn as the concrete is placed in the bore. The sleeving shall extend at least 1 m below the top of the freshly deposited concrete at all times.
- (d) The clearance between the face of the bore hole and the sleeving shall not exceed 75 mm.

E26.3.5 Inspection of Bores

- (a) Concrete shall not be placed in a bore until the bore has been inspected and approved by the Contract Administrator.
- (b) The Contractor shall have available suitable light for the inspection of each bore throughout its entire length.
- (c) All improperly set sleeving, bore, or bottom shall be corrected to the satisfaction of the Contract Administrator.

E26.3.6 Placing Reinforcing Steel

- (a) Reinforcement shall be:
 - (i) placed in accordance with the details shown on the Drawings
 - (ii) rigidly fastened together, and
 - (iii) lowered into the bore intact before concrete is placed.
- (b) Spacers shall be utilized to properly locate the reinforcing steel cage in the bore.

E26.3.7 Forms

- (a) Forms for exposed surfaces that require an "ordinary surface finish" shall be made of good quality plywood, or an approved equivalent, or uniform thickness, with or without a form liner.
- (b) Architectural concrete form liner shall be as specified on the Plans or equivalent as approved by the Contract Administrator.
- (c) Permeable formwork liner shall be Drainoform, Zemdrail II, or equivalent as approved by the Contract Administrator.
- (d) Formwork materials shall conform to CSA Standard CAN/CSA-A23.1, and American Concrete Publication SP:4, "Formwork for Concrete".
- (e) No "stay-in-place" formwork or falsework is permitted.
- (f) Form sheeting plywood to be covered with form liner or to be directly in contact with soil shall be exterior Douglas Fir, concrete form grade, conforming to CSA Standard O121-M1978, a minimum of 20 mm thick.
- (g) Where form liner is not being used, form sheeting shall be Douglas Fir, overlay form liner type conforming to CSA Standard O121-M1978. Approved manufacturers are "Evans" and "C-Z".
- (h) Boards used for formwork shall be fully seasoned and free from defects such as knots, warps, cracks, etc., which may mark the concrete surface.
- (i) No formwork accessories will be allowed to be left in place within 50 mm of the surface following form removal. Items to be left in place, must be made from a

nonrusting material or galvanized steel; and they shall not stain, blemish, or spall the concrete surface for the life of the concrete.

- (j) Forms for exposed concrete surfaces that do not require a form liner may be either new plywood or steel as authorized by the Contract Administrator.
- (k) Studding shall be spruce or pine and shall have such dimensions and spacing that they shall withstand distortion from all the forces to which the forms will be subjected. Minimum dimensions shall be 50 mm x 150 mm.
- (l) Walers shall be spruce or pine, with minimum dimensions of 100 mm x 150 mm.
- (m) All forms are incidental to these Works and must be removed by the Contractor once adequate strength and curing of the concrete has been achieved.
- (n) The forms shall be sufficiently rigid to prevent lateral or vertical distortions from the loading environment to which they shall be subjected. Forms shall be set to the design grades, lines, and dimensions, as shown on the Drawings.
- (o) For piles foundation, the top of the piles shall be formed with tubular forms (Sonotube) to the depth shown on the Drawings.

E26.3.8 Placing Concrete

- (a) Concrete shall not have a free fall of more than 2.0 m and shall be placed so that the aggregates will not separate or segregate. The slump of the concrete shall not exceed 100 mm. The concrete shall be vibrated throughout the entire length.
- (b) Concrete shall be placed to the elevations as shown on the Drawings. The top surface of the pile/bench shall be finished smooth and even with a hand float.
- (c) The shaft shall be free of water prior to placing of concrete. Concrete shall not be placed in or through water unless authorized by the Contract Administrator.

E26.3.9 Protection of Newly Placed Concrete

- (a) Newly laid concrete threatened with damage by rain, snow, fog, or mist shall be protected with a tarpaulin or other approved means.

E26.3.10 Curing Concrete

- (a) The top of the freshly finished concrete foundations shall be covered and kept moist by means of wet polyester blankets immediately following finishing operations and shall be maintained at above 10°C for at least seven (7) consecutive days thereafter.
- (b) After the finishing is completed, the surface shall be promptly covered with a minimum of a single layer of clean, damp polyester blanket.
- (c) Concrete shall be protected from the harmful effects of sunshine, drying winds, surface dripping or running water, vibration, and mechanical shock. Concrete shall be protected from freezing until at least twenty-four hours after the end of the curing period.
- (d) Changes in temperature of the concrete shall be uniform and gradual and shall not exceed 3° in one hour or 20° in twenty-four hours.

E26.3.11 Form Removal

- (a) Forms shall not be removed for a period of at least 24 hours after the concrete has been placed. Removal of forms shall be done in a manner to avoid damage to, or spalling of, the concrete.
- (b) The minimum strength of concrete in place for safe removal of forms shall be 20 MPa.
- (c) Field-cured test specimens, representative of the in-place concrete being stripped, will be tested to verify the concrete strength.

E26.3.12 Patching of Formed Surfaces

- (a) Immediately after forms around top of foundation have been removed, but before any repairing or surface finishing is started, the concrete surface shall be inspected by the

Contract Administrator. Any repair of surface finishing started before this inspection may be rejected and required to be removed.

- (b) All formed concrete surfaces shall have bolts, ties, struts, and all other timber or metal parts not specifically required for construction purposes cut back fifty (50) mm from the surface before patching.
- (c) Minor surface defects caused by honeycomb, air pockets greater than 5 mm in diameter, and voids left by strutting, and tie holes shall be repaired by removing the defective concrete to sound concrete, dampening the area to be patched and then applying patching mortar. A slurry grout consisting of water and cement, shall be wellbrushed onto the area to be patched. When the slurry grout begins to lose the water sheen, the patching mortar shall be applied. It shall be struck-off slightly higher than the surface and left for one hour before final finishing to permit initial shrinkage of the patching mortar and it shall be touched up until it is satisfactory to the Contract Administrator. The patch shall be cured as specified in this Specification, and the final colour shall match the surrounding concrete.

E26.3.13 Cold Weather Concreting

- (a) Protection of concrete shall be considered incidental to its placement. The temperature of the concrete shall be maintained at or above 10°C for a minimum of three (3) days or till the concrete has reached a minimum compressive strength of 20 MPa, by whatever means are necessary. Concrete damaged as a result of inadequate protection against weather conditions shall be removed and replaced by the Contractor at his own expense. Also, concrete allowed to freeze prior to the three (3) days will not be accepted for payment.

E26.3.14 Anti-Graffiti Coating

- (a) Anti-graffiti coating shall be applied to all planter walls and grade beams supporting wooden bench and stage at Public Monument to the 1919 Winnipeg General Strike shown on the drawings or identified by the Contract Administrator.
- (b) The anti-graffiti coating shall be applied according to manufactures specifications.
- (c) Maintain anti-graffiti coating on all vertical concrete surfaces for a period of two (2) years.

E26.3.15 Waterproofing

- (a) Waterproofing membrane shall be applied to all new concrete planter interior walls and existing concrete columns within the planters which will come into contact with planting soil, as identified on the drawings or by the Contract Administrator. The waterproofing membrane shall be roller applied according to manufactures specifications.

E26.3.16 Drilling Anchor Rods

- (a) The anchor rods shall be aligned with a steel template to match the steel plates/angles holes as per Drawings. Extreme care shall be used in this operation to ensure rods are aligned properly and avoid direct contact with internal reinforcing steel.
- (b) Size and embedment of the anchor rods shall be as per Drawings.
- (c) Anchor rods doweling shall be performed using SIKA AnchorFix-3 / SIKA AnchorFix-4 epoxy adhesive or equivalent product. Installation of the anchor rods shall be done in accordance with manufacturer's instructions or recommendation.

E26.3.17 Quality Control

- (a) All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator, including all operations from the selection and production of materials, through to final acceptance of the Work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may

have been previously given. The Contract Administrator reserves the right to reject any materials or Works that are not in accordance with the requirements of this Specification.

- (b) The Contractor shall be responsible for making a thorough inspection of materials to be supplied under this Contract. All material shall be free of surface imperfections and other defects.

E26.4 Measurement and Payment

- E26.4.1 Supply and Installation of reinforced concrete piles will be measured on a unit basis and paid for at the Contract Unit Price for "Light Standard Conc. Pile James Avenue", "Water Level Indicator Conc. Pile Cap & Pile" and "Light Standard Conc. Pile Waterfront AT Path". The quantity to be paid for shall be the total number of units supplied and placed in accordance with this Specification and as measured and accepted by the Contract Administrator.
- E26.4.2 Supply and Installation of Reinforced Concrete Bench will be measured on a lump sum basis and paid for at the Contract Unit Price for "Lily & James Bench Conc." And "Waterfront & James Bench Conc.". The quantity to be paid for each unit of supplied and placed in accordance with this Specification and accepted by the Contract Administrator.

E27. ELECTRICAL WORK

E27.1. General Requirements

- E27.1.1. The specification covering the General Conditions of the Contract, General Specifications, and all associated sections form an integral part of this specification and shall be read in conjunction herewith.
- E27.1.2. Provide all materials, labour, plant and equipment required for a complete and working installation as herein specified and as shown on the drawings.
- E27.1.3. The electrical installation shall be in accordance with the current edition of the Canadian Electrical Code, Provincial and Municipal codes and regulations.
- E27.1.4. Obtain all permits, approvals and pay all related fees required for this installation.
- E27.1.5. All equipment supplied under this Contract shall be new and be C.S.A. approved.
- E27.1.6. Arrange for, and coordinate, rough-in and final inspections with the City of Winnipeg and Contract Administrator.

E27.2. DEFINITIONS

E27.2.1. The following are definitions of terms and expressions used in the specification:

- (a) CONTRACT ADMINISTRATOR means Electrical Engineering Contract Administrator:
- (b) MCW/AGE Consulting Professional Engineers
- (c) INSPECTION AUTHORITY means agent of any authority having jurisdiction over construction standards associated with any part of electrical work on site.
- (d) SUPPLY AUTHORITY means electrical power utility company responsible for delivery of electrical power to project.

- (e) ELECTRICAL CODE means as shown on contract drawings or noted in Contract Documents.
- (f) TYPE TESTED means that each piece of equipment produced by Manufacturer is not fully tested. An original piece with similar arrangement has been fully tested and results of that test are available.
- (g) PROVIDE means to supply, install and leave in working order all materials and necessary wiring, supports, access panels, etc., as necessary for equipment indicated.

E27.3. EXAMINATION

- E27.3.1. Examine the architectural, structural, and landscaping drawings to ensure that the work under this Contract can be satisfactorily carried out. Report any discrepancies to the Contract Administrator prior to submission of bid.
- E27.3.2. Examine the site, local conditions and all existing apparatus if any to be re-used and verify that the condition of this equipment is suitable for its intended use in the new construction.

E27.4. SUPERVISION

- E27.4.1. Supervise the work at all times through a responsible and competent supervisor.
- E27.4.2. Full co-operation shall be shown with other trades to facilitate installations and to avoid delays in carrying out the work.

E27.5. ACCURACY OF DATA

- E27.5.1. Drawings are schematic; exact locations, distances, levels and other dimensions shall be governed by the building as constructed.
- E27.5.2. Outlets or equipment shall be moved to any point within a 10' radius when the Contract Administrator requests relocation before the work has been substantially completed, without additional cost.
- E27.5.3. Branch circuit wiring shall be installed with circuits arranged exactly as shown on the drawings. Conduit and cable runs shall be modified to suit the installation.

E27.6. APPROVAL OF MATERIAL

- E27.6.1. Request for approval of material as equals or alternates to that specified shall be submitted to the Contract Administrator with a stamped self-addressed envelope and performance specifications ten (10) working days prior to the bid submittal. Samples shall be provided on request.
- E27.6.2. Approvals shall be transmitted electronically providing all pertinent information is included for a complete review by the Contract Administrator.

E27.7. SHOP DRAWINGS

- E27.7.1. Submit shop drawings of electrical equipment to the Contract Administrator for review. Fabrication of equipment shall not commence until the Contract Administrator has reviewed shop drawings of such equipment. Two (2) sets shall be submitted with local Inspection Department approval where required.
- E27.7.2. Shop drawings shall be transmitted electronically and in PDF format and Contractor shall include their review confirmation.

E27.7.3. Electronic Submissions (.pdf only).

- (a) Send electronic shop drawings submittals to wpg.shopdrawing@mcw.com only, please do not copy staff members directly.

E27.8. "AS-BUILT" DRAWINGS

E27.8.1. Contractor shall maintain accurate "as-built" drawings on site and shall be present for review at each site review. Submit these record drawings in AutoCAD 2010 or newer format for review at the completion of the project. Note that changes to architectural and structural floor plans must be included. (A minimum of \$1,000.00 per drawing shall be held-back until all drawings are submitted and deemed complete.) The Contract Administrator will not perform final inspections nor certify for occupancy until the "as-built" drawings have been received, reviewed and accepted. After acceptance of "as-built" drawings by the Contract Administrator, provide one (1) complete set on CD-ROM and three (3) sets of prints.

E27.8.2. As-builts shall include circuiting of new and existing equipment to remain. Transfer changes to electronic disc AutoCAD file. Submit disc and hard copy for final review and submission to City.

E27.8.3. Submit a Certificate of Inspection from the local Inspection Authority upon completion of work and include with As-builts.

E27.8.4. The Contract Administrator reserves the right to recommend that a portion of the Contract funds be withheld pending submission of acceptable as-built drawings.

E27.9. TEST

E27.9.1. The electrical installation shall be completely tested demonstrating that the equipment and systems installed perform in the manner intended.

E27.10. GUARANTEE

E27.10.1. The satisfactory operation of all work shall be guaranteed for a period of 12 calendar months after final acceptance of the building.

E27.11. REQUEST FOR CHANGE

E27.11.1. All quotations in response to request for change shall be submitted complete with an itemized cost breakdown of all materials and labour required in the change.

E27.12. REQUEST FOR INFORMATION

E27.12.1. Allow ten (10) working days for MCW/AGE to respond to all requests for information.

E27.12.2. All requests for information shall be reviewed by the Contractor prior to submitting to ensure the information is not on the drawings or specification.

E27.13. GROUNDING

E27.13.1. The entire installation shall be grounded in accordance with the Canadian Electrical Code.

E27.14. WORKMANSHIP

E27.14.1. Install equipment, conduit and cables in a workmanlike manner to present a neat appearance to the satisfaction of the Contract Administrator. Install conduit and cable runs parallel and perpendicular in chases, behind furring or above ceilings. In areas where systems are to be exposed (electrical room only), install neatly and group to present a tidy appearance.

E27.14.2. Install equipment and apparatus requiring maintenance, adjustment or eventual replacement with adequate clearances and accessibility for same.

E27.14.3. Include, in the work, all requirements shown on the shop drawings or manufacturers' installation instructions.

E27.14.4. Replace work unsatisfactory to the Contract Administrator without extra cost.

E27.15. IDENTIFICATION OF EQUIPMENT

E27.15.1. All equipment, including receptacles, shall be identified with engraved lamacoid nameplates either screwed or riveted in place. Where Phenolic plastic coverplates are utilized, the circuit identification to be attached to the outlet box, visible when the coverplate is removed.

E27.15.2. The utilization of Dynamo 6000, P-Touch or equal is acceptable for receptacle.

E27.15.3. Wording for coverplates shall be confirmed by Contract Administrator.

E27.16. CUTTING AND PATCHING

E27.16.1. Arrange and pay for all cutting and patching as required for the electrical installation.

E27.17. WIRING METHODS

E27.17.1. Unless otherwise shown on the drawings, all wires shall be copper, minimum #12 AWG with 90°C x-link insulation. Wiring to be installed in conduit.

E27.17.2. All wiring in finished areas shall be concealed. Conduits shall be run at right angles to the building lines.

E27.17.3. Conduit and wiring shall be grouped where possible and clipped in a neat and workmanlike manner.

E27.17.4. Conduit runs shall be installed and inspected before runs are installed to ensure conformance with Item 5 herein.

E27.17.5. Main underground wiring shall be run in 53mm (2") red PVC conduit.

E27.17.6. Underground wiring shall be suitable for installation in wet areas, such as RWU90 or equivalent.

E27.17.7. U/G wiring shall be as specified on the drawings. Utilize #12AWG RW90 Cu. for connection to luminaires and wiring devices.

E27.18. MOUNTING

E27.18.1. Mounting height of equipment is from finished floor to centerline of equipment unless specified or indicated otherwise.

E27.18.2. If mounting height of equipment is not indicated, verify with Contract Administrator before proceeding with installation.

E27.18.3. Install electrical equipment at the following heights unless indicated or directed otherwise.

(a) .1 As per landscape details and elevations.

E27.19. OUTLET BOXES

E27.19.1. Outlet, junction and switch boxes shall be galvanized pressed steel of size and type to suit each individual application.

E27.20. MISCELLANEOUS APPARATUS AND APPLIANCES

E27.20.1. General

- (a) Provide all required electrical devices, components, conduits, fittings, wiring, disconnects, and miscellaneous equipment to make all connections to equipment.
- (b) Be familiar with the apparatus being supplied and carefully coordinate and cooperate with the supplier/installer to ensure a proper and complete installation.

E27.20.2. Receptacles

- (a) Where equipment has line cord and plug, ensure cap is compatible with receptacle. Provide cord sets to equipment where required.

E27.21. PANELBOARDS

E27.21.1. Circuit breakers shall be bolt on moulded case with thermal breakers rated at 10,000A symmetrical.

E27.21.2. Affix typewritten directory to the inside of the panelboard indicating loads controlled by each circuit.

E27.21.3. Revise the directory in existing panels to suit revised circuiting (typewritten). Place existing directory behind new directory for verification by Contract Administrator.

E27.22. WIRING DEVICES

E27.22.1. Hard wired dimmable LED luminaires shall be provided with 0-10V driver with compatible dimmer control. Approved dimmers are Lutron or Leviton.

E27.22.2. Wet location covers shall be equal to Cooper, Metal WeatherBox While-In-Use protective covers, WIUMV-1 for vertical mounting and WIUMH-1 for horizontal mounting. Plastic covers will not be accepted.

E27.23. LIGHTING

E27.23.1. General

- (a) Supply and install all luminaires complete with lamps. All new luminaires shall be provided with Driver or electronic ballast, Power Smart approved.
- (b) Install luminaires supplied by the City, as indicated.
- (c) Re-lamp all fixtures to be re-used.
- (d) Lighting shall adhere to the Manitoba Hydro Power Smart Program.
- (e) All LED fixtures shall utilize Power Smart approved ballasts or drivers.

E27.23.2. Accessories

- (a) Provide accessories as indicated.
- (b) Drivers used in exterior luminaires shall be rated at -40°C (-4°F) starting.

E27.23.3. Site Lighting

- (a) Provide post top, landscape and roadway luminaires as indicated.
- (b) Coordinate with the Contractor to provide concrete bases for pole-mounted luminaires and bollards as detailed. Anchor bolts to be designed to suit local wind conditions.
- (c) Provide a hand hole, complete with gasketed cover and ground lug on each pole. Poles shall be supplied by Valmont. Coordinate with City of Winnipeg for exact product information.

E27.23.4. LED Lighting

- (a) All LED lighting shall have the following I.E.S. testing to be considered for installation.
- (b) LM 80 08 Approved methods measuring lumen maintenance for SSL light sources.
- (c) LM 79 08 Approved methods for electrical photo and metric measurements of solid state lighting products.
- (d) All LED lamps and drivers shall have minimum 5 year warranty with minimal hours of operation of 50,000 hours or equal to luminaires hours.
- (e) Heat dissipation and maximum heat build up shall be submitted for review.

E27.23.5. Installation (Luminaires)

- (a) Install luminaires at locations indicated, complete with all wiring, connections, fittings, hangers, aligners, box covers and accessories, as required.
- (b) Install luminaires and lens materials in architectural details, as indicated.
- (c) Install luminaires parallel with building lines. Wall-mounted luminaires shall be installed plumb.
- (d) Review all ceiling type, construction details and mounting arrangements before placing luminaire orders and ensure that all mounting assemblies, frames, rings and similar features are included for and match the required installation.
- (e) All luminaires and assemblies shall be properly secured and supported. Support luminaires independent of the ceiling construction, complete with all fasteners, framing and hangers, as may be required. Do not secure luminaires to mechanical ductwork or other vibration producing apparatus, unless specifically detailed on the drawings.
- (f) Where a luminaire is suspended from the ceiling using a self-aligning box cover, an additional ground wire from the outlet box to the luminaire shall be provided.
- (g) Coordinate the installation of luminaires with the work of other trades, ensuring that the necessary depths and mounting spaces are provided. Luminaires which cannot be installed due to a conflict with structural members, pipes or ductwork shall be relocated to a more suitable location, as directed by the Contract Administrator and/or Contract Administrator.
- (h) Install post top, landscape and roadway luminaires plumb.

E27.23.6. Wiring

- (a) Connect luminaires to lighting circuits as indicated.

E27.23.7.Lamps

- (a) Adjust lamp position in adjustable lamp holder-type luminaires to produce the proper beam distribution for the specified lamp.

E27.23.8.Tests

- (a) Perform tests in accordance with Section 26 00 10.
- (b) Check luminaires and replace defective lamps, ballasts, lenses and accessories.

E27.23.9.Cleaning

- (a) Prior to take-over of the project, clean the lenses and reflectors of all luminaires with a damp cloth to remove dust, smudges and fingerprints.