



**THE CITY OF WINNIPEG**

# **BID OPPORTUNITY**

**BID OPPORTUNITY NO. 345-2016**

**2016 NORTHEAST EXCHANGE DISTRICT STREET RENEWALS**

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## **PART B - BIDDING PROCEDURES**

### **B1. CONTRACT TITLE**

B1.1 2016 Northeast Exchange District Street Renewals

### **B2. SUBMISSION DEADLINE**

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, June 9, 2016.

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

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

### **B3. ENQUIRIES**

B3.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.

B3.2 If the Bidder finds errors, discrepancies or omissions in the Bid Opportunity, or is unsure of the meaning or intent of any provision therein, the Bidder shall 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.

B3.3 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.

B3.4 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.

B3.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B3 unless that response or interpretation is provided by the Contract Administrator in writing.

### **B4. CONFIDENTIALITY**

B4.1 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.

B4.2 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.

### **B5. ADDENDA**

B5.1 The Contract Administrator may, at any time prior to the Submission deadline, issue addenda correcting errors, discrepancies or omissions in the Bid Opportunity, or clarifying the meaning or intent of any provision therein.

- B5.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.
- B5.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/bidopp.asp>
- B5.2.2 The Bidder is responsible for ensuring that he/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.
- B5.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

## **B6. SUBSTITUTES**

- B6.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.
- B6.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B6.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.
- B6.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;
  - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
  - (c) identify any anticipated cost or time savings that may be associated with the substitute;
  - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;
  - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.
- B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his/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.
- B6.6 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.
- B6.6.1 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.
- B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

- B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/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 B16.
- B6.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

**B7. BID COMPONENTS**

- B7.1 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;
- B7.2 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.
- B7.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.
- B7.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.
- B7.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid.
- B7.4.2 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.
- B7.5 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.
- B7.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B16.1(a).
- B7.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B7.8 Bids shall be submitted to:
- The City of Winnipeg  
Corporate Finance Department  
Materials Management Division  
185 King Street, Main Floor  
Winnipeg MB R3B 1J1

**B8. BID**

- B8.1 The Bidder shall complete Form A: Bid, making all required entries.

B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:

- (a) if the Bidder is a sole proprietor carrying on business in his/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.

B8.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.

B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.

B8.4 Paragraph 12 of Form A: Bid shall be signed in accordance with the following requirements:

- (a) if the Bidder is a sole proprietor carrying on business in his/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.

B8.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.

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

## **B9. PRICES**

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

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

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

B9.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

## **B10. DISCLOSURE**

B10.1 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.

B10.2 The Persons are:

- (a) N/A

(b) N/A

**B11. QUALIFICATION**

B11.1 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.

B11.2 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>

B11.3 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);

B11.4 Further to B11.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

- (a) a 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
- (b) 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
- (c) 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/>).

B11.5 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.

B11.6 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.



## **B12. BID SECURITY**

B12.1 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.

B12.1.1 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.

B12.1.2 All signatures on bid securities shall be original.

B12.1.3 The Bidder shall sign the Bid Bond.

B12.1.4 The Surety shall sign and affix its corporate seal on the Bid Bond and the Agreement to Bond.

B12.2 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.

B12.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B12.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.

B12.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.

B12.3 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.

## **B13. OPENING OF BIDS AND RELEASE OF INFORMATION**

B13.1 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.

B13.1.1 Bidders or their representatives may attend.

B13.1.2 Bids determined by the Manager of Materials, or his/her designate, to not include the bid security specified in B12 will not be read out.

B13.2 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/>

B13.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page

at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>

- B13.4 The Bidder is advised that any information contained in any Bid may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

#### **B14. IRREVOCABLE BID**

- B14.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.
- B14.2 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.

#### **B15. WITHDRAWAL OF BIDS**

- B15.1 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.
- B15.1.1 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.
- B15.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid, and only such person, has authority to give notice of withdrawal.
- B15.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:
- (a) retain the Bid until after the Submission Deadline has elapsed;
  - (b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid; and
  - (c) if the notice has been given by any one of the persons specified in B15.1.3(b), declare the Bid withdrawn.
- B15.2 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 B14.2 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.

#### **B16. EVALUATION OF BIDS**

- B16.1 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 B11 (pass/fail);
  - (c) Total Bid Price;
  - (d) economic analysis of any approved alternative pursuant to B6.
- B16.2 Further to B16.1(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.

- B16.3 Further to B16.1(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.
- B16.4 Further to B16.1(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 adjusted, if necessary, as follows:
- (a) if the lowest evaluated responsive Bid submitted by a responsible and qualified Bidder is within the budgetary provision for the Work, no adjustment will be made to the Total Bid Price; or
  - (b) if the lowest evaluated responsive Bid submitted by a responsible and qualified Bidder exceeds the budgetary provision for the Work, the Total Bid Prices of all responsive Bids submitted by responsible and qualified Bidders will be adjusted by deducting items listed in Section I: Deletable Items, items I.1 through I.5 in its entirety on Form B in order to achieve a Total Bid Price within the budgetary provision.
- B16.4.1 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.

## **B17. AWARD OF CONTRACT**

- B17.1 The City will give notice of the award of the Contract or will give notice that no award will be made.
- B17.2 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.
- B17.2.1 Without limiting the generality of B17.2, 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.
- B17.3 The Work of this Contract is contingent upon Council approval of sufficient funding during the next Council meeting June 15, 2016. If the project budget approved by Council does not include sufficient funding for the Work, the City will have no obligation to award a Contract.
- B17.4 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 B16.
- B17.4.1 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](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) Lily Street from Market Avenue to Disraeli Freeway
  - (ii) John Hirsch Place from Rorie Street to Bannatyne Avenue
- (b) Streetscaping
  - (i) Lily Street from Market Avenue to Disraeli Freeway
  - (ii) John Hirsch Place from Rorie Street to Bannatyne Avenue
- (c) Electrical
  - (i) Lily Street from Market Avenue to Disraeli Freeway
  - (ii) John Hirsch Place from Rorie Street to Bannatyne Avenue
- (d) Strata Cells
  - (i) John Hirsch Place from Rorie Street to Bannatyne Avenue

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

- (a) Pavement Reconstruction
  - (i) Asphalt pavement removal;
  - (ii) Sidewalk removal;
  - (iii) Removal of existing paving stones;
  - (iv) Stockpiling existing paving stones;
  - (v) Excavation;
  - (vi) Installation of subdrains;
  - (vii) Placement of utility conduits;
  - (viii) Compaction of existing sub-grade;
  - (ix) Installation of manholes, catch basins and connection pipe;
  - (x) Installation of new sewer lines;
  - (xi) Placement of separation geotextile fabric;
  - (xii) Placement of sub-base and base course materials;
  - (xiii) Construction of 200 mm concrete pavement (reinforced);
  - (xiv) Adjustment of existing manholes and catch basins;
  - (xv) Adjustment of valve boxes;
  - (xvi) Supply and installation of valve box extensions;
  - (xvii) Asphaltic Concrete Pavement Type IA (50mm)
  - (xviii) Asphaltic Concrete Pavement Type III (75mm)
  - (xix) Concrete curb renewal;
  - (xx) Construction of 150 mm barrier curb;
  - (xxi) Construction of 150 mm barrier curb and gutter using slip form paving methods;
  - (xxii) Construction of 150 mm modified barrier curb and gutter using slip form paving methods;

- (xxiii) Installation of 100mm sidewalk
  - (xxiv) Installation of 100mm sidewalk complete with blockouts;
  - (xxv) Installation of 200mm reinforced sidewalk complete with blockouts;
  - (xxvi) Installation of detectible warning tiles;
  - (xxvii) Installation of paving stones; and
  - (xxviii) Joint Sealing
- (b) Streetscaping
- (i) Excavations and removals;
  - (ii) Installation of cast in stairs and landings;
  - (iii) Installation of cast in place concrete header;
  - (iv) Tree wells and covers;
  - (v) Site furniture;
  - (vi) Electrical work; and
  - (vii) Plant material
- (c) Electrical
- (i) Luminare installation;
  - (ii) Installation of weatherproof panelboard;
  - (iii) Installation of pedestrian and feature lighting; and
  - (iv) Installation of speciality pole mounted and flood lighting;
- (d) Strata Cells
- (i) Excavation;
  - (ii) Installation of sub-drains;
  - (iii) Placement of drainage course;
  - (iv) Assembly of Strata Cells;
  - (v) Installation of perforated lateral pipe
  - (vi) Placement of geogrid; and
  - (vii) Placement of bio-retention soil into Strata Cell matrix;

### **D3. CONTRACT ADMINISTRATOR**

D3.1 The Contract Administrator is MMM Group Limited a WSP Company, represented by:

Vilko Maroti, CET, P.Eng.  
Manager (Highways, Roads, and Urban Centres)  
Telephone No. 204 943-3178  
Email MarotiV@MMM.ca

D3.2 At the pre-construction meeting, Vilko Maroti, CET, 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 B7.8

### **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 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the facsimile number identified in D3.1.
- D6.3 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

- D6.4 Bids Submissions must be submitted to the address in B7.8.**

#### **D7. FURNISHING OF DOCUMENTS**

- D7.1 Upon award of the Contract, the Contractor will be provided with five (5) complete sets of the Bid Opportunity. If the Contractor requires additional sets of the Bid Opportunity, they will be supplied to him/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/matmgt/safety/default.stm>

#### **D10. INSURANCE**

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

- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability, 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 B12.1(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
  - (c) a daily manpower schedule for the Work
- all acceptable to the Contract Administrator.

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

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.

D13.5 Further to D13.2(c), the daily manpower schedule shall list the daily number of individuals on the Site for each trade.

## **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 commence the Work on the Site within seven (7) Working Days of receipt of the letter of intent.

D14.4 The City intends to award this Contract by June 30<sup>th</sup> 2016.

#### **D15. RESTRICTED WORK HOURS**

D15.1 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.

#### **D16. WORK BY OTHERS**

D16.1 Work by others on or near the Site will include but not necessarily be limited to:

- (a) Manitoba Hydro – Manhole Adjustments. The Contractor is expected to cooperate with Manitoba Hydro to facilitate construction;
- (b) Manitoba Hydro – Supply and inspection of new street lighting hardware (to be installed by the Contractor) and the de-energizing and energizing of the new street light plant;
- (c) Manitoba Hydro Gas Division – Gas services will be relocated if required on Lily Street. The Contractor is expected to cooperate with Manitoba Hydro;
- (d) Shaw Cable. The Contractor is expected to cooperate with Shaw Cable to facilitate construction;
- (e) MTS. The Contractor is expected to cooperate with MTS to facilitate construction;
- (f) Winnipeg Transit. The Contractor is expected to cooperate with Winnipeg Transit to facilitate construction;
- (g) James Avenue Watermain Renewal by Others (Bid No. 141-2016). The Contractor is expected to cooperate with the Contractor of the watermain renewal to facilitate construction.
- (h) Sport Manitoba / Bockstael Construction. The Contractor is expected to cooperate with the Contractor of the Sport Manitoba construction.
- (i) Manitoba Theatre Company (MTC). The Contractor is expected to cooperate with MTC with respect to construction noise during events.
- (j) Centennial Concert Hall / Manitoba Museum. The Contractor is expected to cooperate with the Centennial Concert Hall and Manitoba Museum to facilitate construction.
- (k) Union Sound Hall. The Contractor is expected to cooperate with Union Sound Hall regarding events scheduled for June 24<sup>th</sup>, 2016 and July 1<sup>st</sup>, 2016.

#### **D17. SEQUENCE OF WORK**

D17.1 Further to C6.1, the sequence of work shall be as follows:

D17.1.1 The Work shall be divided into 3 Phases . Each Phase shall be subdivided into stages. Stages are further subdivided into major items of work.

- D17.1.2      **Phase I** – John Hirsch Place Reconstruction
- (i) Pavement Reconstruction described in D2.5 (a);
  - (ii) Streetscaping described in D2.5 (b);
  - (iii) Electrical described in D2.5 (c);
  - (iv) Strata Cell Construction described in D2.5 (d);
- D17.1.3      **Phase II** – Lily Street Reconstruction (Northbound)
- (a) **Stage I** – Lily Street from Market Avenue to Pacific Avenue
    - (i) Pavement Reconstruction described in D2.5 (a);
    - (ii) Streetscaping described in D2.5 (b);
    - (iii) Electrical described in D2.5 (c);
    - (iv) Street Light Installation described in D2.5 (e);
  - (b) **Stage II** – Lily Street from Pacific Avenue to Disraeli Freeway
    - (i) Pavement Reconstruction described in D2.5 (a);
    - (ii) Streetscaping described in D2.5 (b);
    - (iii) Electrical described in D2.5 (c);
    - (iv) Street Light Installation described in D2.5 (e);
- D17.1.4      **Phase III** – Lily Street Reconstruction (Southbound)
- (i) Pavement Reconstruction described in D2.5 (a);
  - (ii) Streetscaping described in D2.5 (b);
  - (iii) Electrical described in D2.5 (c);
  - (iv) Street Light Installation described in D2.5 (e);
- D17.1.5      Immediately following the completion of the asphaltic concrete works, 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.
- D17.1.6      Placing the topsoil and finished grading of all boulevard and median areas shall be completed prior to commencing construction of the asphaltic concrete overlay, including the scratch course.
- D17.1.7      The Contractor shall delay placing the final lift of asphalt on Lily Street, so that the final lift of all lanes is placed in one operation for the Northbound and Southbound lanes.
- D17.1.8      Construction activity on Lily Street from Pacific Avenue to Disraeli Freeway shall not commence until construction of a watermain renewal on James Avenue, by others, is completed. This Work is expected to be completed by July 31, 2016.
- D17.1.9      Immediately following the completion of the asphaltic concrete works of each Stage, 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.

## **D18.      SUBSTANTIAL PERFORMANCE**

- D18.1      The Contractor shall achieve Substantial Performance by October 21<sup>st</sup>, 2016.
- D18.2      When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.
- D18.3      The date on which the Work has been certified by the Contract Administrator as being substantially performed to the requirements of the Contract through the issue of a certificate of Substantial Performance is the date on which Substantial Performance has been achieved.

D18.4 Determination of Substantial Performance shall be exclusive of special orders and landscaping works including the planting of trees, plants, and shrubs. All installations of special order materials and landscaping work shall be completed during the following spring.

#### **D19. TOTAL PERFORMANCE**

D19.1 The Contractor shall achieve Total Performance by June 16<sup>th</sup>, 2017.

D19.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.

D19.3 The date on which the Work has been certified by the Contract Administrator as being totally performed to the requirements of the Contract through the issue of a certificate of Total Performance is the date on which Total Performance has been achieved.

#### **D20. LIQUIDATED DAMAGES**

D20.1 If the Contractor fails to achieve 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);

D20.2 The amounts specified for liquidated damages in D20.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve Substantial Performance or Total Performance by the days fixed herein for same.

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

#### **D21. SCHEDULED MAINTENANCE**

D21.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

- (a) Reflective Crack Maintenance as specified in CW 3250 – Joint and Crack Maintenance of the City of Winnipeg Standard Construction Specifications;
- (b) Strata Cell Maintenance as specified in E13
- (c) Landscape Maintenance as specified in E27;

D21.2 Determination of Substantial Performance and Total Performance shall be exclusive of scheduled maintenance identified herein. All scheduled maintenance shall be completed prior to the expiration of the warranty period. Where the scheduled maintenance cannot be completed during the warranty period, the warranty period shall be extended for such period of time as it takes the Contractor to complete the scheduled maintenance.

#### **CONTROL OF WORK**

##### **D22. JOB MEETINGS**

D22.1 Regular weekly job meetings will be held at the Site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, one representative of the City and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City and the Contractor

respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.

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

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

D23.1 Further to C6.24, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

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

D24.1 Further to B11.4, 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 B11.4.

**MEASUREMENT AND PAYMENT**

**D25. PAYMENT**

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

**WARRANTY**

**D26. WARRANTY**

D26.1 Notwithstanding C13.2, the warranty period shall begin on the date of Substantial 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. 345-2016

2016 Northeast Exchange District Street Renewals

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. 345-2016  
2016 Northeast Exchange District Street Renewals

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)

2016 Northeast Exchange District Street Renewals

<u>Portion of the Work</u>	<u>Name</u>	<u>Address</u>
<b>Supply of Materials:</b>		
Concrete		
Asphalt		
Base Course & Sub-Base		
Geotextile Materials		
Underground Materials (CB, CP, Frames and Covers)		
Trees/Shrubs/Ground Cover		
Paving Stone		
Streetscaping Furniture		
Strata Cells		
Metal Fabrication		
Top Soil/Sod/Seed		
Pedestrian Lighting		
<b>Installation/Placement:</b>		
Concrete		
Asphalt		
Base Course & Sub-Base		
Geotextile Materials		
Underground Materials (CB, CP, Frames and Covers)		
Trees/Shrubs/Ground Cover		
Paving Stone		
Streetscaping Furniture		
Strata Cells		
Metal Fabrication		
Top Soil/Sod/Seed		
Pedestrian Lighting		

## 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>
5515038-C00	COVER	A1
5515038-C01	LILY STREET STA. 1+00 TO STA. 2+30	A1
5515038-C02	LILY STREET STA. 2+30 TO STA. 3+65	A1
5515038-C03	LILY STREET STA. 3+65 TO STA. 5+00	A1
5515038-C04	JOHN HIRSCH PLACE STA. 1+00 TO STA. 2+50	A1
5515038-C05	JOHN HIRSCH PLACE STRATA CELL PLAN AND DETAILS	A1
5515038-C06	JOHN HIRSCH PLACE STRATA CELL DETAILS	A1
L1.1	LILY ST. FROM MARKET TO RUPERT MATERIALS PLAN	A1
L1.2	LILY ST. FROM RUPERT TO ALEXANDER MATERIALS PLAN	A1
L1.3	LILY ST. FROM ALEXANDER TO DISRAELI MATERIALS PLAN	A1
L1.4	JOHN HIRSCH MATERIALS PLAN	A1
L2.1	LILY ST. FROM MARKET TO RUPERT PLANTING PLAN	A1
L2.2	LILY ST. FROM RUPERT TO ALEXANDER PLANTING PLAN	A1
L2.3	LILY ST. FROM ALEXANDER TO DISRAELI PLANTING PLAN	A1
L2.4	JOHN HIRSCH PLANTING PLAN	A1
L3.1	LILY ST. FROM MARKET TO RUPERT WEST SIDE SECTIONS	A1
L3.2	LILY ST. FROM MARKET TO RUPERT WEST SIDE SECTIONS	A1
L3.3	LILY ST. FROM RUPERT TO ALEXANDER WEST SIDE SECTIONS	A1
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## **E2. PROTECTION OF EXISTING TREES**

- E2.1 Construction work will occur in close proximity to existing trees that are to remain. The Contractor shall take the following precautionary steps to prevent damage from construction activities to existing trees within the limits of the construction area. If you require further information on these specifications, please contact the City of Winnipeg Forestry Branch at 204-986-2004:
- (a) For trees greater than 100mm in diameter, attach 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.
  - (b) For trees less than 100mm in diameter, install snow fencing around the tree to a 2.0 meter radius complete with installation hardware. The 2.0 meter radius of the snow fencing may be reduced to suit the tree being protected as approved by the Contract Administrator.
  - (c) Operation equipment within the dripline of the trees shall be kept to the minimum required to perform the work. Equipment shall not be parked, repaired, refueled; construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines of the 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.
  - (d) Repair replace and maintain tree protection material during construction of the Work.
  - (e) Remove snow fencing and strapping material without harming trees as soon as the construction and restoration work is completed.
- E2.2 Existing and new trees on John Hirsch Place form part of the stormwater management system and their continued health is a requirement for the success of this system. The Contractor shall retain a certified arborist for all pruning work, and adhere strictly to the tree protection requirements stipulated in *City of Winnipeg Tree Planting Details and Specifications Downtown Area and Regional Streets*.
- E2.3 Obtain approval from the Contract Administrator to excavate within 2.0 meters of a tree.
- E2.4 Root Protection, Cutting and Care
- (a) 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.
  - (b) Cut roots cleanly with sharp, sterilized hand tools to promote quick wound closure and regeneration.
  - (c) Minimize damage by avoiding excavation during hot, dry weather.
  - (d) Keep protected plants well watered before and after digging.

- (e) 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.
- E2.5 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.
- E2.6 American elm trees are not to be pruned between April 1<sup>st</sup> and August 1<sup>st</sup> and Siberian elm trees between April 1<sup>st</sup> and July 1<sup>st</sup> of any year under provisions of The Dutch Elm Disease Act.
- E2.7 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.
- E2.8 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. The contractor will be solely financially responsible for any removal and replacement costs associated with this work.
- E2.9 Measurement and Payment
  - E2.9.1 Tree protection, root pruning, and temporary root cover material will be paid for on a unit each basis. Price shall be payment in full for supplying materials and for performing the Work.

### **E3. TRAFFIC CONTROL**

- E3.1 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.
- E3.2 Notwithstanding E3.1, 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.

E3.2.1 An exception to E3.2 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.

E3.2.2 Further to E3.2, 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.

#### **E4. TRAFFIC MANAGEMENT**

E4.1 Further to clause 3.7 of CW 1130:

E4.1.1 The Contractor shall schedule construction activities to meet the following:

- (a) Southbound Lily Street, at least one lane for local access traffic and bus traffic shall be maintained along this street during construction.
- (b) On Lily Street, intersecting street and private approach access shall be maintained at all times.
- (c) John Hirsch Place will be closed to all traffic. The Contractor shall sign the street "Road Closed" in accordance with the Manual of Temporary Traffic Control.
- (d) On John Hirsch Place, the parking garage and private approach accesses shall be maintained at all times.

E4.1.2 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 24 hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access.

E4.1.3 Pedestrian and ambulance/emergency vehicle access must be maintained at all times.

#### **E5. REFUSE AND RECYCLING COLLECTION**

E5.1 While access to refuse and/or recycling collection vehicles is restricted, on collection day(s) the Contractor shall move all of the affected property owners refuse and/or recycling materials to a nearby common area, prior to an established time, in accordance with E5.2 to permit the normal collection vehicles to collect the materials. Immediately following recycling collection the Contractor shall return recycling receptacles to the addresses marked on the receptacles.

E5.2 Collection Schedule:

##### **Lily Street**

*Collection Day(s):* **Thursdays**

*Zone:* **1A**

*Common Collection Area:* **Several locations along Lily Street**

**John Hirsch Place**

<i>Collection Day(s):</i>	<b>Thursdays</b>
<i>Zone:</i>	<b>1A</b>
<i>Common Collection Area:</i>	<b>Garbage bin behind Union Sound Hall</b>

E5.3 No measurement or payment will be made for the work associated with this specification.

**E6. PEDESTRIAN SAFETY**

E6.1 During the project, on Lily Street and John Hirsch Place, a temporary snow fence shall be installed where open excavation for underground and roadworks 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 Construction of accessible walkway corridors will be fenced off and/or barricaded to prevent access from pedestrian traffic as directed by the contract administrator. No measurement for payment shall be made for this work.

E6.3 Continuous sidewalk access on Lily Street and John Hirsch Place must be maintained on one side of the street and at intersections 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. INFRASTRUCTURE SIGNS**

E9.1 The Contractor shall obtain infrastructure signs from the Traffic Services Sign Shop at 421 Osborne Street. The Contractor shall mount each sign securely to a rigid backing material approved by the Contract Administrator. The Contractor shall fasten each sign to a suitable support and erect and maintain one sign at each street as directed by the Contract Administrator. When the Contract Administrator considers the Work on the street complete, the Contractor shall remove and dispose of the signs and supports. No measurement for payment will be made for performing all operations herein described and all other items incidental to the work described

**E10. SAW CUTTING PAVEMENT**

E10.1 At the limits of excavation as directed by the Contract Administrator, the Contractor shall saw cut the existing pavement to produce a clean straight edge when excavated. The edge must be clean and straight prior to pouring new concrete pavement.

E10.2 Measurement and Payment

E10.2.1 Sawcutting pavement and disposal of surplus material will be considered incidental to Clause 4.1 of CW 3110 "Pavement Removal." No measurement and payment will be made within this section.

## **E11. REMOVAL AND STOCKPILE OF EXISTING GRANITE BOLLARDS FOR REINSTALLATION**

### **E11.1 Description**

E11.1.1 This Specification shall cover all operations related to the removal and stockpiling of existing granite bollards for reinstallation.

### **E11.2 Materials**

#### **E11.2.1 Stockpiled Granite Bollards**

- (a) Existing Granite Bollard: 360 x 360 x 762mm.
- (b) Existing Steel Plate: 510 x 510 x 12mm stainless steel plate, matte finish.
- (c) New Welded Wire Mesh: 152 x 152 - MW9.1 x MW91.1, one (1) layer, available from Dupont Wire Ltd. (1-866-312-8540), or approved equal.
- (d) New Anchor Bolts: 12 x 100mm stainless steel anchor bolts.

### **E11.3 Construction Methods**

E11.3.1 The Contractor shall remove and stockpile all granite bollards including base plates as shown on the Drawings or as directed by the Contract Administrator. The Contractor shall fill all holes from bollards and signs and replace with clean granular base course and compact to 98% SPD. The Contractor shall install asphalt as per CW3410 in all areas where landscaped island are removed as shown on the Drawings or as directed by the Contract Administrator.

E11.3.2 Review condition of steel plates with Contract Administrator. Steel plates that are damaged are to be repaired to ensure plate sits flat on top of concrete sidewalk. If steel plates are deemed unsalvageable due to excessive damage, Contractor to supply new steel plate and relevant components to match existing, at no additional cost to the City.

### **E11.4 Method of Measurement and Basis of Payment**

E11.5 Removal and stockpile of existing granite bollards shall be measured on a unit basis and will be paid for at the Contract Price per unit for the "Removal and Stockpile of Granite Bollards for Reinstallation" measured as specified herein, 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.

## **E12. PLACEMENT OF UTILITY CONDUITS**

### **E12.1 Description**

E12.1.1 This specification will cover the placement of utility supplied conduits as identified on the drawings.

### **E12.2 Materials**

E12.2.1 Conduit shall be supplied by the identified utilities.

E12.2.2 The Contractor shall contact the utility companies to obtain the conduits.

### **E12.3 Construction Methods**

E12.3.1 Construct all work as shown on the Drawings or as directed by the Contract Administrator.



- E12.3.2 Minor deviations from Standard Details may be required in the field where unknown underground obstructions are encountered. The Contractor shall not deviate from the Drawings or standard details without prior approval by the Contract Administrator.
- E12.4 Backfill General
- E12.4.1 Place sand backfill as the bottom layer of all trenched excavations. Sand is placed to a depth of 200 millimetres over the full width of the area of excavation. Install plastic conduit so it is vertically and horizontally centred in the sand backfill.
- E12.4.2 Place the sand bottom layer of backfill so that the in situ ground in the excavated area is covered and the conduit is protected from ridges, bumps or other features that may cause damage to the conduit.
- E12.4.3 Place conduit in accordance with Section 3.11 of this specification.
- E12.4.4 Place sand backfill on top of conduit in such a manner that the conduit is not bent or kinked.
- E12.4.5 Tamp sand firmly from the sides of the conduit, down and under the conduit.
- E12.5 Installation of Conduit
- E12.5.1 Install conduit of either a single length of 38 mm or 52 mm plastic conduit, or use multiple lengths of 38 mm or 52 mm plastic conduit placed side by side in accordance with the Drawings.
- E12.5.2 Install conduit at a preferred depth of one metre (1 m) below street level. The preferred one metre (1m) depth may be increased for the purpose of avoiding underground obstructions or decreased to minimum of 900mm as directed by the Contract Administrator.
- E12.5.3 Install conduits so that in no cases shall the conduit be formed into a bend radius of less than 500 millimetres.
- E12.5.4 Install conduit either by directional boring or open trenching, subject to the following conditions:
- (a) Open cut to facilitate pushing operations only at termination locations and cutovers, where required by outside utilities, or as directed by the Contract Administrator.
  - (b) Install conduit along landscaped boulevards by directional boring, unless otherwise directed by the Contract Administrator.
- E12.5.5 Open trench as directed by the Contract Administrator. The width of the trench shall be 200mm maximum, or in accordance with the drawings.
- E12.5.6 Terminate all conduit installations in accordance with the Drawings. Types of terminations are as follows:
- (a) Joining onto an existing conduit.
  - (b) Entry into a base or service box to be constructed under this Specification.
  - (c) Above ground level affixed to a wood pole or structure.
  - (d) Below ground level for a stub.
  - (e) Through a drill hole into pavement to be used as a lead-in conduit for vehicle detector loops.
- E12.5.7 When the conduit is terminated above ground level on a wood pole or structure the conduit shall have a true vertical position below the termination point starting at ground level immediately adjacent to the designated pole or structure. The conduit projection left above ground shall have a length of at least 450 mm.
- E12.5.8 Immediately following installation, fit plastic conduit plugs snugly into the open ends of conduit terminated above and below ground, except for lead-in conduit for vehicle detector loops as noted in SD-332. Install plastic conduit plugs prior to placing any concrete for

signal bases or service boxes, and before backfilling over conduit stubs. Leave plastic conduit plugs in place except for temporarily removal required for the installation of twine.

## E12.6 Measurement and Payment

### E12.6.1 Installation of Conduit

- (a) Installation of Conduit shall be measured on a length basis and paid for at the Contract Unit price per metre for "Items of Work". The length to be paid for shall be the total number of metres of trench for conduit placement, including conduit stubs installed in accordance with this specification, accepted and measured by the Contract Administrator.

### E12.6.2 Items of Work:

- (i) Placement of Utility Conduits

E12.6.3 The length of conduit installed shall be measured horizontally between the centre points of the specified terminal points of the conduit. Installed conduit shall be measured along the path of installation.

E12.6.4 No measurement or payment shall be made for Joining of Conduit.

E12.6.5 No measurement or payment shall be made for the removal of blockages or water from the conduit unless the Contract Administrator determines that the cause of the blockage or water was not caused by the Contractor.

E12.6.6 No measurement or payment shall be made for Manitoba Hydro safety watches or MTS/Shaw supervision.

E12.6.7 No measurement or payment shall be made for the repair of conduit that is damaged by the Contractor and cannot accept wiring. This includes work and materials to remove pavement, excavate, and restoration of the cut.

## E13. STRATA CELL SYSTEM

### E13.1 Description

E13.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of Strata Cells and related excavation, granular drainage material and base course, drainage pipe, lateral pipe system, vertical pipe system, ReRoot Barrier, geotextile, geogrid and bio-retention soil mix.

### E13.2 Materials

E13.2.1 Strata Cell 60 series. Available from CityGreen ph. 780-462-5064 or approved equal.

E13.2.2 Granular drainage material in accordance with specification CW3120 - Installation of Sub Drains.

E13.2.3 Drainage pipe: 150mm dia. perforated HDPE pipe and non-perforated solid HDPE pipe.

E13.2.4 Lateral pipe: 125mm dia. perforated HDPE pipe.

E13.2.5 Vertical pipe: 150mm dia. non-perforated solid HDPE pipe.

E13.2.6 Strata Cell catch basin lead: 125mm or 150mm dia. non-perforated solid HDPE pipe.

E13.2.7 ReRoot linear root barrier: 100um thickness and 100% high density Polyethylene. This resin meets FDA regulation 177.1520 for food packaging.

E13.2.8 Geogrid: biaxial geogrid.

E13.2.9 Geotextile per CW3120.

E13.2.10 Bioretention planting soil: a mix of screened sandy loam soil, organic 4-8% by volume.

### E13.3 Construction Method

- E13.3.1 Strata Cell modules must be transported and stored on Citygreen 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.
- E13.3.2 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.
- E13.3.3 Soft dig around existing trees to determine extent of existing root system, install Strata Cells on the locations shown on the drawing or when start to see tree roots.
- E13.3.4 Tree pit locations and dimensions, as detailed by the specifying Landscape Architect, must be accurately surveyed and marked using string lines, survey pegs and marking paint.
- E13.3.5 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).
- E13.3.6 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.
- E13.3.7 All excavated material shall be disposed of off-site in accordance with specification CW1130.
- E13.3.8 Compact sub-grade in accordance with specification CW3110.
- E13.3.9 Install reinforcement geotextile fabric in accordance with CW3130.
- E13.3.10 Install 450mm depth granular drainage course with subdrain pipe in accordance with specification CW3120, and as shown on the Drawings.
- E13.3.11 Install subdrain cleanouts at the end of subdrains as shown on the drawings.
- E13.3.12 Install aggregate sub-base below Strata Cell Matrix 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.
- E13.3.13 Assembling Strata Cell matrix (Strata Cell 60 Series) in accordance with Citygreen Strata Cell Specification.
- E13.3.14 Install 125mm perforated lateral pipes and fittings within the top layer of modules as shown on the drawings. Install 150mm solid vertical pipe and trim to 150mm above finished pavement level and supported in a vertical position by temporary staking. Open ends of pipe to be sealed with caps or weather-proof tape.
- E13.3.15 Wrap Strata Cell matrix with geogrid.
- E13.3.16 Load bio-retention soil into the Strata Cell matrix, Matrix is to be vibrated using plate vibration or needle vibration equipment in order to shake soil into all voids.
- E13.3.17 Place the filtergrid layer on the top of matrix and cut to length, ensuring that the material fully covers the top of the matrix and cut to length.
- E13.3.18 Install backfill in 200mm lifts to top of the matrix.
- E13.3.19 Install ReRoot linear root barrier in proximity to tree root ball to protect all pavement layers. Vertical, integral ribs guide tree roots down into Strata Cell matrix beneath pavement.
- E13.4 Maintenance

- E13.4.1 The Strata Cell system requires periodical maintenance to clean out debris that has entered the system. To clean out the system, two different methods may be used. The methods that can be used for cleaning out the Strata Cell system are:
- (a) The use of a Street or Sidewalk Vacuum to remove debris from the system;
  - (b) The use of a HydroVac to remove debris from the system;
- E13.4.2 Maintenance work for Strata Cell system shall be performed twice per year for two years during the spring as well as in the fall.
- E13.4.3 The preferred method for maintenance work may be indicated at any time during the maintenance period by the City of Winnipeg and will then be the required method for any remaining maintenance work within the two year period.
- E13.5 Measurement and Payment
- E13.5.1 Construction of Strata Cell will be measured on a unit basis and paid for at the Contract Unit Price for Strata Cell. The quantity to be paid for will be the total unit constructed in accordance with this specification, accepted and measured by the Contract Administrator. Inclusive of excavation, granular drainage material, geogrid, bioretention soil, geotextile and backfill. Over-excavation will not be paid.
- E13.5.2 Supply and install of lateral pipe and vertical pipe will be measured on a length basis. Length to be paid for will be the total number of linear metres supplied and installed in accordance with this specification accepted and measures by the Contract Administrator.
- E13.5.3 Drainage pipe shall be paid for on a length basis. Length to be paid for will be the total number of linear metres supplied and installed in accordance with this specification accepted and measures by the Contract Administrator.
- E13.5.4 Strata Cell 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.
- Items of Work:
- (i) Strata Cell Maintenance Year 1
  - (ii) Strata Cell Maintenance Year 2

## **E14. CAST-IN-PLACE CONCRETE**

- E14.1 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.
- E14.2 Materials
- E14.2.1 General
- (a) The Contractor shall be responsible for the supply, safe storage, and handling of all materials set forth in this Specification.
- E14.2.2 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.
- E14.2.3 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.

#### E14.2.4 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.

#### E14.2.5 Cement

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

#### E14.2.6 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.

#### E14.2.7 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.

E14.2.8 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.

E14.2.9 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.

E14.2.10 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.

E14.2.11 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.

E14.2.12 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.

E14.2.13 Anchor Rods, Nuts, and Washers

- (a) All anchor rods shall be threaded-type.
- (b) Anchor rods, nuts and washers shall be in accordance with ASTM F1554 and shall be hot-dip galvanized in accordance with CSA Standard G164 for a minimum net retention of 600 g/m<sup>2</sup>. Supply and installation will be incidental to construction of concrete foundation and no separate payment will be made.
- (c) It is the Contractor's responsibility to ensure that the threaded rods are not in direct contact with the foundation reinforcing steel.

E14.2.14 Anchor Rod Templates

- (a) Anchor rod templates shall be CSA G40.21 Grade 300W, minimum 10 mm thick, and will be incidental to construction of new concrete foundation and no separate payment will be made.

E14.2.15 Fibre Joint Filler

- (a) Fibre joint filler shall be rot-proof and of the preformed, non-extruding, resilient-type, made with a bituminous fibre such as "Flexcell," and shall conform to the requirements of ASTM Standard D1751, or approved equal in accordance with B6.

E14.2.16 Waterproofing Membrane

- (a) Waterproofing membrane shall be "Sonoshield HLM 5000 R" or approved equivalent by the Contract Administrator.

E14.2.17 Miscellaneous Materials

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

E14.3 Construction Methods

#### E14.3.1 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.

#### E14.3.2 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.

#### E14.3.3 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.

#### E14.3.4 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.

#### E14.3.5 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.



#### E14.3.6 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.

#### E14.3.7 Placing Metal Bases

- (a) Contractor to install metal bases as supplied by the Contract Administrator following curing of concrete foundations.
- (b) Metal bases are to be installed plumb, level, and flush to the concrete foundation. Contractor to use stainless steel washers to level bases as required.

#### E14.3.8 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 Engineer.
- (c) Permeable formwork liner shall be Drainoform, Zemdrail II, or equivalent as approved by the Engineer.
- (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.

#### E14.3.9 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 of the foundation.
- (b) Concrete shall be placed to the elevations as shown on the Drawings. The top surface of the foundation 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.

E14.3.10 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.

E14.3.11 Construction Joints

- (a) Construction joints shall be located only where shown on the Drawings or as otherwise approved in writing by the Contract Administrator. Construction joints shall be at right angles to the direction of the main reinforcing steel. All reinforcing steel shall be continuous across the joints. Bevelled shear keys, as shown on the Drawings or approved by the Contract Administrator, shall be provided at all joints.
- (b) In lieu of shear keys, the Contractor may roughen the surface as follows. The surface shall be rough, with a minimum amplitude of 6 mm. Acceptable procedures to obtain this rough surface are as follows:
  - (i) By removing the mortar from between the larger aggregate particles with a water jet and soft brush when the concrete is in a semi-hardened state (greencut).
  - (ii) By first applying a chemical retarder to the surface and then removing the mortar from the larger aggregate particles with a water jet and brush.
- (c) The face of joints shall be cleaned of all laitance and dirt, after which the cementitious grout or an approved bonding agent shall be applied. Forms shall be retightened, and all reinforcing steel shall be thoroughly cleaned at the joint prior to concreting.

E14.3.12 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.

E14.3.13 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.

E14.3.14 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.

#### E14.3.15 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.

#### E14.3.16 Anti-Graffiti Coating

- (a) Anti-graffiti coating shall be applied to all planter walls 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.

#### E14.3.17 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.

#### E14.3.18 Drilling Anchor Rods

- (a) The anchor rods shall be aligned with a steel template to match the steel plates/angels 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.

#### E14.3.19 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.

#### E14.4 Measurement and Payment

E14.4.1 Supply and Installation of CIP Reinforced Concrete Pile for Pedestrian Light will be measured on a unit basis and paid for at the Contract Unit Price for "Supply and Install CIP Reinforced Concrete Pile for Pedestrian Light (including excavation, anchor rods and conduit for electrical)". 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.

#### E14.4.2 Construction of Cast-in-Place Concrete

- (a) Construction of cast-in-place concrete will be measured on a unit basis for CIP Reinforced Concrete Pile for Steel Trellis, on a linear metre basis for the CIP Retaining Wall and on a cubic metre basis for the CIP Stairs, and will be paid for at the Contract Price per unit for the "Items of Work" listed here below for Cast-in-Place Concrete constructed in accordance with this Specification and accepted by the Contract Administrator.

Items of Work:

- (i) Supply and Install CIP Reinforced Concrete Pile for Steel Trellis (Including excavation)
- (ii) Supply and Install CIP Retaining Wall (incl. Footings, and Base Course)
- (iii) Supply and Install CIP Reinforced Concrete Pile for Entry Map (Including excavation, pile cap and grade beams)

### **E15. PRUNING OF EXISTING TREES**

#### E15.1 Description

E15.1.1 Provide all labour, materials, methods, equipment and accessories for pruning of existing trees within the limit of Work.

#### E15.2 Quality Assurance

E15.2.1 Pruning shall be provided by a person with a Manitoba Arborists Certificate with demonstrable experience sourcing and Work.

E15.2.2 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.

#### E15.3 Pruning Methodology

E15.3.1 Prune as required to remove dead, broken or damaged limbs.

E15.3.2 Prune back to healthy growth while maintaining balanced crown shape.

E15.3.3 Employ clean sharp tools.

E15.3.4 Make cuts smooth and flush with outer edge of branch collar near the main stem or branch.

E15.3.5 Cuts must be smooth and sloping to prevent accumulation of water on cut.

E15.3.6 Do not leave little stumps ("horns") on trunks or main branches.

E15.3.7 Prune according to accepted horticultural practices as outline in "The Pruning Manual", Publication No. 1505-1977 by Agriculture Canada.

#### E15.4 Measurement and Payment

E15.4.1 Pruning of existing trees shall be paid for on a unit each basis. Price shall be payment in full for supplying materials and for performing the Work.

## **E16. TREE VAULTS**

### **E16.1 Description**

E16.1.1 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, root barrier, planting medium, wood mulch and black granite mulch.

### **E16.2 Materials**

E16.2.1 Granular drainage material in accordance with specification CW3120 - Installation of Sub Drains.

E16.2.2 Drainage pipe: 150mm dia. perforated PVC pipe.

E16.2.3 Non-woven geotextile to CW3120.

E16.2.4 Root Barrier - Tree vaults over Hydro Ducts Only

- (a) Rootstop RS10-900
- (b) Barrier joint tape
- (c) Available from CityGreen ph. 780-462-5064 or approved equal.

E16.2.5 Concrete materials and accessories in accordance with Specification CW 3310 – Portland Cement Concrete Pavement Works, to suit loads designed by Structural Engineer.

E16.2.6 Precast Concrete Sidewalk Panel

- (a) Reinforced precast concrete panel to accommodate AASHTO HS-20 loading to the following sizes, manufacturer to supply shop drawings stamped by a Structural Engineer:
  - (i) Type A - Lily: 1220 x 1120 x 150mm, with with 280mm wide blockout and 473 x 374mm opening.
  - (ii) Type B - Lily: 1220 x 1120 x 150mm with with 280mm wide blockout.
  - (iii) Type C - Alexander: 1220 x 1220 x 150mm.
  - (iv) Type D - Alexander: 1220 x 1220 x 150mm, with 280mm wide blockout.
- (b) Medium sandblast finish for sidewalk panels.
- (c) Available from Barkman Concrete Ltd. Ph. 204-667-3310, or approved equal.

E16.2.7 Planting medium in accordance with Planting Medium and Finished Grading specification.

E16.2.8 Wood mulch and black granite mulch in accordance with Trees, Shrubs & Groundcover Plantings specification.

E16.2.9 Tree Cover in accordance with Exterior Metal Fabrication specification.

### **E16.3 Submittals**

E16.3.1 Prior to construction, submit samples of the following materials to the Contract Administrator:

- (a) Shop drawing for each type of precast concrete sidewalk panel.
- (b) Non-woven geotextile: 1 sq. m.
- (c) Root barrier: 1 sq. m.

E16.3.2 Prior to installation, arrange for inspection and approval of the following materials by the Contract Administrator:

- (a) One of each type of precast concrete sidewalk panel.

#### E16.4 Construction Method

- E16.4.1 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.
- E16.4.2 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 / roadway drainage system (min 1.0% slope).
- E16.4.3 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.
- E16.4.4 All excavated material shall be disposed of off site in accordance with specification CW1130.
- E16.4.5 Backfill between roadway base gravel and tree vault edge with compacted granular where required.
- E16.4.6 At hydro duct locations only install root barrier bottom & all sides of tree vaults. Overlap 300 between bottom barrier and side barriers. Attach root barrier pieces together with root barrier tape.
- E16.4.7 Install 150mm depth granular drainage course 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 into existing catch basin.
- E16.4.8 Cover drainage course and sides of tree pit with geotextile in accordance with specification CW3120 and as shown on the Drawings. (do not install geotextile at vaults that are located over hydro duct line).
- E16.4.9 Install soil mound, planting medium and trees.
- E16.4.10 After tree planting, ensure that finished soil level is 75mm below lip of tree vault to accommodate black granite / wood chip mulch.
- E16.4.11 Install sidewalk panels and galvanized tree covers on lip of tree vault flush and true. Remove debris from tree lip or grind down concrete as required to ensure sidewalk panel / tree covers do not wobble.

#### E16.5 Measurement and Payment

- E16.5.1 Construction of Tree Vaults will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre. The quantity to be paid for will be the total volume constructed in accordance with this specification, accepted and measured by the Contract Administrator. Tree Vault pricing includes excavation, granular drainage material, geotextile and root barrier. Over-excavation will not be paid.
- E16.5.2 Supply and install of precast concrete sidewalk panel will be measured on a unit each basis. Price shall be payment in full for supplying materials and for performing the Work.
- E16.5.3 Drainage pipe shall be paid for on a lineal metre basis. Price shall be payment in full for supplying materials and for performing the Work.

### **E17. UNIT PAVING**

#### E17.1 Description

- E17.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of unit pavers, unit pavers w/letters, brick pavers and stockpiled granite pavers in formed blockouts, as indicated on the Drawings.

## E17.2 References

E17.2.1 CW 3330 – Installation of Interlocking Paving Stones

E17.2.2 CW 3335 – Installation of Interlocking Paving Stones on a Lean Concrete Base

## E17.3 Materials

### E17.3.1 Unit Pavers:

- (a) 300 x 151 x 100mm Broadway paver, running bond, charcoal colour – museum loading area indicator strips.
- (b) 300 x 151 x 100mm Broadway paver, running bond, copper canyon colour – museum loading area sidewalk.
- (c) 300 x 151 x 100mm Broadway paver, buff colour – Lily roadway intersections (herring bone) and Elgin (running bond).
- (d) 300 x 151 x 100mm Broadway paver, running bond, mahogany colour – pedestrian crossings.
- (e) 600 x 300 x 100mm Broadway paver, buff colour – single row between unit pavers w/letters.
- (f) John Hirsch Roadway
  - (i) 300 x 151 x 100mm Broadway paver, running bond, buff colour 13% of total area
  - (ii) 300 x 300 x 100mm Broadway paver, running bond, buff colour 29% of total area.
  - (iii) 600 x 300 x 100mm Broadway paver, running bond, buff colour 58% of total area.
- (g) 210 x 105 x 60mm Holland paver, herringbone, sierra grey.
- (h) Available from Barkman Concrete Ltd. Ph. 204-667-3310, or approved equal.

### E17.3.2 Unit Pavers With Letters:

- (a) 600 x 300 x 100mm Broadway paver, buff colour, single row, with water jet letter filled with hot-cast high performance PTMEG based polyurethane [ST5-520], charcoal colour.
- (b) Available from Barkman Concrete Ltd. Ph. 204-667-3310, or approved equal.

### E17.3.3 Brick Pavers:

- (a) 194 x 93 x 57mm Endicott paver, running bond, medium ironspot #46.
- (b) 194 x 93 x 57mm Endicott paver, running bond, dark ironspot.
- (c) Available from Alsip's Building Products and Services Ph. 204-667-3330, or approved equal.

### E17.3.4 Stockpiled Granite Pavers:

- (a) 200 x 100 x 60mm, granite.
- (b) 400 x 150 x 60mm, granite.

### E17.3.5 Bedding Sand

- (a) Bedding sand shall be fine aggregate to the requirements of specification CW3330.

### E17.3.6 Joint Sand

- (a) Joint sand to the requirements of specification CW3330.

### E17.3.7 Mortar Bed and Mortar Joints

- (a) Portland cement mixed on site, or approved equal.

#### E17.4 Submittals

E17.4.1 Submit shop drawings for unit pavers with letters.

E17.4.2 Prior to installation, arrange for inspection and approval of the following materials by the Contract Administrator:

- (a) (1) One sample of unit pavers w/letter.

#### E17.5 Construction Method

E17.5.1 Contractor to verify the exact dimensions of unit pavers, brick pavers and stockpiled granite pavers, prior to the construction of blockouts in concrete sidewalk. Use physical samples of specified pavers when construction form work for blockouts.

E17.5.2 Install concrete sidewalk w/blockouts and roadway w/blockouts as specified on Drawings.

E17.5.3 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.

E17.5.4 Preparation of Mortar Bed

- (a) Remove all accumulated debris from blockouts.
- (b) Mix Portland cement on site per manufacturer's instructions and place into blockouts to the depths indicated on the Drawings.

E17.5.5 Installation of Unit Pavers, Unit Pavers W/Letters and Brick Pavers

- (a) Unit pavers, unit pavers w/letters and brick pavers shall be installed in formed concrete blockouts in accordance with the specification 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) Spread and fine grade joint sand over paving surface and sweep into joints.
- (f) Sweep remaining sand over all paving areas and remove from site.
- (g) Replace at no extra cost all whole or cut stones marked as unacceptable.
- (h) Remove cracked, chipped, broken or otherwise damaged paving materials from Site immediately.
- (i) Upon completion, clean in accordance with manufacturers recommendations.

E17.5.6 Installation of Stockpiled Granite Pavers

- (a) Stockpiled granite pavers shall be installed in formed concrete blockouts in accordance with the specification CW3335, set in locations and patterns as shown on the Drawings.
- (b) Joint Spacing: spaces between joints shall be 6mm / 1/4" for John Hirsch roadway / Lily & Alexander sidewalk and 19mm / 3/4" for Lily & James roadway, and shall be uniform and consistent while maintaining true patterns as indicated on the Drawings.
- (c) Commence installation of pavers against edge to obtain straightest possible course for installation. Set pavers onto mortar bed and mortar joint spaces between pavers.



- (d) Pavers shall be cut with saw only to obtain true even undamaged edges. Chipped pavers are unacceptable.
- (e) Crews shall work on installed pavers, not on mortar bed.
- (f) Any cement that falls onto the face of the granite pavers shall be cleaned off immediately.
- (g) Protect pavers from vehicular and pedestrian traffic with traffic barriers to ensure that mortar bed and joint material has had sufficient time to cure. Protection shall remain in place for the entire duration of the curing time, as recommended by the mortar bed / joint material manufacturer.
- (h) Replace at no extra cost all granite pavers marked as unacceptable.
- (i) Remove cracked, chipped, broken or otherwise damaged paving materials from Site immediately.

#### E17.6 Quality Assurance

- E17.6.1 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.

#### E17.7 Measurement and Payment

The supply and installation of unit pavers, brick pavers and stockpiled granite pavers shall be paid for on a square metre basis. Supply of letter pavers and installation of letter pavers shall be paid for each paver. Price shall be payment in full for supplying materials and for performing the Work.

### **E18. EXTERIOR METAL FABRICATION**

#### E18.1 Description

- E18.1.1 Provide all labour, materials, methods, equipment and accessories for the fabrication and installation of trellis, parking screen fence, I-beam bollards, c-channel posts / bollards, angle bar posts, information panels, steel pipe bollards, tree covers, tripods, museum / hydro anchor bracket w/silhouettes, and entry maps.

#### E18.2 References

- E18.2.1 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 Seamless.
  - (b) ASTM A269-02, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
  - (c) ASTM A307-02, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- E18.2.2 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.

### E18.3 Materials

#### E18.3.1 I-Beam Bollards

- (a) W150 X 22 steel I-Beam.
- (b) 254 x 254 x 12mm thk. steel flat bar base plate.
- (c) Wood Block: 161 x 76 x 205mm white oak wood block, painted in accordance with Exterior Site Carpentry specification.
- (d) Wood Block: 161 x 60 x 86mm white oak wood block, unfinished in accordance with Exterior Site Carpentry specification.
- (e) Fasteners: 6m dia. x 159 or 127mm stainless steel threaded rod w/washers and bolts.
- (f) Anchor Bolts: 6mm dia. x 100mm stainless steel.

#### E18.3.2 C-Channel Posts / Bollards

- (a) Post / Bollard: C180X18 steel C-channel.
- (b) Base Plate: 228 x 150 x 12mm thk. steel flat bar.
- (c) Wood block, bollard: 138 x 38 x 846mm white oak wood block, unfinished in accordance with Exterior Site Carpentry specification.
- (d) Anchor Bolts: 6mm dia. x 100mm stainless steel.

#### E18.3.3 Angle Bar Posts

- (a) Post: 100 x 100 x 9mm thk. steel.
- (b) Base Plate: 200 x 200 x 12mm thk. Steel flat bar.
- (c) Anchor Bolts: 6mm dia. x 100mm stainless steel.

#### E18.3.4 Information Panel

- (a) 457 x 1817 x 12mm thk. steel panel.
- (b) 482 x 1117 x 12mm thk. steel panel.
- (c) 656 x 609 x 12mm thk. base plate.
- (d) Information Panel: iZone 420 x 890mm, 0.75 thickness, exterior matte finish available from Parkworks, ph. 204-414-2990, or approved equal.
- (e) Wood Block: 442 x 102 x 640mm white oak wood block, unfinished in accordance with Exterior Site Carpentry specification.
- (f) Fasteners: 6m dia. x 536mm stainless steel threaded rod w/washers and bolts.
- (g) Anchor Bolts: 6mm dia. x 100mm stainless steel.

#### E18.3.5 Structural Steel

- (a) The trellis post is required to have a minimum grade of 300W.
- (b) The trellis post will be made of galvanized steel.

#### E18.3.6 Steel Pipe Bollard

- (a) 150mm dia. round 9 gauge (4mm) steel pipe.
- (b) Concrete to CW2160.
- (c) Colour: to CGSB1-GP-12C yellow 505-308.

#### E18.3.7 Tree Cover

- (a) 1220 x 1120mm 2 piece cover, solid, 9.5mm thick galvanized steel plate.
- (b) 1220 x 1120mm 2 piece cover with 454 x 355mm opening, 9.5mm thick galvanized steel plate.
- (c) 1220 x 1220mm 2 piece cover with 454 x 451mm opening, 9.5mm thick galvanized steel plate.

E18.3.8 Tripod

- (a) 25mm O.D. x 76mm long schedule 40 pipe.
- (b) 60 x 25 x 9mm thk. steel flat bar.
- (c) 279 dia. x 9mm thk. steel flat bar with CNC-cut letters.
- (d) 152 x 102 x 9mm thk. steel flat bar with CNC-cut silhouette.
- (e) 137 x 25 x 9mm thk. steel flat bar.
- (f) 152 x 76 x 9mm thk. steel flat bar.
- (g) 1141 or 953 x 76 x 6mm thk. Steel flat bar.
- (h) 152 x 76 x 6mm thk. Steel flat bar.
- (i) All metal to be painted in accordance with Exterior Metal Painting specification.
- (j) Anchor Bolts: 6mm dia. x 100mm stainless steel.

E18.3.9 Museum Museum / Hydro Anchor Bracket w/Silhouettes

- (a) Various sizes of 9mm thk. steel flat bar, galvanized.
- (b) 610 x 305 x 9mm thk. steel flat bar with CNC-cut silhouette, galvanized.
- (c) Mounting Plate: 12mm thk. steel flat bar, galvanized.
- (d) All metal to be painted in accordance with Exterior Metal Painting specification.
- (e) Screws: 6mm dia. x 76mm stainless steel.
- (f) Anchor Bolts: 6mm dia. x 100mm stainless steel.

E18.3.10 Entry Maps

- (a) 9mm thk. Steel flat bar base plate, painted.
- (b) Map Plate –Roads: 9mm thk. steel flat bar with CNC-cut silhouette, painted.
- (c) Map Plate – Rivers: 9mm thk. Corten steel CNC-cut silhouette, not painted.
- (d) All metal, excluding corten steel, to be painted in accordance with Exterior Metal Painting specification.
- (e) Concrete to CW2160.
- (f) Foundation design by Contractor. Contractor to submit shop drawings sealed by Engineer.

E18.3.11 Accessories

- (a) Paint for Exterior Metal: in accordance with Exterior Metal Painting specification.
- (b) Paint for I-Beam Bollard Wood Block in accordance with Exterior Wood Painting specification.
- (c) Leveling grout: contractor to provide a product for review by Contract Administrator.
- (d) Welding materials: to CSA W59.
- (e) Welding electrodes: to CSA W48 Series.
- (f) Caulk: GE Silicone II window and door caulking, clear, or approved equal.

E18.4 Submittals

E18.4.1 Submit product data for the following:

- (a) White reflective paint.
  - (b) Leveling grout.
- E18.4.2 Submit samples for the following:
- (a) One (1) I-beam bollard, full size, painted.
  - (b) One (1) C-Channel bollard, full size, painted.
  - (c) One (1) tripod, full size, painted.
  - (d) One (1) museum anchor bracket w/silhouettes, full size, painted.
  - (e) One (1) 1220 x 1120mm 2 piece tree cover with 454 x 355mm opening.
  - (f) One (1) 300 x 300mm full scale, full colour printed graphic proof of information panel.
  - (g) One 300 x 300mm sample or corten steel w/final finish.
  - (h) One steel trellis post.
- E18.4.3 Submit Shop Drawings for the following:
- (a) I-beam bollard.
  - (b) C-Channel bollard / post.
  - (c) Angle bar post.
  - (d) Tripod.
  - (e) Museum / hydro anchor bracket w/silhouette & light fixture.
  - (f) Entry maps: Shop drawings to include foundation design, base plate to map plate & base plate to foundation connections, sealed by Engineer.
  - (g) Trellis
  - (h) Parking Screen Fence
  - (i) Shop drawings to clearly indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number and size of anchors, supports, reinforcement, details and accessories.
  - (j) Indicate and list hardware and miscellaneous items.
  - (k) Provide templates, patterns, fixing diagrams as required.
  - (l) Indicate related, adjacent materials, and connections
- E18.4.4 Contract Administrator to provide artwork for the following items, in digital format:
- (a) Information panel graphic.
  - (b) Tripod silhouettes and letters.
  - (c) Museum and Hydro anchor bracket silhouettes.
  - (d) Entry maps, east and west sides.
- E18.5 Delivery, Storage and Handling
- E18.5.1 Deliver materials to site, suitably packaged, clearly marked indicating manufacturer name and any other identifying symbols or information. Do not deliver materials long before they are required on site. Cause no delays to scheduling.
- E18.5.2 Cover exposed stainless steel with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
- E18.5.3 Leave protective covering in place until final cleaning of site. Provide instructions for removal of protective covering.
- E18.5.4 Store materials in a dry location off the ground, and prevent damage.
- E18.5.5 Materials that have been damaged or deemed unfit for use during delivery or storage shall be immediately replaced at no cost.

## E18.6 Site Conditions

- E18.6.1 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.
- E18.6.2 Report any discrepancies or omissions to the Contract Administrator, who will issue written clarification. Oral interpretations or instructions are not acceptable.

## E18.7 Construction Method

- E18.7.1 Obtain approval of submittals including mock-ups and shop drawings prior to ordering materials and commencing fabrication.
- E18.7.2 Fabricate work square, true, straight and accurate to required sizes, with joints closely fitted and properly secured.
- E18.7.3 Use self-tapping, shake-proof, counter-sunk or hidden screws on items requiring assembly by screws.
- E18.7.4 Where possible, fit and shop assemble work, ready for erection.
- E18.7.5 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- E18.7.6 De-grease and be-bur all sharp edges in the shop left behind after fabrication is complete.

## E18.8 Installation

- E18.8.1 Erect metal work square, plumb, straight and true, accurately fitted, with tight joints and intersections.
- E18.8.2 Provide suitable and acceptable means of anchorage, such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- E18.8.3 Steel bollards to be surface mounted to concrete sidewalk.
- E18.8.4 Exposed fastening devices to match finish and be compatible with material through which they pass, per the Drawings.
- E18.8.5 Do welding work in accordance with CSA W59, unless specified otherwise.
- E18.8.6 Make field connections with high tensile bolts, or weld to CSA S16.1-M (latest).
- E18.8.7 Touch up rivets, field welds, bolts and burnt or scratched surfaces after erection.

## E18.9 Acceptance

- E18.9.1 Work will be accepted only if it is erected true to the design intent in conformation with shop drawings and site instructions.

## E18.10 Measurement and Payment

- E18.10.1 The supply and installation of the steel trellis, I-beam bollards, c-channel bollards, information panels, steel pipe bollards, tree covers, tripods, museum / hydro anchor bracket & silhouette, and entry maps, shall be paid for on a unit each. Price shall be payment in full for supplying materials and for performing the Work.
- E18.10.2 The supply and installation of c-channel posts, parking screen fence, and angle bar posts shall be paid for on a lineal metre basis. Price shall be payment in full for supplying materials and for performing the Work.

## **E19. EXTERIOR SITE CARPENTRY**

### E19.1 Description

E19.1.1 Provide labour, materials, methods, equipment and accessories for the fabrication and installation of dual & single garbage bin enclosure, timber planters and bench on cip conc. wall – Lily.

## 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

- (a) white oak, kiln dried and sanded sides faces and edges from a local source.

E19.3.2 Cedar Lumber

- (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.
- (b) Source and Delivery: this material shall be from one supplier and shipped by rail.

E19.3.3 Pressure Treated Lumber

- (a) Material: to be pressure treated wood, no. 1 grade, colour: brown, moisture content 19% or less in accordance with following standards: CAN/CSA-O141; NLGA Standard Grading Rules for Canadian Lumber; Forest Stewardship Council (FSC) certified.
- (b) Preservative for above ground use: to CSA-O80 Series, ACQ-C treatment, clear finish. Minimum net retention: 4.0 kg/m<sup>3</sup>.
- (c) Preservative for ground contact: to CSA-O80 Series, ACQ-C treatment, clear finish. Minimum net retention: 6.4 kg/m<sup>3</sup>.

E19.3.4 Re-Claimed Douglas Fir Lumber

- (a) Material: from a local source within Manitoba, sanded to suit and as directed by Contract Administrator.

E19.3.5 Hardware

- (a) Nails and spikes: to CAS B111, galvanized, for exterior works and for treated lumber. Use spiral thread nails.

- (b) Threaded rods, bolts nuts, washers, lag screws to be hot dipped galvanized, sizes to suit application.
- (c) Lag screws: hot dipped, galvanized, sizes to suit application.
- (d) Post Anchor: 150 x 150mm Titan Max Post Anchor, black colour, or approved equal.
- (e) Heavy Duty Strap Hinges: stainless steel.
- (f) Wheels: exterior grade 150mm dia. minimum.
- (g) Joist Hangers: galvanized steel.

E19.3.6 Accessories

- (a) Asphalt shingle: Marquis Wmax or approved equal, charcoal colour.

E19.4 Submittals

E19.4.1 Submit product data and samples for:

- (a) Garbage Bin Enclosure: post anchor, heavy duty strap hinges, locking pins, locking pin sleeves, wheels, heavy duty latch, lockable and heavy duty gate handles.
- (b) Sample of no.2 western red cedar.
- (c) Sample of white oak.
- (d) Sample of douglas fir re-claimed wood timber.
- (e) Asphalt shingle.

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 treated and non-treated wood in a manner which will avoid damage or field fabrication causing alteration in original treatment.
- E19.6.2 Re-treat pressure treated wood surfaces exposed by cutting, trimming or boring with liberal brush application of clear preservative and fire retardant before installation. Ensure that damaged areas such as abrasions, nail and spike holes, area thoroughly saturated with field treatment solutions as per CSA-O80 and CSA-O80.20
- E19.6.3 Construct all work as indicated on the Drawings using adequate fastening methods to ensure solid durable finished work suitable for the purpose intended.
- E19.6.4 Do all nailing and fastening neatly, evenly and thoroughly.
- E19.6.5 Frame anchor, fasten, tie and brace members to provide necessary strength and rigidity. Install all members true to line, levels and elevations.
- E19.6.6 Set plumb and space uniformly. Countersink bolts where necessary to provide clearance for other work.

## E19.7 Measurement and Payment

- E19.7.1 The supply and installation of dual & single garbage bin enclosures shall be paid for on a lump sum basis. Price shall be payment in full for supplying materials and for performing the Work.
- E19.7.2 The supply and installation of timber planters and bench shall be paid for on a unit each basis. Price shall be payment in full for supplying materials and for performing the Work.

## E20. EXTERIOR METAL PAINTING

### E20.1 Description

- E20.1.1 Provide all labour, materials, methods, equipment and accessories for the painting of I-beam bollards, c-channel posts / bollards, angle bar posts, tripods, information panels, steel pipe bollards, trellis, junction boxes, electrical conduit, tripods, museum / hydro anchor bracket w/silhouettes, and entry maps.

### E20.2 References

- E20.2.1 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.

### E20.3 Materials

- E20.3.1 Exterior Grade Paint Coatings for I-beam bollards, c-channel posts / bollards, angle bar posts, trellis, junction boxes, electrical conduit:
- (a) Tremclad 27048X 125 Flat Black, or approved equal, 2 coats or 2 mil min. thickness.
- E20.3.2 Paint for Steel Pipe Bollards:
- (a) Exterior grade paint colour to CGSB1-GP-12C yellow 505-308, 2 coats or 2 mil min. thickness.
- E20.3.3 Paint for tripods, information panels, museum / hydro anchor bracket w/silhouettes, and entry maps:
- (a) Primer: Approved high-build epoxy primer, 4 mil. min. thickness. Ensure compatibility with urethane coating.
  - (b) Coating: 2 coats or 2 mil min. thickness, high performance alkyd rust-inhibiting industrial coating, such as CIL Fortified Urethane or approved equal. Colour to be Satin Finish Black.

### E20.4 Submittals

- E20.4.1 Submit two (2) copies of WHMIS MSDS - Material Safety Data Sheets for each paint product.
- E20.4.2 Submit samples of the following:
- (a) One (1) I-beam bollard, full size, painted.
  - (b) One (1) C-Channel bollard, full size, painted.
  - (c) One (1) tripod, full size, painted.
  - (d) One (1) museum anchor bracket w/silhouettes, full size, painted.

### E20.5 Quality Assurance

- E20.5.1 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.

E20.5.2 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.

E20.5.3 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.

## E20.6 Construction Method

E20.6.1 Ensure that sample is approved prior to proceeding.

E20.6.2 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 obtain Contract Administrators to review the Work that is to be completed in the field, prior to proceeding.

E20.6.3 Deburr and degrease metal surfaces using products approved by the paint manufacturer.

E20.6.4 Conduct abrasive blasting to fully clean the metal.

E20.6.5 Clean metal to white metal by dry abrasive blasting. Ensure surface is free of grease, rust, or scale.

E20.6.6 Contact Contract Administrator for review and approval of prepared surface.

E20.6.7 Apply paint within 12 hours of sandblasting.

E20.6.8 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.

E20.6.9 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.

E20.6.10 Paint shall be applied within 24 hours of completion of surface preparation.

E20.6.11 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.

E20.6.12 Touch-up runs and snags immediately while paint application is in progress.

E20.6.13 Application related failures shall be corrected prior to the application of a subsequent coat.

E20.6.14 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.

E20.6.15 Apply as many coats as necessary to ensure even and proper coating of metal, to be reviewed and approved by the Contract Administrator.

## E20.7 Delivery to Site

E20.7.1 Allow all shop painted members to fully cure before preparing for shipment.

E20.7.2 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.

E20.7.3 Deliver to site with equipment suitable for carrying steel loads and capable of hoisting steel members over other features into their final locations.

#### E20.8 Touch-Ups

E20.8.1 Ensure all welding work and mechanical fasteners are wiped clean and free of oil, debris and grit.

E20.8.2 Apply touch-ups with appropriately sized brushes to get into all grooves and voids.

E20.8.3 Thickness of touch-ups shall match thickness of adjacent paint.

E20.8.4 Once all touch-ups are complete contact Contract Administrator for review and approval of metal work and coating.

#### E20.9 Standard of Acceptance

E20.9.1 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.

E20.9.2 Painted surfaces shall be warranted against corrosion, peeling and general failure for two (2) years after date of total performance.

#### E20.10 Final Acceptance

E20.10.1 Provide the City of Winnipeg with maintenance manual inserts detailing products and methods used to achieve metal painting finishes.

E20.10.2 Provide City of Winnipeg with one (1) gallon of each type of paint.

#### E20.11 Measurement and Payment

E20.11.1 Painting of I-beam bollards, c-channel posts / bollards, angle bar posts, tripods, information panels, steel pipe bollards, trellis, junction boxes, electrical conduit, tripods, museum / hydro anchor bracket w/silhouettes, and entry maps will not be measured for payment and shall be included in the supply and install of said items.

### **E21. EXTERIOR WOOD PAINTING**

#### E21.1 Description

E21.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of paint for the I-Beam bollard painted wood block.

#### E21.2 References

E21.2.1 The Master Painters Institute (MPI)

(a) Architectural Painting Specification Manual, current edition.

(b) Standard GPS-1, MPI Green Performance Standard for Painting and Coatings.

#### E21.3 Materials

E21.3.1 Behr premium plus primer and sealer exterior, #43601, colour: sleek white OR-W15, or approved equal, 2 coats or 2 mil min. thickness.

E21.3.2 Rustoleum clear reflective spray paint or approved equal, 2 coats or 2 mil min. thickness.

#### E21.4 Submittals

E21.4.1 Submit two (2) copies of WHMIS MSDS - Material Safety Data Sheets for each paint product.

E21.4.2 Submit samples of the following:

(a) One (1) I-beam bollard mock-up, including painted wood block.

## E21.5 Quality Assurance

- E21.5.1 Painter to have a minimum of five (5) years proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
- E21.5.2 Conform to latest MPI requirements for exterior painting work including preparation and priming.
- E21.5.3 Materials in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.
- E21.5.4 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.

## E21.6 Construction Method

- E21.6.1 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.
- E21.6.2 Clean and sand wood down to smooth finish. Vacuum of all debris and particles on wood surfaces and wipe down with tack cloth ensuring fine particles are fully removed
- E21.6.3 Paint only when temperature, humidity and precipitation forecasts are well within the manufacturers acceptable ranges. Do not paint when temperature falls below 5°C overnight and a max daily high of 10°C.
- E21.6.4 Apply paint in a uniform layer using brush and/or roller as recommended by paint manufacturer. Work paint into cracks, crevices and corners. Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple
- E21.6.5 Apply coats of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- E21.6.6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- E21.6.7 Sand and dust between coats to remove visible defects.
- E21.6.8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.
- E21.6.9 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.
- E21.6.10 Painted surfaces shall be warrantied against corrosion, peeling and general failure for two (2) years after date of total performance.

## E21.7 Measurement and Payment

- E21.7.1 Painting of I-beam bollard painted wood block will not be measured for payment and shall be included in the supply and install of the I-beam bollard.

## **E22. PAVEMENT MARKING**

### E22.1 Description

- E22.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of line painting for parking stalls on John Hirsch.

### E22.2 References

- E22.2.1 CAN/CGSB-1.5M91, Low Flash Petroleum Spirits Thinner.

- E22.2.2 CGSB1-GP-12c-68, Standard Paint Colours.
- E22.2.3 CGSB1-GP-71-83, Method, of Testing Paints and Pigments.
- E22.2.4 CGSB1-GP-74M-79, Paint, Traffic, Alkyd.
- E22.3 Submittals
  - E22.3.1 Proof of Non-Toxic Composition: Product data confirming chemical composition for traffic paint conforms to the latest health and environmental standards.
  - E22.3.2 Samples to Contract Administrator the following material sample quantities at least 2 weeks prior to commencing work and Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, CGSB specification number and formulation number and batch number:
    - .1 One painted sample of paint.
    - .2 Sampling to CGSB1-GP-71.
- E22.4 Materials
  - E22.4.1 Paint: to CGSB1-GP-74M, alkyd traffic paint.
  - E22.4.2 Colour: White to CGSBI-GP-12C.
  - E22.4.3 Thinner: to CAN/CGSB-1.5.
- E22.5 Paint Equipment Requirements
  - E22.5.1 Paint applicator to be an approved pressure type mobile distributor capable of applying paint in single line(s). Applicator to be capable of applying marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shut-off.
- E22.6 Condition of Surfaces
  - E22.6.1 Pavement surface to be dry, free from ponding water, frost, ice, dust, oil, grease and other foreign materials. Clean paved areas as necessary to achieve acceptable surface preparation.
- E22.7 Traffic Control
  - E22.7.1 Barricade areas to be painted to all vehicular traffic during installation and for 4 hours after installation.
- E22.8 Application
  - E22.8.1 Lay out lines as indicated on the drawings. Obtain Contract Administrator approval prior to painting.
  - E22.8.2 Unless otherwise approved by Contract Administrator, apply paint only when air temperature is above 10°C, wind speed is less than 60 km/h and no rain is forecast within the next 8 hours.
  - E22.8.3 Apply paint evenly at rate of 3 sq.m per litre. Do not thin paint unless approved by Contract Administrator.
  - E22.8.4 Paint lines to be 150mm wide, of uniform colour and density with sharply defined edges.
  - E22.8.5 Thoroughly clean distributor tank before refilling with paint of different colour.
- E22.9 Tolerance
  - E22.9.1 Paint markings to be within plus or minus 6mm of dimensions indicated, straight and true and aligned with fixed features such as curbs, sidewalks and walls.
  - E22.9.2 Remove incorrect markings and re-apply at no extra cost to The City.

## E22.10 Protection of Completed Work

E22.10.1 Protect pavement markings until dry.

## E22.11 Cleaning

E22.11.1 Upon completion of installation, remove construction and accumulated environmental dirt, surplus materials, rubbish, tools and equipment barriers.

## E22.12 Measurement and Payment

E22.12.1 Line painting shall be paid for on a lump sum basis. Price shall be payment in full for supplying materials and for performing the Work.

## **E23. SITE FURNISHINGS**

### E23.1 Description

E23.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and install of greenscreen panels, benches, limestone seating block, waste receptacles, bike racks, and granite bollard from stockpile.

### E23.2 Submittals

E23.2.1 Submit product data for benches and greenscreen panel.

E23.2.2 Submit shop drawings for benches and greenscreen panel: indicated sizes, assembly, method of anchorage and installation details. Use Drawings and as-built field measurements to prepare shop drawings.

### E23.3 Materials

#### E23.3.1 Greenscreen Panels

E23.3.2 3049 x 1070 x 75mm Greenscreen panels mounted to steel trellis I-beam. Finish: wrinkled black. Available from Architek Sustainable Building Products Inc., ph. 888-317-5585, or approved equal.

#### E23.3.3 Victor Stanley 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 for Benches on Concrete Sidewalk: 6mm dia. x 100mm stainless steel anchor bolts.
- (c) Anchor Bolts for Benches on Unit Pavers in Concrete Blockout: 6mm dia. x 200mm stainless steel anchor bolts.

#### E23.3.4 Maglin Wall Mounted Bench

- (a) MLB 872 BL-W-A 1828 x 438 x 108mm with centre arm rest, black powdercoated, IPE wood slats, surface mounted with custom mounting bracket to existing 200mm wide concrete wall. Supplied by Maglin Inc. ph. 403-700-7498, or approved equal.
- (b) Anchor Bolts: 6mm dia. x 100mm stainless steel anchor bolts.

#### E23.3.5 Limestone Seating Blocks

- (a) 1000 x 500 x 550mm limestone block, scabbed finish top & sides, sawn surface finish on bottom. Supplied by Gillis Quarries ph. 204.22-2242, or approved equal.

#### E23.3.6 Waste Receptacle

- (a) Dual stream waste receptacle, surface mounted. Waste receptacle available from Recycle Everywhere ph. 204-942-2284, or approved equal.

- (b) Anchor Bolts for Waste Receptacles on Concrete Sidewalk: 6mm dia. x 100mm stainless steel anchor bolts.
- (c) Anchor Bolts for Waste Receptacles on Unit Pavers in Concrete Blockout: 6mm dia. x 200mm stainless steel anchor bolts.

#### E23.3.7 Bike Rack

- (a) Hoop style surface mounted bike racks, powdercoated black, to match hoop style bike racks in the Exchange District. Bick racks available from Rackworks ph. 204-955-5221, or approved equal.
- (b) Anchor Bolts for Bike Racks on Concrete Sidewalk: 6mm dia. x 100mm stainless steel anchor bolts.
- (c) Anchor Bolts for Bike Racks on Unit Pavers in Concrete Blockout: 6mm dia. x 200mm stainless steel anchor bolts.

#### E23.3.8 Stockpiled Granite Bollards

- (a) Existing Granite Bollard: 360 x 360 x 762mm.
- (b) Existing Steel Plate: 510 x 510 x 12mm stainless steel plate, matte finish.
- (c) New Anchor Bolts: 12 x 100mm stainless steel anchor bolts.

#### E23.4 Construction Methods

E23.4.1 All work is to be located and installed in accordance with the Drawings and manufacturers specifications.

E23.4.2 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.

E23.4.3 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.

#### E23.4.4 Greenscreen Panel Installation

- (a) Measure as-built conditions and verify Greenscreen panel sizes prior to ordering.
- (b) Provide shop drawing to Contract Administrator. Do not proceed with construction until shop drawings are reviewed by Contract Administrator.
- (c) Install Greenscreen panels as per manufacturers written specifications.
- (d) Touch-up up damaged finishes to approval of the Contract Administrator.

#### E23.5 Measurement and Payment

E23.5.1 The supply and installation greenscreen panels, benches, limestone seating block, waste receptacles, bike racks, and granite bollard from stockpile shall be paid for on a unit each basis. Price shall be payment in full for supplying materials and for performing the Work.

### **E24. PLANTING MEDIUM & FINISHED GRADING**

#### E24.1 Description

E24.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of planting medium in tree vaults and planting beds.

#### E24.2 References

E24.2.1 Agriculture and Agri-Food Canada

.1 The Canadian System of Soil Classification, Third Edition, 1998.

E24.2.2 Canadian Council of Ministers of the Environment (CCME) Guidelines.

E24.2.3 The City of Winnipeg Standard Construction Specifications

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

E24.3 Submittals

E24.3.1 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.

E24.3.2 Submit two (2) copies of soil analysis and recommendations for corrections to Contract Administrator.

E24.4 Quality Assurance

E24.4.1 Inform Contract Administrator of proposed source of materials to be supplied and provide a sample for review by Contract Administrator prior to installation.

E24.4.2 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.

E24.4.3 Test planting medium for nutrients N, P, K, micronutrients, soluble salt content, pH value and OM (organic matter).

E24.4.4 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.

E24.5 Delivery, Storage and Handling

E24.5.1 Store materials in a dry area, protected from freezing, sedimentation and contamination.

E24.5.2 Deliver and store fertilizer in waterproof bags labeled with weight, analysis and name of manufacturer.

E24.6 Materials

E24.6.1 Planting Medium: In accordance with CW 3540 for topsoil except organic matter to be in the range of 5-10%.

E24.6.2 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.

E24.6.3 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%

E24.6.4 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 m<sup>2</sup> which is 8 pounds per 100 sq ft.

E24.7 Construction Method

E24.7.1 Excavation

- (a) Excavate tree vaults and planting beds by hand 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 enters excavations and planters prior to planting. Ensure source of water is not groundwater.
- (d) Scarify bottom of planting beds to a depth of 150mm.
- (e) Cover bottom of tree pit and planting bed with bone meal fertilizer.
- (f) Verify and obtain approval by Contract Administrator of tree vaults with geotextile and planting beds prior to compacted soil mound and planting medium placement

E24.7.2 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.

E24.7.3 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.

E24.7.4 Finished Grading

- (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.

E24.8 Surplus Material

E24.8.1 Dispose of unused planting medium off Site in accordance with CW1130.

E24.9 Cleaning

E24.9.1 Perform cleaning to remove accumulated environmental dirt from all paved surfaces of building faces. Remove surplus materials, rubbish, tools and equipment barriers.

E24.10 Measurement and Payment

E24.10.1 Planting Medium shall be paid for a cubic metre basis. Price shall be payment in full for supplying materials and for performing the Work.

**E25. TREES, SHRUBS & GROUNDCOVER PLANTINGS**

E25.1 Description

E25.1.1 Provide all labour, materials, methods, equipment and accessories for the supply and installation of trees, shrubs, groundcovers, vines, perennials, wood mulch, and black granite mulch.

E25.2 References

E25.2.1 Agriculture and and Agri-Food Canada (AAFC)

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

E25.2.2 Canadian Nursery Landscape Association (CNLA)

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

E25.2.3 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.

E25.2.4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

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

E25.3 Submittals

E25.3.1 Submit product data for:

- (a) Fertilizer.
- (b) Wood mulch.

E25.3.2 Submit samples for:

- (a) Wood mulch.
- (b) Black granite mulch.

E25.4 Source Quality Control

E25.4.1 Obtain approval from Contract Administrator of plant material at source.

E25.4.2 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.

E25.4.3 Acceptance of plant material at source does not prevent rejection on Site prior to or after planting operations.

E25.4.4 Plant material imported from other nations will not be accepted.

E25.4.5 Bare root plant material will not be accepted.

E25.5 Storage and Protection

E25.5.1 Coordinate the shipping of plants and excavation of holes to ensure minimum time laps between digging and planting.

E25.5.2 Protect plant material from frost, excessive heat, wind and sun during delivery.

E25.5.3 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.

E25.5.4 Protect stored plant material from frost, wind and sun as follows:

- (a) For bare root plant material, preserve moisture around roots by heeling-in or burying roots in topsoil and watering to full depth of root zone.
- (b) For pots and containers, maintain moisture level in containers.
- (c) For balled and burlapped and wire basket rootballs, place to protect branches from damage. Maintain moisture level in root zones.

E25.5.5 Remove broken and damaged roots with sharp pruning shears. Make clean cut and cover cuts over 20mm (3/4") diameter with wound dressing.

E25.5.6 Keep roots moist and protect from sun and wind. Heel-in trees that cannot be planted immediately in shaded areas and water well.

E25.6 Scheduling

- E25.6.1 Order plant material as soon as possible after award of contract to ensure plant availability. Request substitutes as required.
- E25.6.2 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.
- E25.7 Warranty of Nursery Stock
- E25.7.1 For all plant material an eighteen (18) month warranty period is required.
- E25.7.2 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.
- E25.7.3 End-of-Warranty inspection will be conducted by Contract Administrator.
- E25.7.4 Contract 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.
- E25.8 Replacements
- E25.8.1 During warranty period, remove from Site any plant material that has died or failed to grow satisfactorily as determined by the Contract Administrator.
- E25.8.2 Extend warranty on replacement plant material for a period equal to the original warranty period.
- E25.8.3 All required replacements shall be by plants of at least the same size and species as specified, and shall be supplied and planted in accordance with the original Drawings and Specifications.
- E25.8.4 Should the replaced plant material not survive, the Contractor will be responsible to replace it a third time and guarantee it for a period equal to the original warranty period unless it is determined that unique Site conditions or inadequate maintenance causes the death of plants
- E25.9 Plant Material
- E25.9.1 Type of root preparation, sizing, grading and quality: comply to Canadian Standards for Nursery Stock.
- E25.9.2 Source of plant material: grown in Zone 3 only in accordance with Plant Hardiness Zones in Canada.
- E25.9.3 Plant material must be planted in zone indicated as appropriate for its species.
- E25.9.4 Plant material free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.
- E25.9.5 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.
- E25.9.6 Refer to Plant Specification List on the Drawings and the Drawings for species, quantities, size and quality of plant materials.
- E25.10 Water
- E25.10.1 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.

- E25.10.2 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.
- E25.11 Planting Medium: backfill with planting medium as specified in Planting Medium Specification.
- E25.12 Stakes: 76mm dia. x 2440mm ht. wooden stakes.
- E25.13 Heavy duty Baler Twine: Polypropylene baler twine, UV protected.
- E25.14 Tree Tie: biodegradable or polyethylene fabric strapping min. 3bmm wide.
- E25.15 Guying Wire: 9 gauge, flexible, non-corrosive strand wire.
- E25.16 Wire Tightener: PG wire tightener.
- E25.17 Clamps: U- bolt: galvanized, 12mm (1/2")  $\emptyset$ , c/w curved retaining bar and hex nuts.
- E25.18 Anchor: Drive-in Type: 12mm (1/2")  $\emptyset$  x 300mm (12") long, aluminum.
- E25.19 Tree Protection: Plastic, 13 mm  $\emptyset$ , nylon reinforced garden hose over guy wire.
- E25.20 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,
- E25.21 Black Granite Mulch: granite mulch, black in colour.
- E25.22 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 m<sup>2</sup> which is 8 pounds per 100 sq ft.
- E25.23 Pre-Planting Preparation
- E25.23.1 Obtain approval from Contract Administrator of finish grading, and planting medium installation prior to commencing Work in this section.
- E25.23.2 Ensure plant material is acceptable to the Contract Administrator.
- E25.23.3 Remove damaged roots and branches from plant material with sharp clean equipment treating wounds as necessary to maintain plant health.
- E25.23.4 Apply anti-desiccant to deciduous trees in leaf in accordance with manufacturer's instructions.
- E25.24 Plant Material Layout
- E25.24.1 Prepare planting beds. Refer to Planting Medium Specification.
- E25.24.2 Lay out plants in pots on beds for Contract Administrator approval prior to installation.
- E25.24.3 For individual trees:
- Stake out locations of all trees and obtain approval from Consultant prior to excavating tree pits.
  - Excavate tree pits to depths and widths indicated on the Drawings.
  - Remove rocks, roots, debris and toxic material from the tree pit.
  - Scarify sides of planting hole.
- E25.24.4 For shrubs, shrubs, groundcovers, vines, perennials:
- Lay out plants per drawings carefully ensuring spacing specified on the Drawings.
  - Obtain Contract Administrator approval of plant layouts and make any necessary adjustments on Site.

E25.24.5 Remove water which enters excavations or planting beds prior to planting. Notify Contract Administrator if water source is groundwater.

#### E25.25 Planting

E25.25.1 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.

E25.25.2 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.

E25.25.3 Plant vertically in locations as indicated. Orient plant material to give best appearance in relation to structure, roads and walks.

E25.25.4 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.

E25.25.5 For groundcovers, vines and perennials: backfill soil evenly to finish grade and tamp to eliminate air pockets.

E25.25.6 Water plant material thoroughly. Report extreme ponding in planters indicative of malfunctioning drains to the Contract Administrator immediately.

E25.25.7 After soil settlement has occurred, fill with soil to finish grade.

E25.25.8 Dispose of burlap, wire and container material off Site.

#### E25.26 Tree Supports

E25.26.1 Install tree supports as indicated on the Drawings taking care not to damage or puncture underground utilities.

E25.26.2 Use double stake tree support for deciduous trees:

(a) Place first stake on prevailing wind side of tree trunk.

(b) Drive stakes minimum 150mm into undisturbed soil beneath bottom of roots. Ensure stakes are secure, vertical and unsplit.

(c) Install tree tie 1500mm above grade.

#### E25.27 Pruning

E25.27.1 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.

#### E25.28 Mulching

E25.28.1 Obtain approval of planting placement from Contract Administrator before mulching material is applied.

E25.28.2 Ensure soil settlement has been corrected prior to mulching.

E25.28.3 Spread wood chip mulch as indicated on all planting beds. Spread mulch to minimum thickness of 75mm.

E25.28.4 Spread black granite mulch to the locations and levels indicated on the Drawings.

#### E25.29 Maintenance

E25.30 Maintain plant material from date of planting to the end of the warranty period. Refer to Landscape Maintenance Specification.

## E25.31 Measurement and Payment

- E25.31.1 Trees, shrubs, groundcovers, vines, and perennials shall be paid for on a unit each basis. Price shall be payment in full for supplying materials and for performing the Work.
- E25.31.2 Wood mulch and black granite mulch shall be paid for on a square metre basis. Price shall be payment in full for supplying materials and for performing the Work.

## E26. TREE REMOVAL

- E26.1 Further to CW 3010 – Clearing and Grubbing, tree removal including the roots shall be measured on a unit basis for the number of trees removed in accordance with CW 3010. Payment shall be at the Contract Unit Price bid for “Removal and Disposal of Trees and Shrubs in Paving Area” measured as specified herein for the total number of trees or shrubs removed in accordance with this Specification, accepted and measured by the Contract Administrator.

## E27. LANDSCAPE MAINTENANCE

### E27.1 Description

- E27.1.1 Provide all labour, materials, methods, equipment and accessories for the maintenance of trees, shrubs, groundcovers, vines, and perennials following acceptance of the plant material to start warranty.

- E27.1.2 In general, the Work shall include:

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

- E27.1.3 Maintenance shall be performed on an as required basis.

### E27.2 Maintenance and Warranty Period

- E27.2.1 Maintenance shall occur between the date of installation and up to a period of two (2) years from date landscaped areas are accepted to start warranty. The warranty period for plant materials will be coincidental to the maintenance period.
- E27.2.2 Thirty 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.

### E27.3 Materials and Equipment

- E27.3.1 Materials shall conform to the requirements of related Specification sections.
- E27.3.2 Provide all equipment to properly execute Work. Maintain such equipment in a workable, safe condition while in use during this project.
- E27.3.3 Contract Administrator shall review equipment to be used to execute Work prior to execution.

### E27.4 Method

#### E27.4.1 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.

#### E27.4.2 Maintenance of Trees, Shrubs, Groundcovers, Vines, and Perennials:

- (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) Mulching: add mulch as required to maintain original thickness. Contractor is to provide replacement mulch material.
- (g) Winter Preparation: Ensure adequate moisture in tree root zones prior to freeze-up.

#### E27.5 Measurement and Payment

E27.5.1 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.

##### Items of Work:

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

## **E28. HYDRO-EXCAVATION**

### Description

- E28.1 This specification shall cover the removal of earthen material immediately adjacent to underground utilities infrastructure by means of high pressure water spray, and the recovery of excavated material by vacuum type means or equivalent method as approved by the Contract Administrator.

### Equipment

- E28.2 Hydro-Excavation equipment shall be capable of maintaining a minimum working pressure of 10,000 psi, at a rate of flow of 10 to 12 gallons per minute. The unit should be adjustable, so as to provide adequate pressure to remove earthen material identified by the Contract Administrator.
- E28.3 Spray head shall be equipped with a rotating type nozzle in order to provide a wider path of cut.

### Construction Methods

#### E28.4 Hydro-Removal of Earthen Material

- E28.4.1 Earthen material adjacent to utility entity shall be sprayed with high pressure water so as to remove all such material identified by the Contract Administrator.

#### E28.5 Recovery of Excavated Material

- E28.5.1 The recovery of excavated material shall be done using a vacuum type method, or other type method as approved by the Contract Administrator.
- E28.5.2 The recovery of material shall follow immediately behind the excavation, to avoid excavated areas from filling with excavated material.
- E28.5.3 The use of mechanical sweepers will not be allowed.
- E28.5.4 Dispose of material in accordance with Section 3.4 of CW 1130-R2.

### Measurement and Payment

#### E28.6 Hydro-Excavation

- E28.6.1 Hydro-Excavation of earthen material and its recovery and disposal will be measured on an hourly basis and paid for at the Contract Unit Price per hour for "Hydro Excavation". The hours to be paid for will be the total number of hours of Hydro Excavation in accordance with this specification, accept and measured by the Contract Administrator. Travel to and from the Site will be considered incidental to "Hydro Excavation".

## **E29. SOFT EXCAVATION TO EXPOSE UNDERGROUND UTILITIES**

### E29.1 Description

- E29.1.1 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.
- E29.1.2 These underground utilities include, but are not limited to, Manitoba Hydro cables, MTS cables, CPR, existing sewers, and existing watermains.

### E29.2 Materials

#### E29.2.1 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.

### E29.3 Construction Methods

E29.3.1 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.

E29.3.2 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.

### E29.4 Measurement and Payment

E29.4.1 Soft excavation to expose underground utilities will be considered incidental to the Work. No measurement and payment will be made within this section.

## **E30. WORKING IN CLOSE PROXIMITY TO THE AQUEDUCT**

E30.1 Prior to any construction, the Aqueduct must be exposed by soft dig method so as to confirm depth and location.

E30.2 Granular material, construction material, soil or other material shall not be stockpiled on the Aqueduct or within 5 meters of centreline of the Aqueduct.

E30.3 Stage construction such that the Aqueduct is not subjected to significant asymmetrical loading at any time.

E30.4 Where work is in close proximity to the Aqueduct, utilize construction practices and procedures that do not impart excessive vibration loads on the Aqueduct or that would cause the settlement of the subgrade below the Aqueduct.

E30.5 Concrete pavement removal and excavation within 3 metres horizontally of the Aqueduct shall be completed by saw cutting and removal, or use of hand held jack hammers. Use of machine mounted concrete breakers above the Aqueduct shall not be permitted.

## **E31. AREAWAY**

E31.1 The Areaway located at 145 Pacific Avenue is to be abandoned. The owner will be constructing a wall to seal off the proposed abandoned area. The contractor may be required to excavate the existing Areaway. The Areaway will be backfilled with free draining granular base course as approved by the contract administrator.

E31.2 The backfill will be paid on a unit cost basis as "Areaway Backfill" and the abandonment of the Areaway will be a lump sum payment as "Abandonment of 145 Pacific Avenue Areaway".

E31.3 The City is still in discussion with the property owner and building construction contractor to determine which contractor shall backfill the areaway.

## **E32. PROVISIONAL ITEMS**

E32.1 The Provisional Items listed in the Schedule of Prices are a part of the Contract.

E32.2 The Contractor shall not perform Work included in the Provisional Items without prior authorization from the Contract Administrator. All Work included in the Provisional Items will be carried out within the construction areas shown on the Drawings.

E32.3 Notwithstanding GC:7, the City reserves the right to diminish all or any portion of the Items of Work listed in the Provisional Items and no claim shall be made for damages on grounds of loss of anticipated profit or for any other reason.