



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 552-2006

**BROADWAY / EXCHANGE DISTRICT - SIDEWALK IMPROVEMENTS
PRINCESS STREET – NOTRE DAME AVENUE TO JAMES AVENUE
KING STREET – NOTRE DAME AVENUE TO WILLIAM AVENUE
ARTHUR STREET – MCDERMOT AVENUE TO BANNATYNE AVENUE
BROADWAY – MEMORIAL BOULEVARD TO MAIN STREET**

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PART B - BIDDING PROCEDURES

B1. PROJECT TITLE

- B1.1 BROADWAY / EXCHANGE DISTRICT - SIDEWALK IMPROVEMENTS
PRINCESS STREET – NOTRE DAME AVENUE TO JAMES AVENUE
KING STREET – NOTRE DAME AVENUE TO WILLIAM AVENUE
ARTHUR STREET – MCDERMOT AVENUE TO BANNATYNE AVENUE
BROADWAY – MEMORIAL BOULEVARD TO MAIN STREET

B2. SUBMISSION DEADLINE

- B2.1 The Submission Deadline is 12:00 noon Winnipeg time, September, 13, 2006.
- B2.2 Bid Submissions determined by the Manager of Materials to have been received later than the Submission Deadline will not be accepted and will be returned upon request.
- B2.3 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

B3. SITE INVESTIGATION

- B3.1 Further to GC:3.1, the Bidder may view the Sites without making an appointment.

B4. ENQUIRIES

- B4.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.
- B4.2 If the Bidder finds errors, discrepancies or omissions in the Bid Opportunity, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.
- B4.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator to all Bidders by issuing an addendum.
- B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator only to the Bidder who made the enquiry.
- B4.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B4 unless that response or interpretation is provided by the Contract Administrator in writing.

B5. 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 Branch internet site at <http://www.winnipeg.ca/matmgt>.
- B5.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Branch internet site for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B5.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B6. SUBSTITUTES

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

B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative shall base his Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B15.

B6.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B7. BID SUBMISSION

B7.1 The Bid Submission consists of the following components:

- (a) Form A: Bid;
- (b) Form B: Prices, hard copy;
- (c) 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 All components of the Bid Submission 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 in ink, to constitute a responsive Bid.

B7.3 The Bid Submission shall be submitted enclosed and sealed in an envelope. The envelope shall be clearly marked with the Bid Opportunity number and the Bidder's name and address.

B7.3.1 Samples or other components of the Bid Submission 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 Submission.

B7.3.2 A hard copy of Form B: Prices must be submitted with the Bid Submission. 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.

B7.4 Bid Submissions submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.

B7.5 Bid Submissions shall be submitted to:

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

B8. BID

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

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

- (a) if the Bidder is a sole proprietor carrying on business in his own name, his name shall be inserted;
- (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
- (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;

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

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

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

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

- (a) if the Bidder is a sole proprietor carrying on business in his own name, it shall be signed by the Bidder;
- (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
- (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, shall be affixed;
- (d) if the Bidder is carrying on business under a name other than his own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.

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

B8.4.2 All signatures shall be original and shall be witnessed except where a corporate seal has been affixed.

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 Submission and the Contract, when awarded, shall be both joint and several.

B9. PRICES

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

B9.1.1 For the convenience of Bidders, and pursuant to B7.3.2 and B15.4.2, an electronic spreadsheet Form B: Prices in Microsoft Excel (.xls) format is available along with the Adobe PDF documents for this Bid Opportunity on the Bid Opportunities page at the Materials Management Branch internet website at <http://www.winnipeg.ca/matmgt>.

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.

B10. QUALIFICATION

B10.1 The Bidder shall:

- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba;
- (b) be responsible and not be suspended, debarred or in default of any obligation to the City;

- (c) be financially capable of carrying out the terms of the Contract;
- (d) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract;
- (e) have successfully carried out work, similar in nature, scope and value to the Work; and
- (f) employ only Subcontractors who:
 - (i) are responsible and not suspended, debarred or in default of any obligation 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 Branch internet site at <http://www.winnipeg.ca/matmgt>); and
 - (ii) have successfully carried out work similar in nature, scope and value to the portion of the Work proposed to be subcontracted to them, and are fully capable of performing the Work required to be done in accordance with the terms of the Contract;
- (g) have a written workplace safety and health program in accordance with The Workplace Safety and Health Act (Manitoba);

B10.2 Further to B10.1(g), the Bidder shall, within three (3) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

- (a) a valid COR certification number under the Certificate of Recognition (COR) Program - Option 1 administered by the Manitoba Heavy Construction Association's Safety, Health and Environment Program; or
- (b) a valid COR certification number under the Certificate of Recognition (COR) Program administered by the Manitoba Construction Safety Association; 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 Branch internet site at <http://www.winnipeg.ca/matmgt>.)

B10.3 The Bidder shall be prepared to submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B10.4 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B11. BID SECURITY

B11.1 The Bidder shall provide bid security in the form of:

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

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

B11.1.1 If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.

B11.2 The bid security of the successful Bidder and the next two lowest evaluated responsive and responsible Bidders will be released by the City when a Contract for the Work has been duly executed by the successful Bidder and the performance security furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

B11.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B11.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.

B11.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.

B11.3 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Bid Opportunity.

B12. OPENING OF BIDS AND RELEASE OF INFORMATION

B12.1 Bid Submissions will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Branch, or in such other office as may be designated by the Manager of Materials.

B12.1.1 Bidders or their representatives may attend.

B12.1.2 Bid Submissions determined by the Manager of Materials, or his designate, to not include the bid security specified in B11 will not be read out.

B12.2 After the public opening, the names of the Bidders and their Total Bid Prices as read out (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 Branch internet site at <http://www.winnipeg.ca/matmgt>.

B12.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract Amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

B12.4 The Bidder is advised that any information contained in any Bid Submission may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B13. IRREVOCABLE BID

B13.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.

B13.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly executed and the performance security furnished as

herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid.

B14. WITHDRAWAL OF BIDS

- B14.1 A Bidder may withdraw his Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.
- B14.1.1 Notwithstanding GC:23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.
- B14.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid, and only such person, has authority to give notice of withdrawal.
- B14.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials shall:
- (a) retain the Bid Submission until after the Submission Deadline has elapsed;
 - (b) open the Bid Submission to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid; and
 - (c) if the notice has been given by any one of the persons specified in B14.1.3(b), declare the Bid withdrawn.
- B14.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B13.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

B15. EVALUATION OF BIDS

- B15.1 Award of the Contract shall be based on the following bid evaluation criteria:
- (a) compliance by the Bidder with the requirements of the Bid Opportunity (pass/fail);
 - (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B10 (pass/fail);
 - (c) Total Bid Price;
 - (d) economic analysis of any approved alternative pursuant to B6.
- B15.2 Further to B15.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid Submission 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 if the interests of the City so require.
- B15.3 Further to B15.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid Submission or in other information required to be submitted, that he is responsible and qualified.
- B15.4 Further to B15.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.
- B15.4.1 If there is any discrepancy between the Total Bid Price written in figures, the Total Bid Price written in words and the sum of the quantities multiplied by the unit prices for each item, the sum of the quantities multiplied by the unit prices for each item shall take precedence.

B15.4.2 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.

B16. AWARD OF CONTRACT

B16.1 The City will give notice of the award of the Contract by way of a letter of intent, or will give notice that no award will be made.

B16.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.

B16.2.1 Without limiting the generality of B16.2, the City will have no obligation to award a Contract where:

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

B16.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid.

PART C - GENERAL CONDITIONS

C1. GENERAL CONDITIONS

- C1.1 The General Conditions for Construction Contracts (Revision 2000 11 09) are applicable to the Work of the Contract.
- C1.2 The *General Conditions for Construction Contracts* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

- D1.1 In addition to the General Conditions for Construction Contracts, these Supplemental Conditions are applicable to the Work of the Contract.
- D1.2 The General Conditions are amended by striking out "The City of Winnipeg Act" wherever it appears in the General Conditions and substituting "The City of Winnipeg Charter".
- D1.3 The General Conditions are amended by striking out "Tender Package" wherever it appears in the General Conditions and substituting "Bid Opportunity".
- D1.4 The General Conditions are amended by striking out "Tender Submission" wherever it appears in the General Conditions and substituting "Bid Submission".
- D1.5 The General Conditions are amended by deleting GC:6.16 and GC:6.17. The City of Winnipeg is now within the jurisdiction of the Manitoba Ombudsman pursuant to The Ombudsman Act.

D2. SCOPE OF WORK

- D2.1 The Work to be done under the Contract shall consist of:
- (a) Unit Paver Sidewalk Restoration
 - (i) Princess Street – Notre Dame Avenue to James Avenue (Excluding West Sidewalk from William Avenue to James Avenue).
 - (ii) King Street – Notre Dame Avenue to William Avenue (Excluding West Sidewalk from Bannatyne Avenue to William Avenue).
 - (iii) Broadway
 - Memorial Street to Edmonton Street
 - Edmonton Street to Carlton Street (South Side Only)
 - Carlton Street to Donald Street
 - Donald Street to Smith Street (South Side Only)
 - Smith Street to Main Street
 - (b) Sidewalk Reconstruction with Unit Paver Bands
 - (i) King Street – Bannatyne Avenue to William Avenue (West Side Only)
 - (c) Sidewalk Reconstruction with Precast Concrete Paving Slabs
 - (i) Broadway
 - Edmonton Street to Carlton Street (North Side Only)
 - Donald Street to Smith Street (North Side Only)
 - (d) Unit Paver Roadway Replacement
 - (i) Arthur Street – McDermot Avenue to Bannatyne Avenue.
- D2.2 The major components of the work are as follows:
- (a) Unit Paver Sidewalk Restoration
 - (i) Regrading unit pavers (Areas with humps, dips and or kicks)
 - (ii) Replacing unit pavers with either salvaged or new unit pavers (where pavers have deteriorated).
 - (iii) Renewing curbs and sidewalks at intersections.

- (b) Sidewalk Reconstruction with Unit Paver Bands
 - (i) Removing concrete sidewalk.
 - (ii) Removing and salvaging sidewalk unit pavers.
 - (iii) Excavation
 - (iv) Construct concrete sidewalk with block outs for unit pavers.
 - (v) Tree well construction.
 - (vi) Tree placement.
- (c) Sidewalk Reconstruction with Precast Concrete Paving Slabs
 - (i) Removing concrete sidewalk
 - (ii) Removing and salvaging sidewalk unit pavers
 - (iii) Excavation
 - (iv) Regrading existing base
 - (v) Structural soil pavement
 - (vi) Tree irrigation and subdrain systems
 - (vii) Tree well construction
 - (viii) Tree placement
 - (ix) Placing Precast Concrete Paving Slabs
- (d) Unit Paver Roadway Replacement.
 - (i) Removing pavement unit pavers
 - (ii) Regarding base
 - (iii) Renewing curb and gutter (sections only)
 - (iv) Sidewalk renewal at intersection.
 - (v) Regarding sidewalk unit pavers
 - (vi) Constructing 200 mm reinforced concrete pavement at McDermot Avenue intersection.
 - (vii) Placing pavement unit pavers.

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is Wardrop Engineering, represented by:

Shane McCartney, P.Eng
Project Engineer
Wardrop Engineering inc.
400-386 Broadway
Winnipeg, MB R3C 4M8

Telephone No. (204) 956-0980
Facsimile No. (204) 957-5389

D3.2 At the pre-construction meeting, Shane McCartney, P.Eng will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D4. CONTRACTOR'S SUPERVISOR

- D4.1 At the pre-construction meeting, the Contractor shall identify his designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.
- 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 24 hours a day to respond to an emergency.

D5. NOTICES

- D5.1 Except as provided for in GC:23.2.2, 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.
- D5.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D5.3, D5.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the address or facsimile number identified in D3.1.
- D5.3 All notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following address or facsimile number:
The City of Winnipeg
Chief Administrative Officer Secretariat
Administration Building, 3rd Floor
510 Main Street
Winnipeg MB R3B 1B9
Facsimile No.: (204) 949-1174
- D5.4 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following address or facsimile number:
The City of Winnipeg
Corporate Services Department
Legal Services Division
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1
Facsimile No.: (204) 947-9155

D6. FURNISHING OF DOCUMENTS

- D6.1 Upon award of the Contract, the Contractor will be provided with five (5) complete sets of the Bid Opportunity. If the Contractor requires additional sets of the Bid Opportunity, they will be supplied to him at cost.

SUBMISSIONS

D7. SAFE WORK PLAN

- D7.1 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 GC:4.1 for the return of the executed Contract.

D7.2 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 Branch internet site at <http://www.winnipeg.ca/matmgt>.

D8. INSURANCE

D8.1 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) all inclusive, with The City of Winnipeg being named as an additional insured, with a cross-liability clause, such liability policy to also contain a contractual liability, an unlicensed motor vehicle liability and a completed operations endorsement to remain in place at all times during the performance of the Work and throughout the warranty period;
- (b) automobile liability insurance for owned and non-owned automobiles used for or in connection with the Work in the amount of at least two million dollars (\$2,000,000.00) at all times during the performance of the Work and until the date of Total Performance;

D8.2 Deductibles shall be borne by the Contractor.

D8.3 The Contractor shall provide the City Solicitor with a certificate of insurance of each policy, in a form satisfactory to the City Solicitor, 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 GC:4.1 for the return of the executed Contract.

D8.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least fifteen (15) Calendar Days prior written notice to the Contract Administrator.

D9. PERFORMANCE SECURITY

D9.1 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.

D9.1.1 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.

D9.2 If the bid security provided in his Bid Submission was not a certified cheque or draft pursuant to B11.1(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 GC:4.1 for the return of the executed Contract.

D10. SUBCONTRACTOR LIST

D10.1 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 GC:4.1 for the return of the executed Contract.

D11. DETAILED WORK SCHEDULE

D11.1 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.

D11.2 The detailed work schedule shall consist of the following:

(a) A Gantt chart for the work acceptable to the Contract Administrator.

D11.3 Further to D11.2(a), the Gantt chart shall show the time on a weekly basis, required to carry out the Work of each trade, or specification division. The time shall be on the horizontal axis, and the type of trade shall be on the vertical axis.

SCHEDULE OF WORK

D12. COMMENCEMENT

D12.1 The Contractor shall not commence any Work until he is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.

D12.2 The Contractor shall not commence any Work on the Site until:

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

- (i) evidence that the Contractor is 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;
- (ii) evidence of the workers compensation coverage specified in GC:6.14;
- (iii) the twenty-four (24) hour emergency response phone number specified in D4.2.
- (iv) the Safe Work Plan specified in D7;
- (v) evidence of the insurance specified in D8;
- (vi) the performance security specified in D9
- (vii) the subcontractors list provided in D10; and
- (viii) the detailed work schedule specified in D11.

(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.

D12.3 The Contractor shall commence the Work on the Site within seven (7) Working Days of receipt of the letter of intent.

D13. WORKING DAYS

D13.1 Further to GC:1.1(gg);

D13.1.1 The Contract Administrator will determine daily if a Working Day has elapsed and will record his assessment. On a weekly basis the Contract Administrator will provide the

Contractor with a record of the Working Days assessed for the preceding week. The Contractor shall sign each report signifying that he agrees with the Contract Administrator's determination of the Working Days assessed for the report period.

D13.1.2 Work done to restore the Site to a condition suitable for Work, shall not be considered "work" as defined in the definition of a Working Day.

D14. RESTRICTED WORK HOURS

D14.1 Further to clause 3.10 of CW 1130, the Contractor shall require written permission 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.

D15. WORK BY OTHERS

D15.1 Work by others on or near the Site will include but not necessarily be limited to:

- (a) Forestry working around existing tree root system
- (b) Traffic Services installing sign clamps on Broadway sidewalk reconstruction blocks
- (c) Manitoba Hydro adjusting manhole frames.

D16. SEQUENCE OF WORK

D16.1 Further to GC:6.1, the sequence of work shall be as follows:

D16.1.1 The Work shall be divided into 2 Phases. Each Phase shall be subdivided into stages. Stages are further subdivided into major items of work.

D16.1.2 **Phase I** – 2006 Works

Stage I

- (a) West Sidewalk on Princess Street from Notre Dame Avenue to William Avenue.
 - (i) Regrade sections of unit pavers.
 - (ii) Renew Sidewalk and ramp curbs at intersections.
- (b) West Sidewalk on King Street from Notre Dame Avenue to William Avenue
 - (i) Regrade sections of unit pavers.
 - (ii) Renew Sidewalk and ramp curbs at intersections.
 - (iii) Reconstruct unit paver sidewalk from Bannatyne Avenue to William Avenue.
- (c) Replace Pavement pavers on Arthur Street from McDermot Avenue to Bannatyne Avenue
 - (i) Remove pavement pavers
 - (ii) Regrade base
 - (iii) Renew sections of curb and gutter
 - (iv) Place new pavement pavers
 - (v) Regrade sections of sidewalk unit pavers
 - (vi) Renew sidewalk and ramp curbs at McDermot intersection
 - (vii) Construct landscape sidewalk crossing at McDermot

Stage II

- (a) East Sidewalk on Princess Street from Notre Dame Avenue to James Street

- (i) Regrade sections of unit pavers.
- (ii) Renew sidewalk and ramp curbs at intersections.
- (b) East sidewalk on King Street from Notre Dame Avenue to Bannatyne Avenue.
 - (i) Regrade sections of unit pavers.
 - (ii) Renew sidewalk and ramp curbs at intersections.

D16.1.3

Phase II – 2007 Works

Stage I

- (a) North and south sidewalk on Broadway from Memorial Boulevard to Carlton Street. (Not including north sidewalk Broadway from Edmonton to Carlton Street)
 - (i) Regrade sections of unit pavers
 - (ii) Renew Sidewalk and ramp curbs at intersections.
- (b) North Sidewalk Broadway from Edmonton to Carlton Street.
 - (i) Removal & Salvage unit pavers
 - (ii) Complete excavation for trees
 - (iii) Install subdrain
 - (iv) Place Structure soil
 - (v) Place trees
 - (vi) Place irrigation system
 - (vii) Place sidewalk pavers
 - (viii) Construct concrete curb/splash strip
 - (ix) Renew sidewalk and ramp curbs at intersections

Stage II

- (a) North & South sidewalk on Broadway from Carlton Street to Smith Street. (Not including N. Sidewalk Broadway from Donald Street to Smith Street)
 - (i) Regrade sections of unit pavers.
 - (ii) Renew Sidewalk and ramp curbs at intersections.
- (b) North sidewalk Broadway from Donald Street to Smith Street.
 - (i) Regrade sections of unit pavers.
 - (ii) Renew Sidewalk and ramp curbs at intersections.
 - (iii) Reconstruct unit paver sidewalk from Bannatyne Avenue to William Avenue.
 - (iv) Place Structure soil
 - (v) Place trees
 - (vi) Place irrigation system
 - (vii) Place sidewalk pavers
 - (viii) Construct concrete curb/splash strip
 - (ix) Renew sidewalk and ramp curbs at intersections

Stage III

- (a) North & South sidewalk on Broadway from Smith Street to Main Street.
 - (i) Regrade sections of unit pavers.
 - (ii) Renew Sidewalk and ramp curbs at intersections.

D17. SUBSTANTIAL PERFORMANCE

- D17.1 The Contractor shall achieve Substantial Performance within thirty five (35) consecutive Working Days of the commencement of the Work as specified in D12.
- D17.2 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.
- D17.3 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. TOTAL PERFORMANCE

- D18.1 The Contractor shall achieve Total Performance within forty (40) consecutive Working Days of the commencement of the Work as specified in D12.
- D18.2 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.
- D18.3 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.

D19. LIQUIDATED DAMAGES

- D19.1 If the Contractor fails to achieve Total Performance in accordance with the Contract by the day fixed herein for Total Performance, the Contractor shall pay the City seven hundred fifty dollars (\$750) per day for each and every working day following the day fixed herein for Total Performance during which such failure continues.
- D19.2 The amount specified for liquidated damages in D19.1 is based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve Total Performance by the day fixed herein for same.
- D19.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D20. SCHEDULED MAINTENANCE

- D20.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:
- (a) Maintenance of trees as specified in E20 Landscape Maintenance
- D20.2 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

D21. JOB MEETINGS

- D21.1 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.
- D21.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

D22. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

- D22.1 Further to GC:6.26, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

WARRANTY

D23. WARRANTY

- D23.1 Notwithstanding GC:13.2 or D23.1, the Contract Administrator may permit the warranty period for a portion or portions of the Work to begin prior to the date of Total Performance if:
- (a) a portion of the Work cannot be completed because of unseasonable weather or other conditions reasonably beyond the control of the Contractor but that portion does not prevent the balance of the Work from being put to its intended use.
- D23.1.1 In such case the date specified by the Contract Administrator for the warranty period to begin shall be substituted for the date specified in GC:13.2 for the warranty period to begin.

FORM H1: PERFORMANCE BOND
(See D9)

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 dated the

_____ day of _____, 20____, for:

BID OPPORTUNITY NO. 552-2006

BROADWAY / EXCHANGE DISTRICT - SIDEWALK IMPROVEMENTS
PRINCESS STREET – NOTRE DAME AVENUE TO JAMES AVENUE
KING STREET – NOTRE DAME AVENUE TO WILLIAM AVENUE
ARTHUR STREET – MCDERMOT AVENUE TO BANNATYNE AVENUE
BROADWAY – MEMORIAL BOULEVARD TO MAIN STREET

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)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

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

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

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

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

(Date)

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

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

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

(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

FORM J: SUBCONTRACTOR LIST
(See D10)

BROADWAY / EXCHANGE DISTRICT
PRINCESS STREET – NOTRE DAME AVENUE TO JAMES AVENUE
KING STREET – NOTRE DAME AVENUE TO WILLIAM AVENUE
ARTHUR STREET – MCDERMOT AVENUE TO BANNATYNE AVENUE
BROADWAY – MEMORIAL BOULEVARD TO MAIN STREET

<u>Portion of the Work</u>	<u>Name</u>	<u>Address</u>
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SURFACE WORKS

Supply of Materials

- Sidewalk unit pavers
- Pavement unit pavers
- Precast Concrete Paving Slabs and Granite Pavers
- Base Course
- Concrete

Installation/Placement

- Removal/Installation sidewalk unit paver
- Removal/Installation pavement unit paver
- Installation Precast Concrete Paving Slabs and Granite Pavers
- Placement base course
- Concrete sidewalk/curbing

UNDERGROUND WORKS

Supply of Materials

- Subdrain piping
- Irrigation system

Installation/Placement

- Subdrain piping
- Irrigation system

LANDSCAPING WORKS

Supply of Materials

- Trees
- Structural soil

Installation/Placement

- Trees
- Structural Soil

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS, STANDARD DETAILS AND DRAWINGS

E1.1 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.

E1.1.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

E1.1.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.

E1.1.3 Further to GC:2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.

E1.2 The following Drawings are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
C0001	Cover Sheet Arthur Street-McDermot Avenue to Bannatyne Avenue Plan and Profile	594 mm x 841 mm
L01	Cross Walk – Arthur Street at McDermot Plan and Details	279 mm x 432 mm
L02	King Street Paving West Side-Bannatyne Avenue to William Avenue Plan	279 mm x 432 mm
L03	Exchange District Paving and Planting Details	279 mm x 432 mm
L04	Broadway Avenue North Side Plan	279 mm x 432 mm
L05	Broadway Streetscape Details	279 mm x 432 mm
L06	Broadway Irrigation Schematic Plan	279 mm x 432 mm

E2. TREE PROTECTION

E2.1 Description

E2.1.1 This Specification shall cover the protection of existing trees within the limits of Work as indicated on the Drawings.

E2.1.2 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 other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E2.2 Materials

E2.2.1 In accordance with the Drawings.

E2.3 Construction Methods

- E2.3.1 The Contractor shall protect existing trees in areas where excavation work is being done and at all locations where damage might occur as a result of construction operations.
- E2.3.2 The Contractor shall not stockpile materials and soil or store equipment on boulevards within 2 m of trees. Under no circumstances are vehicles to be parked on the boulevard.
- E2.3.3 Mature tree trunks within the limits of construction or otherwise identified to be at risk by the Contract Administrator shall be strapped with 25 x 150 x 2400 mm (1" x 6" x 8") wood planks. Smaller trees shall be similarly protected using appropriately sized wood planks.
- E2.3.4 Excavation shall be performed in a manner that minimizes damage to the existing root systems. Where possible, excavation shall be carried out such that the edge of the excavation shall be a minimum of 1.5 times the diameter (measured in inches), with the outcome read in feet, from the closest edge of the trunk. Where roots must be cut to facilitate excavation, they shall be pruned neatly at the face of excavation.
- E2.3.5 Hand excavate or employ 'Air Spade' within the root zone unless otherwise directed by the Contract Administrator.
- E2.3.6 Operation of equipment within the dripline of the trees shall be kept to the minimum required to perform the work required. Equipment shall not be parked, repaired, refueled; construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines of trees. The dripline of a tree shall be considered to be the ground surface directly beneath the tips of its outermost branches. The Contractor shall ensure that the operations do not cause flooding or sediment deposition on areas where trees are located.
- E2.3.7 Work on Site shall be carried out in such a manner so as to minimize damage to existing tree branches. Where damage to tree branches does occur, the Contractor shall engage a tree care professional with a Manitoba Arborists Certificate to prune the damaged branch.
- E2.3.8 All damage to existing trees caused by the Contractor's activities shall be repaired to the requirements and satisfaction of the Contract Administrator and the City of Winnipeg's Forester or his designate.
- E2.3.9 Elm trees cannot be trimmed between April 1 and July 31, inclusive.
- E2.4 Method of Measurement
- E2.4.1 No separate measurement or payment will be made for the protection of trees

E3. TRAFFIC CONTROL

- E3.1 Further to clauses 3.6 and 3.7 of CW 1130-R1:
- (a) Where directed, 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. No measurement for payment will be made for this work.
 - (b) In accordance with the Manual of Temporary Traffic Control, the Contractor ("Agency" in the manual) shall make arrangements with the Traffic Services Section of the City of Winnipeg to place all temporary regulatory signs. The Contractor shall bear all costs associated with the placement of temporary traffic control devices by the Traffic Services Section 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-R1:

E4.1.1 The Contractor may close one lane next to the actual work areas on King Street, Princess Street and Broadway. Work on only one side of King Street and Princess Street at a time. Arthur Street will be permitted to be closed for 10 consecutive working days.

E4.1.2 Intersecting streets and private approach access shall be maintained at all times.

E4.1.3 Should the Contractor be unable to maintain pedestrian or vehicular access to a residence or business, he 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.

E4.1.4 Pedestrian and ambulance/emergency vehicle access must be maintained at all times.

E5. PEDESTRIAN SAFETY

E5.1 During the project maintain safe pedestrian access to properties. For sidewalk reconstructions on Broadway, a temporary snow fence shall be installed surrounding the deep excavation. 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. WATER USED BY CONTRACTOR

E6.1 Further to clause 3.7 of CW 1120-R1, 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.

E7. SURFACE RESTORATIONS

E7.1 Further to clause 3.3 of CW 1130-R1, 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.

E8. REGRADE ROADWAY BASE

DESCRIPTION

E8.1 General

E8.1.1 This specification covers regrading of existing roadway base to design grades in preparation for Pavement Unit Pavers.

E8.1.2 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 other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E8.1.3 Referenced Standard Construction Specifications

(a) CW 3110 – Sub-Grade, Sub-Base and Base Course Construction.

MATERIALS

E8.2 Crushed Limestone Base Course Material

- E8.2.1 Crushed limestone base course material will have a maximum aggregate size of 20 millimetre and be supplied in accordance with Section 2.2 of CW 3110.

CONSTRUCTION METHODS

E8.3 General

- E8.3.1 Prior to regrading existing roadway base insure all bedding sand from the pavement units pavers has been removed. Contract Administrator to review and approve completion of sand removal prior to starting base regrading.
- E8.3.2 Regrade roadway base in areas outlined on the construction drawings and as directed by the Contract Administrator.
- E8.3.3 In areas where fill is required scarify surface prior to placing base material to create an adequate interface between old and new materials.
- E8.3.4 Place and compact crushed base material in accordance with CW 3110. Compact to a minimum of 100% Standard Proctor Density.
- E8.3.5 Take required precautions so not to damage or displace the existing roadway subbase structure. Smaller equipment is to be used in performing these works.

MEASUREMENT AND PAYMENT

E8.4 Regrade Roadway Base

- E8.4.1 Regrade roadway base will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Regrade Roadway Base". The area to be paid for will be the total number of square metres of roadway base regraded in accordance with this specification, accepted and measured by the Contract Administrator.

E9. REMOVE AND DISPOSE OF PAVEMENT UNIT PAVERS

DESCRIPTION

E9.1 General

- E9.1.1 This specification covers removing and disposing of existing pavement unit pavers.
- E9.1.2 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 other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

CONSTRUCTION METHODS

E9.2 General

- E9.2.1 Remove and dispose of pavement unit pavers where outlined on the drawings and as directed by the Contract Administrator. Dispose of material in accordance with Section 3.4 of CW 1130.

- E9.2.2 Remove and dispose of sand bedding and debris. Dispose of material in accordance with Section 3.4 of CW 1130. Contract Administrator to review and approve removal of sand bedding prior to base regrading.
- E9.2.3 Take required precautions so not to damage or displace the existing roadway subbase structure. Smaller equipment is to be used in performing these works.

MEASUREMENT AND PAYMENT

- E9.3 Remove and Dispose of Pavement Unit Pavers
 - E9.3.1 Remove and Dispose of Pavement Unit Pavers will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Remove and Dispose of Pavement Unit Pavers". The area to be paid for will be the total number of square metres of unit pavers removed and disposed of in accordance with this specification, accepted and measured by the Contract Administrator.

E10. REMOVE AND SALVAGE SIDEWALK UNIT PAVERS

DESCRIPTION

- E10.1 General
 - E10.1.1 This specification covers removing and salvage sidewalk unit pavers for reuse in the project.
 - E10.1.2 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 other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

CONSTRUCTION METHODS

- E10.2 General
 - E10.2.1 Remove and salvage sidewalk unit pavers in areas where sidewalk reconstruction is outlined on the drawings and as directed by the Contract Administrator.
 - E10.2.2 Provide safe storage for salvaged sidewalk unit pavers.
 - E10.2.3 Unit pavers considered to be in poor condition and not reusable for the project by the Contract Administrator are to be disposed of in accordance with Section 3.4 of CW 1130.
 - E10.2.4 Surplus salvaged unit pavers not required for the project are to be placed on pallets and delivered to the City Yard at 1170 Pacific Avenue as directed by the Contract Administrator.

MEASUREMENT AND PAYMENT

- E10.3 Remove and Salvage Sidewalk Unit Pavers
 - E10.3.1 Remove and Salvage Sidewalk Unit Pavers will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Remove and Salvage Sidewalk Unit Pavers". The area to be paid for will be the total number of square metres of sidewalk unit pavers removed and salvaged in accordance with this specification, accepted and measured by the Contract Administrator.

E11. REGRADE SIDEWALK UNIT PAVERS

DESCRIPTION

E11.1 General

E11.1.1 This specification covers regrading of sidewalk unit pavers.

E11.1.2 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 other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

MATERIALS

E11.2 General

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

E11.3 Crushed Limestone Base Course Material

E11.3.1 Crushed limestone base course material will have a maximum aggregate size of 20 millimetre and be supplied in accordance with Section 2.2 of CW 3110.

E11.4 Bedding Sand

E11.4.1 Bedding sand for sidewalk and roadway applications shall conform to the requirements of Specification CW 3330-R3.

E11.5 Joint Sand

E11.5.1 Joint sand shall conform to the requirements of Specification CW 3330-R3.

CONSTRUCTION METHODS

E11.6 General

E11.6.1 Remove sidewalk unit pavers and set aside reuseable pavers in a safe area for later placement.

E11.6.2 If the grade difference required to regrade the unit pavers is within 12mm, re-level the bedding sand for replacement of unit pavers.

E11.6.3 If the grade difference required to regrade the unit pavers is greater than 12mm, remove the bedding sand and set aside for reuse. Adjust the grade to provide the required thickness of bedding sand as outlined on the drawings. Use Crushed Limestone Base Course Material if fill material is required. Replace the bedding sand.

E11.6.4 Spread and level the bedding sand so that the concrete unit pavers when installed are 5 mm higher than the finished grade. No more sand shall be spread than can be covered in one day with concrete unit pavers. The bedding sand layer shall not be compacted prior to installation of the concrete unit pavers.

E11.6.5 Re-install the unit pavers. Concrete and clay pavers shall be installed in accordance with the requirements of Specification CW 3330-R3, set in locations and patterns as shown on the Drawings. Spaces between joints shall not exceed 3 mm, and shall be uniform and consistent while maintaining true patterns as indicated on the Drawings.

E11.6.6 If cutting of pavers is required, the sawn edges shall be true, even and undamaged. Cuts shall occur at the end of rows and intersections of lines of paving only.

E11.6.7 Clay brick pavers shall be compacted into the bedding sand layer using approved vibratory compactors until they are at the proper grade, uniformly level and free of any movement. Joint sand shall be swept into the joints until full.

E11.6.8 Supply and placing of bedding and joint sand shall be incidental to the installation of the paving stones.

E11.7 Quality Control

E11.7.1 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.

MEASUREMENT AND PAYMENT

E11.8 Regrade Sidewalk Unit Pavers

E11.8.1 Regrade sidewalk unit pavers will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Regrade Sidewalk Unit Pavers". The area to be paid for will be the total number of square metres of sidewalk unit pavers regraded in accordance with this specification, accepted and measured by the Contract Administrator.

Regrading area to be specified.

a.) Less than 5 sq.m.

b.) Greater than 5 sq.m.

E12. REPLACE SIDEWALK UNIT PAVERS WITH SALVAGED UNIT PAVERS

DESCRIPTION

E12.1 General

E12.1.1 This specification covers replacing sidewalk unit pavers with salvaged unit pavers in good condition that have been removed and salvaged on the project.

E12.1.2 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 other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

MATERIALS

E12.2 General

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

E12.3 Crushed Limestone Base Course Material

E12.3.1 Crushed limestone base course material will have a maximum aggregate size of 20 millimetre and be supplied in accordance with Section 2.2 of CW 3110.

E12.4 Bedding Sand

E12.4.1 Bedding sand for sidewalk and roadway applications shall conform to the requirements of Specification CW 3330-R3.

E12.5 Joint Sand

E12.5.1 Joint sand shall conform to the requirements of Specification CW 3330-R3.

CONSTRUCTION METHODS

E12.6 General

E12.6.1 Remove sidewalk unit pavers and dispose of them where marked out and directed by the Contract Administrator. Disposal of material in accordance with Section 3.4 if CW 1130.

E12.6.2 Complete regrading if required.

E12.6.3 If the grade difference required to regrade the unit pavers is within 12mm, re-level the bedding sand for replacement of unit pavers.

E12.6.4 If the grade difference required to regrade the unit pavers is greater than 12mm, remove the bedding sand and set aside for reuse. Adjust the grade to provide the required thickness of bedding sand as outlined on the drawings. Use Crushed Limestone Base Course Material if fill material is required. Replace the bedding sand.

E12.6.5 Spread and levelled the set a side bedding sand so that the concrete unit pavers when installed are 5 mm higher than the finished grade. Supply and place additional bedding sand to meet the required thickness. Supply and placement of additional bedding sand will be considered incidental to the works. No more sand shall be spread than can be covered in one day with concrete unit pavers. The bedding sand layer shall not be compacted prior to installation of the concrete unit pavers.

E12.6.6 Install good used unit pavers that have been salvaged from the sidewalk reconstruction location. Concrete and clay pavers shall be installed in accordance with the requirements of Specification CW 3330-R3, set in locations and patterns as shown on the Drawings. Spaces between joints shall not exceed 3 mm, and shall be uniform and consistent while maintaining true patterns as indicated on the Drawings.

E12.6.7 If cutting of pavers is required, the sawn edges shall be true, even and undamaged. Cuts shall occur at the end of rows and intersections of lines of paving only.

E12.6.8 Clay brick pavers shall be compacted into the bedding sand layer using approved vibratory compactors until they are at the proper grade, uniformly level and free of any movement. Joint sand shall be swept into the joints until full.

E12.7 Quality Control

E12.7.1 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.

MEASUREMENT AND PAYMENT

E12.8 Replace sidewalk unit pavers with salvaged unit pavers.

E12.8.1 Replace sidewalk unit pavers with salvaged unit pavers will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Replace Sidewalk Unit Pavers with Salvaged Unit Pavers". The area to be paid for will be the total number of square

metres of sidewalk unit pavers replaced with Salvaged unit pavers in accordance with this specification, accepted and measured by the Contract Administrator.

Replacement area to be specified.

- a.) Less than 5 sq.m.
- b.) Greater than 5 sq.m.

E12.8.2 Supply and placing of bedding and joint sand shall be included in the installation of the paving stones.

E13. REPLACE SIDEWALK UNIT PAVERS WITH NEW UNIT PAVERS

DESCRIPTION

E13.1 General

E13.1.1 This specification covers replacing sidewalk unit pavers with new unit pavers.

E13.1.2 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 other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

MATERIALS

E13.2 General

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

E13.3 Crushed Limestone Base Course Material

E13.3.1 Crushed limestone base course material will have a maximum aggregate size of 20 millimetre and be supplied in accordance with Section 2.2 of CW 3110.

E13.4 Concrete Unit Pavers

E13.4.1 Concrete unit pavers for sidewalk applications shall be bevel edge precast concrete unit pavers, 60 mm depth.

E13.4.2 Type, colours and patterns of concrete unit pavers shall be as indicated on the Drawings, supplied by Barkman Concrete Ltd. or approved equal. Pavers shall conform to the requirements of CAN3-A231.2, Precast Concrete Pavers.

E13.4.3 Further to CAN3-A231.2.6.1.1, where concrete pavers are shipped for installation before the pavers are 28 days old, the average compressive strength of these pavers at the time of delivery to the work site shall not be less than 40 MPa.

E13.5 Clay Brick Pavers

E13.5.1 Clay brick pavers as manufactured by Endicott Clay Products Company and supplied by Alsip Industrial Products Ltd., Winnipeg, MB, (204) 667-3330. Pavers shall conform to ASTM C902. Type 1, dimensional tolerance: 1/8", wire cut face, 102 mm x 204 mm x 60 mm depth, solid (not cored). Colour: medium ironspot.

E13.6 Bedding Sand

E13.6.1 Bedding sand for sidewalk and roadway applications shall conform to the requirements of Specification CW 3330-R3.

E13.7 Joint Sand

E13.7.1 Joint sand shall conform to the requirements of Specification CW 3330-R3.

CONSTRUCTION METHODS

E13.8 General

E13.8.1 Remove sidewalk unit pavers and dispose of them where marked out and directed by the Contract Administrator. Disposal of material in accordance with Section 3.4 if CW 1130.

E13.8.2 Complete regrading if required.

E13.8.3 If the grade difference required to regrade the unit pavers is within 12mm, re-level the bedding sand for replacement of unit pavers.

E13.8.4 If the grade difference required to regrade the unit pavers is greater than 12mm, remove the bedding sand and set aside for reuse. Adjust the grade to provide the required thickness of bedding sand as outlined on the drawings. Use Crushed Limestone Base Course Material if fill material is required. Replace the bedding sand.

E13.8.5 Spread and level bedding sand so that the concrete unit pavers when installed are 5 mm higher than the finished grade. Supply and place additional bedding sand to meet the required thickness. Supply and placement of additional bedding sand will be considered incidental to the works. No more sand shall be spread than can be covered in one day with concrete unit pavers. The bedding sand layer shall not be compacted prior to installation of the concrete unit pavers.

E13.8.6 Install the new unit pavers. Concrete and clay pavers shall be installed in accordance with the requirements of Specification CW 3330-R3, set in locations and patterns as shown on the Drawings. Spaces between joints shall not exceed 3 mm, and shall be uniform and consistent while maintaining true patterns as indicated on the Drawings.

E13.8.7 If cutting of pavers is required, the sawn edges shall be true, even and undamaged. Cuts shall occur at the end of rows and intersections of lines of paving only.

E13.8.8 Clay brick pavers shall be compacted into the bedding sand layer using approved vibratory compactors until they are at the proper grade, uniformly level and free of any movement. Joint sand shall be swept into the joints until full.

E13.9 Quality Control

E13.9.1 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.

MEASUREMENT AND PAYMENT

E13.10 Replace sidewalk unit pavers with new unit pavers.

E13.10.1 Replace sidewalk unit pavers with new unit pavers will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Replace Sidewalk Unit Pavers with New Unit Pavers". The area to be paid for will be the total number of square metres of

sidewalk unit pavers replaced with new unit pavers in accordance with this specification, accepted and measured by the Contract Administrator.

Type of unit paver replaced with new.

- (ii) Endicott Clay Paver
- (iii) Half Holland Paver
- (iv) Munic Paver

Regrading area to be specified.

- a.) Less than 5 sq.m.
- b.) Greater than 5 sq.m.

E13.10.2 Supply and placing of bedding and joint sand shall be included in the installation of the paving stones.

E14. TREE WELL CURB

DESCRIPTION

E14.1 General

E14.1.1 This specification covers construction of tree well curbs.

E14.1.2 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 other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E14.1.3 Referenced Standard Construction Specifications

- (b) CW 3310 - Portland Cement Concrete Pavement Works.
- (c) CW 3110 - Sub-Grade, Sub-Base and Base Course Construction
- (d) CW 3325 - Portland Cement Concrete Sidewalk

MATERIALS

E14.2 Concrete and reinforcement steel materials in accordance with CW 3310.

E14.3 Base materials in accordance with CW 3110.

CONSTRUCTION METHODS

E14.4 General

E14.4.1 Excavate area for tree well curb and place 150mm base course material as detailed on the drawings and as directed by the Contract Administrator in accordance with CW 3110 and CW 3325.

E14.4.2 Construct tree well curb to design grades as per drawings and as directed by the Contract Administrator in accordance with CW 3310.

MEASUREMENT AND PAYMENT

E14.5 Tree Well Curb

E14.5.1 Tree Well Curb will be measured on a linear measurement basis and paid for at the Contract Unit Price per metre for "Tree Well Curb ". The length to be paid for will be the

total number of metres of Tree Well curb constructed in accordance with this specification, accepted and measured by the Contract Administrator.

E15. REBUILD TREE WELL CURB

DESCRIPTION

E15.1 General

- E15.1.1 This specification covers rebuilding existing tree well curbs to the required elevations to match sidewalk design grades.
- E15.1.2 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 other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.
- E15.1.3 Referenced Standard Construction Specifications
 - (b) CW 3310 - Portland Cement Concrete Pavement Works.

MATERIALS

- E15.2 In accordance with CW 3310 - Portland Cement Concrete Pavement Works.

CONSTRUCTION METHODS

E15.3 General

- E15.3.1 Remove the required height off the existing curb to provide space to construct a minimum 100mm high curb adjustment to match the sidewalk design grade.
- E15.3.2 Place reinforcing steel as per City of Winnipeg Standard detail SD-205 with the exception of drilled the deformed bars 75mm into the concrete instead of 100mm.
- E15.3.3 Form and pour the curb adjustment to the grades laid out by Contract Administrator in accordance with CW-3310 - Portland Cement Concrete Pavement Works.

MEASUREMENT AND PAYMENT

E15.4 Rebuild Tree Well Curb

- E15.4.1 Rebuild Tree Well Curb will be measured on a linear measurement basis and paid for at the Contract Unit Price per metre for "Rebuild Tree Well Curb ". The length to be paid for will be the total number of metres of Tree Well curb rebuilt in accordance with this specification, accepted and measured by the Contract Administrator.

E16. CONCRETE SIDEWALK WITH FORMED BLOCK OUTS FOR PRECAST CONCRETE UNIT PAVERS

E16.1 Description

- E16.1.1 Where shown on the drawings and as directed by the Contract Administrator the Contractor shall form block outs in the concrete sidewalk to allow for precast concrete unit pavers. The concrete sidewalk is to be constructed in accordance CW3325-R2 and be acceptable to the Contract Administrator.

E16.2 Construction Methods

E16.2.1 The Contractor shall size block outs to minimize cutting of paver sand allow for a maximum joint width of 3 mm between pavers and concrete sidewalk. Obtain approval of the forms from Contract Administrator prior to pouring concrete. Blockout areas for pavers are to maintain a minimum thickness of 100mm as shown on the drawings and as directed by the Contract Administrator.

E16.3 Method of Measurement

E16.3.1 Construction of concrete sidewalks with block outs for precast concrete unit pavers shall be measured on a surface area basis. The surface area to be paid for shall be the number of square metres of concrete sidewalk constructed in accordance with this Specification and accepted by the Contract Administrator, as computed by measurements made by the Contract Administrator.

E16.3.2 Basis of Payment

E16.3.3 Construction of concrete sidewalks with block outs for precast concrete unit pavers will be paid for at the Contract Unit Price per square metre for "100mm Concrete Sidewalk with Block Outs", 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.

E17. UNIT PAVING IN SIDEWALK FORMED BLOCK OUTS AND ROADWAYS

E17.1 Description

E17.1.1 This Specification shall cover the supply and installation of concrete unit paving and clay brick paving in formed block outs as indicated on the Drawings.

E17.1.2 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 Work as hereinafter specified.

E17.2 Materials

- E17.2.1 General
- .1 The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification.
- E17.2.2 Concrete Unit Pavers
- .1 Concrete unit pavers for sidewalk applications shall be bevel edge precast concrete unit pavers, 60 mm depth.
 - .2 Concrete unit pavers for roadway applications shall be bevel edge precast concrete unit pavers, 80 mm depth.
 - .3 Type, colours and patterns of concrete unit pavers shall be as indicated on the Drawings, supplied by Barkman Concrete Ltd. or approved equal. Note 60 mm and 80 mm depth Munic Pavers are not part of the current catalogue but are available on special order. Pavers shall conform to the requirements of CAN3-A231.2, Precast Concrete Pavers.
 - .4 Further to CAN3-A231.2.6.1.1, where concrete pavers are shipped for installation before the pavers are 28 days old, the average compressive strength of these pavers at the time of delivery to the work site shall not be less than 40 MPa.
- E17.2.3 Clay Brick Pavers
- .1 Clay brick pavers as manufactured by Endicott Clay Products Company and supplied by Alsip Industrial Products Ltd., Winnipeg, MB, (204) 667-3330. Pavers shall conform to ASTM C902. Type 1, dimensional tolerance: 1/8", wire cut face, 102 mm x 204 mm x 60 mm depth, solid (not cored). Colour: medium ironspot.
 - .2 Clay detectable warning pavers as manufactured by Endicott Clay Products Company and supplied by Alsip Industrial Products Ltd., Winnipeg, MB, (204) 667-3330. Pavers shall conform to ASTM C902. Type 1, dimensional tolerance: 1/8", wire cut face, 102 mm x 204 mm x 60 mm depth, solid (not cored). Colour: dark ironspot.
- E17.2.4 Bedding Sand
- .1 Bedding sand for sidewalk and roadway applications shall conform to the requirements of Specification CW 3330-R3.
- E17.2.5 Joint Sand
- .1 Joint sand shall conform to the requirements of Specification CW 3330-R3.
- E17.3 Construction Method
- E17.3.1 Preparation of Sand base
- .1 Install bedding sand in formed recesses in concrete sidewalk, depth as indicated on the Drawings. The sand layer shall be spread and leveled so that the concrete unit pavers when installed are 5 mm higher than the finished grade. No more sand shall be spread than can be covered in one day with concrete unit pavers. The bedding sand layer shall not be compacted prior to installation of the concrete unit pavers.
No concrete unit pavers shall be placed until the construction of the underlying layers has been approved by the Contract Administrator.
- Installation of Unit Pavers
- .1 Concrete and clay pavers shall be installed in accordance with the requirements of Specification CW 3330-R3, set in locations and patterns as shown on the Drawings. Spaces between joints shall not exceed 3 mm, and shall be uniform and consistent while maintaining true patterns as indicated on the Drawings.
 - .2 If cutting of pavers is required, the sawn edges shall be true, even and undamaged. Cuts shall occur at the end of rows and intersections of lines of paving only.

- .4 Clay brick pavers shall be compacted into the bedding sand layer using approved vibratory compactors until they are at the proper grade, uniformly level and free of any movement. Joint sand shall be swept into the joints until full.
- .5 Clay detectable warning pavers shall be installed at curb ramps as indicated on the Drawings.
- .6 Supply and placing of bedding and joint sand shall be incidental to the installation of the paving stones.

E17.4 Quality Control

- E17.4.1 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.

E17.5 Method of Measurement

E17.5.1 60mm Depth Concrete Pavers in Formed Blockouts

- .1 The supply and installation of 60 mm depth concrete unit pavers in formed blockouts shall be measured on a surface area basis. The surface area to be paid for shall be the number square metres constructed in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

E17.5.2 80mm Depth Concrete Pavers in Formed Blockouts

- .1 The supply and installation of 80 mm depth concrete unit pavers in formed blockouts shall be measured on a surface area basis. The surface area to be paid for shall be the number square metres constructed in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

E17.5.3 Clay Brick Pavers in Formed Blockouts

- .1 The supply and installation of clay brick pavers in formed blockouts shall be measured on a surface area basis. The surface area to be paid for shall be the number square metres constructed in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

E17.5.4 Clay Detectable Warning Pavers in Formed Blockouts

- .1 The supply and installation of clay detectable warning pavers in formed blockouts shall be measured on a surface area basis. The surface area to be paid for shall be the number square metres constructed in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

E17.6 Basis of Payment

E17.6.1 60mm Depth Concrete Pavers in Formed Blockouts

- .1 The supply and installation of 60 mm depth concrete unit pavers in formed blockouts shall be paid for at the Contract Unit Price per square metre for “60mm Concrete Unit Pavers in Formed Blockouts” measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

- E17.6.2 80mm Depth Concrete Pavers in Formed Blockouts
- .1 The supply and installation of 80 mm depth concrete unit pavers in formed blockouts shall be paid for at the Contract Unit Price per square metre for “ 80mm Concrete Unit Pavers in Formed Blockouts” measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.
- E17.6.3 Clay Brick Pavers in Formed Blockouts
- .1 The supply and installation of clay brick pavers shall be paid for at the Contract Unit Price per square metre for “Clay Brick Pavers,” measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.
- E17.6.4 Clay Detectable Warning Pavers in Formed Blockouts
- .1 The supply and installation of clay detectable warning pavers shall be paid for at the Contract Unit Price per square metre for “Clay Detectable Warning Pavers,” measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

E18. TREES

E18.1 Description

- E18.1.1 This Specification shall cover the supply and installation of plant material as specified herein and as indicated on the Drawings, and shall supplement the “Guidelines for the Planting of Boulevard Trees - Schedule D”, latest edition, available from the City of Winnipeg Forestry Branch. Where these two documents differ, this Specification shall take precedence.
- E18.1.2 The Work to be done by the Contactor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E18.2 Source Quality Control

- E18.2.1 Obtain Approval of plant material at source.
- E18.2.2 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.
- E18.2.3 Acceptance of plant material at its source does not prevent rejection on Site prior to or after planting operations.
- E18.2.4 Trees are to be grown in nurseries under proper horticultural practices as recommended by the Canadian Nursery Trades Association.
- E18.2.5 Only those trees will be accepted which have been grown for at least the last four (4) previous years in nurseries located in an Agriculture Canada Plant Hardiness Zone designation of 2 (a or b) or 3 (a or b). Trees that have grown in Plant Hardiness Zone 4 or greater will be rejected.

E18.3 Shipment and Pre-Planting Care

- E18.3.1 Coordinate shipping of plants and excavation of holes to ensure minimum time lapse between digging and planting.
- E18.3.2 Tie branches of trees securely and protect plant material against abrasion, exposure and extreme temperature change during transit. Avoid binding of planting stock with rope or wire that damage bark, break branches or destroy natural shape of plant. Give full support to rootball of large trees during lifting.
- E18.3.3 Cover plant foliage with tarpaulin and protect bare roots by means of dampened straw, peatmoss, sawdust or other acceptable material to prevent loss of moisture during transit and storage.
- E18.3.4 Remove broken and damaged roots with sharp pruning shears. Make clean cuts and cover cuts over 10 mm diameter with wound dressing.
- E18.3.5 Keep roots moist and protected from sun and wind. Heel-in trees that cannot be planted immediately in shaded areas and water well.

E18.4 Warranty

- E18.4.1 Further to GC 13, the Contractor agrees to replace and replant any nursery stock found dead or in poor condition throughout the warranty period as defined in E15, without cost to the Owner. "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 Owner.
- E18.4.2 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, and the replaced plant material shall carry an additional two (2) years guarantee. Should the replaced plant material not survive, the Contractor will be responsible to replace it a third time and guarantee it for an additional two (2) years unless it is determined that unique Site conditions causes the death of plants.
- E18.4.3 An end-of-warranty inspection will be conducted.
- E18.4.4 Contract Administrator reserves the right to extend Contractor's warranty responsibilities for an additional one (1) year if, at the end of warranty period, leaf development and growth is not sufficient to ensure future survival.

E18.5 Replacements

- E18.5.1 During the warranty period, remove from Site any plant material that has died or failed to grow satisfactorily as determined by Contract Administrator.
- E18.5.2 Replace plant material as soon as possible and as directed by the Contract Administrator.

E18.6 Materials

- E18.6.1 Topsoil: screened clay-textured or loam-textured dark topsoil, a fertile, friable material neither of heavy clay nor of very light sandy nature containing by volume, a minimum of 4% for clay loams and 2% for sandy loams to be maximum 25% organic matter (peat, well rotted manure or composted material) and capable of sustaining vigorous plant growth. Topsoil shall be free of subsoil contamination, roots, stones over 25 mm in diameter and other extraneous matter. Topsoil shall not contain quack grass rhizomes, Canada thistle roots or other noxious weeds. Salinity rating shall be 4.0 mmhos/cm or less on a saturated paste basis. The pH range shall be between 6.0 and 8.0. Soil shall not be blow-in dirt taken from wind-erosion sites and shall not be taken from fields abandoned to corn production

where such soils may contain soil incorporated herbicides with lasting residual effects such as eradican and atrazine.

- E18.6.2 Structural Soil: to
- E18.6.3 Water: Potable and free of minerals which may be detrimental to plant growth
- E18.6.4 Tree Rings: fabricated from 3 mm galvanized wire encased in two-ply reinforced 12 mm diameter rubber garden hose or equivalent.
- E18.6.5 Stakes: T-Bar steel stakes 38 mm x 38 mm x 5 mm x 2500 mm.
- E18.6.6 Guy Wires and Accessories: Steel wire strand to CSA G4-M1977 3 mm diameter. Horticultural guy wire tightener.
- E18.6.7 Trunk Collar: 150 mm diameter corrugated plastic pipe, 300 mm height.
- E18.6.8 Rootball Burlap: Biodegradable 150 g Hessian burlap.
- E18.6.9 Anti-Desiccant: Wax-like emulsion to provide film over plant surfaces reducing evaporation but permeable enough to permit transpiration.
- E18.6.10 Wound Dressing: Horticulturally accepted non-toxic, non-hardening emulsion.
- E18.6.11 Fertilizer: Slow release formulation of low nitrogen, high phosphorous (e.g., 10-50-12). Apply at rate in accordance with manufacturers written instructions.
- E18.6.12 Woodchip Mulch: Woodchips from hardwood trees, free of bark, branches, and leaves varying in size from 1/4" to 3/4" (6-20 mm) thick.
- E18.6.13 Horticultural Bonemeal: Raw bonemeal finely ground with minimum analysis of 3% nitrogen and 10% phosphoric acid.
- E18.7 Plant Material
 - E18.7.1 Quality and Source: Comply with Guide Specification for Nursery Stock, latest edition, of Canadian Nursery Trades Association (CNTA) referring to size and development of plant material and rootball. Height and spread dimensions refer to main body of plant and not from branch tip to branch tip. Use trees of No. 1 grade.
 - E18.7.2 Nomenclature of specified trees is to conform to the International Code of Nomenclature for Cultivated Plants and is to be in accordance with the approved scientific names given in the latest edition of "Standardized Plant Names".
 - E18.7.3 Trees are to be characteristically developed for their species and structurally sound, well branched, healthy and vigorous and densely foliated when in leaf. Each tree is to have a healthy, well developed, fibrous root system, which may be verified through a testing procedure that destructively samples one, or more randomly selected rootballs.
 - E18.7.4 Trees are to have been root pruned regularly, but not later than one growing season prior to arrival on site. Trees in excess of 75 mm caliper are to have been half root pruned during each of two successive growing season, the latter at least, one growing season prior to arrival on site.
 - E18.7.5 All parts of plant material are to be moist and show live, green cambium tissue when cut.
 - E18.7.6 Trees and shrubs are to be free of disease, insect infestation, rodent damage, sun scald, frost cracks, abrasions, unhealed scars, scars exceeding 5 cm in diameter, major forks or crooks in the trunk, broken branches, or angled leaders. Trees having the above defects will not be accepted by the Contract Administrator.

- E18.7.7 Trees having a leader that has developed at a sharp angle to the trunk as a result of pruning or trunk damage will not be accepted.
- E18.7.8 Tree Spade Dug Material: Dig plant material with mechanized digging equipment of hydraulic spade or clamshell type. Rootballs to satisfy CNTA standards. Lift rootball from hole, place in wire basket designed for purpose and lined with burlap. Tie burlap around rootball and tie basket to ball with heavy rope. Take care not to injure trunk of tree with wire basket ties or rope.
- E18.7.9 Container Grown Stock: Acceptable if container is large enough for root development. Trees and shrubs must have grown in container for minimum of one growing season but no longer than two. Root system must be able to “hold” soil when removed from container. Plants that have become root bound are not acceptable. Container stock must have been fertilized with slow releasing fertilizer.
- E18.7.10 Deciduous trees in excess of 3 m height must have been dug with large firm ball. Rootballs must include seventy-five percent (75%) of fibrous and feeder root system. This excludes the use of native trees grown in light sandy or rocky soil. Secure rootballs with burlap, heavy twine and rope. For large trees wrap ball in double layer of burlap and drum lace with minimum 10 mm diameter rope. Protect rootballs against sudden changes in temperature and exposure to heavy rainfall.
- E18.7.11 Collected or Native Plant Material: Any nursery stock dug from native stands, wood lots, orchards or neglected nurseries shall be designated as “collected plants”. The use of “collected plants” will not be permitted unless approved by Contract Administrator.
- E18.7.12 Cold Storage: approval required for plant material that has been held in cold storage.
- E18.7.13 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.

E18.8 Plant Specification List

Botanical / Common Name	Size / Remarks
Deciduous Trees	
<i>Fraxinus pennsylvanica</i> ‘Patmore’/ Patmore Green Ash	75 mm (3”) cal., 4.5-5.0 m (15’-17’) ht., 13 major branches in well formed head 2.0 m (7’) ht. above grade. B&B or tree mover, wire basket. Double stake.
<i>Ulmus americana</i> / American Elm	75 mm (3”) cal., 4.5-5.0 m (15’-17’) ht., 13 major branches in well formed head 2.0 m (7’) ht. above grade. B&B or tree mover, wire basket. Double stake.

E18.9 Equipment

- E18.9.1 All equipment shall be of a type approved by the Contract Administrator and shall be kept in good working order.

E18.10 Construction Methods

E18.10.1 General

- .1 Stake out location of trees and groundcovers as per Drawings. Obtain Contract Administrator’s acceptance prior to excavating.
- .2 Apply anti-desiccant in accordance with material manufacturer’s instructions, as required.
- .3 Coordinate operations. Keep Site clean and planting holes drained. Immediately remove soil of debris spilled onto street pavement, grass or sidewalk.

E18.10.2 Planting Time

- .1 Plant only under conditions that are conducive to health and physical conditions of plants.
- .2 Provide planting schedule. Extending planting operations over long period using limited crew will not be accepted.
- .3 Install trees and groundcovers within 48 hours of removal from the nursery.

E18.10.3 Excavation

- .1 Excavate tree pits and groundcover holes as indicated on Detail on Drawings. Distribute excavated topsoil on site. Dispose of excavated material off site.
- .2 Protect bottom of excavations against freezing.
- .3 Remove water which enters excavations prior to planting. Ensure source of water is not ground water or from a broken water pipe.

E18.10.4 Excavation at Existing Mature Trees (Broadway only)

- .1 Excavate by hand or with Air Spade to depth required for paving. Protect roots from damage.
- .2 Excavate trenches as shown on the Drawings with 'Air Spade' or approved alternate method. Trenches may have gaps to protect major roots. Contract Administrator or their designate shall be present during excavation of trenches.
- .3 Remove excavated materials from site.

E18.10.5 Planting – Exchange District

- .1 Loosen sides of planting holes to a depth of 100 to 150 mm as indicated on Detail on Drawing. Cover bottom of each excavation with bonemeal in amount recommended by manufacturer.
- .2 Plant trees vertically with roots placed straight out in hole. Orient plant material to give best appearance in relation to structure, roads, and walks.
- .3 Place plant material to equal depth they were originally growing in nursery.
- .4 With balled and burlapped rootballs, loosen burlap and remove maximum of 1/3 of the top burlap from rootball without disturbing the rootball. Do not pull burlap or rope from under rootball. With container stock, remove entire container without disturbing rootball. Non-biodegradable wrappings must be removed.
- .5 Tree Spade Excavated Material: dig tree hole with same mechanical equipment as used to dig plant material. Ensure hole dug is upright as possible.
- .6 Tamp planting soil around root system in layers of 150 mm, eliminating air voids. Frozen or saturated planting soil is unacceptable. When 2/3 of planting soil has been placed, fill hole with water. After water has completely penetrated into soil, complete backfilling.
- .7 Each tree is to have an earth saucer at its base having a diameter as large as the excavation with a 100 mm lip formed at the perimeter of the saucer to retain water.

E18.10.6 Planting – Broadway

- .1 Install sub-surface drain lines as shown on the Drawings. All subdrain work to be complete and operational prior to installation of structural soil.
- .2 Excavate and compact the subgrade to depths, slopes, and width shown on the Drawings. Do not over excavate. Subgrade surface shall slope toward the drain lines as indicated. Where tree roots larger than 25 mm (1") diameter are encountered, the Contractor shall excavate by hand or with approved equipment such as an Air Spade. Damaged root sections shall be cleanly cut with sterilized pruning equipment.

- .3 Clear the excavation of all construction debris, trash, rubble, and any other foreign matter. Excavate the soil sufficiently to remove any spilled fuels, oils, concrete wash out silts or other material harmful to plants. Fill over with approved material and compact to attain required subgrade compaction.
- .4 Obtain approval of subdrains and subgrade prior to installation of structural soil.
- .5 Rest rootball on compacted subgrade. Build up and compact subgrade as required to set the crown of the rootball at finish grade.
- .6 Plant trees vertically with roots placed straight out in hole. Orient plant material to give best appearance in relation to structure, roads, and walks.
- .4 With balled and burlapped rootballs, loosen burlap and remove maximum of 1/3 of the top burlap from rootball without disturbing the rootball. Do not pull burlap or rope from under rootball. With container stock, remove entire container without disturbing rootball. Non-biodegradable wrappings must be removed.
- .6 Install and compact structural soil around root system in 150 mm lifts to 95% Proctor Density. Delay compaction by minimum of 24 hours if moisture content is high. Protect structural soil with plywood or plastic during delays as directed.
- .7 Prior to paving, the Contract Administrator shall visually inspect the structural soil for consistency with the provided samples. Significant variation from the approved samples may result in testing of the soil at the discretion of the Contract Administrator. Installed structural soil which fails to meet the specifications or varies otherwise from the approved sample shall be removed and replaced with new structural soil that meets the specifications.

E18.10.7 Fertilizing

- .1 When planting is completed, give surface of planting saucer or tree pit dressing of fertilizer as specified above. Mix fertilizer thoroughly with top layer of planting soil and water in well.

E18.10.8 Tree Support

- .1 Tree support is shown on Planting Details on Drawings.
- .2 Staking for deciduous trees up to 10' (3 m) and coniferous trees up to 6.5' (2 m) in height: backfill planting hole 2/3, drive T-rail stake 2' (900 mm) into bottom of pit, taking care not to damage main roots. Place stake or anchor 6" (150 mm) away from trunk on side of prevailing wind. Fasten trunk to stake or anchor with tree ring. Different methods of fastening tree trunk to stake or anchor are acceptable if no damage to bark of tree will occur. Obtain approval prior to using other methods.
- .3 Guy Wires for Trees up to 6" (140 mm) Caliper:
 - .1 For deciduous trees taller than 10' (3 m) and evergreen taller than 6.5' (2 m), fasten three wires to tree where a branch will prevent slipping down. Use tree rings to prevent abrasion of bark.
 - .2 Fasten wires to anchors at distance from tree base equal to height of where wire is attached to trunk. Install wire tighteners and tighten slightly.
 - .3 Where guy wires are used close to pedestrian traffic ways, fasten metal flags to wires to make them clearly visible.

E18.10.9 Pruning

- .1 Prune trees after planting, to compensate for loss of roots suffered during transplanting. Postpone pruning, of those trees where heavy bleeding may occur, until in full leaf. Employ clean sharp tools and make cuts flush with main branch, smooth and sloping as to prevent accumulation of water. Remove projecting stumps on trunks or main branches. Remove dead and injured branches that rub causing damage to bark. Trim out crown of trees and shrubs without changing twigs along main branches. Treat cuts in excess of 20 mm diameter and damaged parts with application of wound dressing.

E18.10.10 Mulching

- .1 Obtain approval of planting before mulching material is applied. Loosen soil in planting beds and pits and remove debris and weeds. Spread mulch to minimum thickness of 75 mm (3") or as indicated on drawing. Mulch material susceptible to blowing must be moistened and mixed with topsoil before applying. When mulching is placed in fall, place immediately after planting. When mulch is placed in spring, wait until soil has warmed.

E18.10.11 Maintenance

- .1 Ensure all plant material is watered in immediately after installation. Maintain all planted areas from time of installation to the time they are accepted to start warranty (min. 30 days) as part of the installation contract.

E18.11 Method of Measurement

E18.11.1 Excavation at Mature Trees (Broadway only)

- .1 Excavation at mature trees will be measured on a Unit Basis. The number of mature tree excavations to be paid for shall be the total number performed in accordance with this Specification and accepted by the Contract Administrator. Disposal of excavated material shall be incidental to the excavation price.

E18.11.2 Tree Planting (Exchange District)

- .1 The supply and installation of trees in the Exchange District will be measured on a Unit Basis. The number of plants to be paid for shall be the total number of trees supplied and installed in accordance with this Specification and accepted by the Contract Administrator. Excavation, topsoil and fertilizer required for planting will not be measured and shall be considered incidental to the supply and installation of plant material.

E18.11.3 Tree Planting (Broadway)

- .1 The supply and installation of trees Broadway will be measured on a Unit Basis. The number of plants to be paid for shall be the total number of trees supplied and installed in accordance with this Specification and accepted by the Contract Administrator. Structural soil will be paid for under E20. Subdrains shall be paid for under the relevant specification section. Irrigation system shall be paid for under E22. Excavation and fertilizer required for planting will not be measured and shall be considered incidental to the supply and installation of plant material.

E18.12 Basis of Payment

E18.12.1 Excavation at Mature Trees (Broadway only)

- .1 Excavation at mature trees will be paid for at the Contract Unit Price per each mature tree for "Excavation at Mature Trees (Broadway only)". The Price shall be payment in full for supplying all materials and performing all operations herein described and all other items of Work incidental to the Work included in this Specification.

E18.12.2 Tree Planting (Exchange District)
.1 Tree Planting in the Exchange District will be paid for at the Contract Unit Price per each tree as itemized in Plant Specification List, under E18, counted as specified herein. Price shall be payment in full for supplying all materials and performing all operations herein described and all other items of Work incidental to the Work included in this Specification.

E18.12.3 Tree Planting (Broadway)
.1 Tree Planting on Broadway will be paid for at the Contract Unit Price per each tree as itemized in Plant Specification List, under E18, counted as specified herein. Price shall be payment in full for supplying all materials and performing all operations herein described and all other items of Work incidental to the Work included in this Specification.

E19. LANDSCAPE MAINTENANCE

E19.1 General Description

E19.1.1 This Specification shall cover the maintenance of trees, shrubs, and perennials following acceptance of the plant material to start warranty.

E19.1.2 Contractor shall maintain all landscape areas in accordance with these Specifications from date of installation up to the date they are accepted to start warranty as part of the installation contract.

E19.1.3 In general, the Work shall include:

- .1 Fertilizing
- .2 Watering
- .3 Weed Control
- .4 Pest and Disease Control
- .6 Mulching
- .7 Tree Support
- .8 Winter Preparation

E19.1.4 Maintenance shall be performed on an as required basis.

E19.2 Maintenance and Warranty Period

E19.2.1 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.

E19.2.2 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.

E19.3 Materials and Equipment

E19.3.1 Materials shall conform to the requirements of related Specification sections.

E19.3.2 Provide all equipment to properly execute Work. Maintain such equipment in a workable, safe condition while in use during this project.

E19.3.3 Contract Administrator shall review equipment to be used to execute Work prior to execution.

E19.4 Construction Method

E19.4.1 General

- .1 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.
- .2 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.
- .3 Schedule operations in accordance with growth, health, weather conditions, and use of site.
- .4 Perform each operation continuously and completely within a reasonable time period.
- .5 Store equipment and materials off site.
- .6 Collect and dispose of debris or excess material on the day the maintenance is undertaken.

E19.4.2 Maintenance of Trees

- .1 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.
- .2 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.
- .3 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.
- .4 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.
- .5 Pruning
The Contractor shall provide a person with a Manitoba Arborists Certificate for each work crew or Work site.

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

.6 Mulching

Add mulch as required to maintain original thickness.

Contractor is to provide replacement mulch material.

.7 Tree Supports and Tie Adjustments

Maintain tree supports and ties in proper repair.

Remove supports and ties at end of maintenance period unless otherwise directed by Contract Administrator.

.8 Winter Preparation

Ensure adequate moisture in tree root zones prior to freeze-up.

Apply anti-desiccant to evergreen trees susceptible to winter desiccation.

E19.5 Method of Measurement

E19.5.1 Landscape maintenance shall be paid for on an annual Lump Sum basis. No measurement shall be made for this Work.

E19.6 Basis of Payment

E19.6.1 Landscape maintenance shall be paid for at the Contract Lump Sum Price for the Items of Work listed below, measured as specified herein, which 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

E20. STRUCTURAL SOIL

E20.1 Description

E20.1.1 The work of this Section consists of the manufacture of Structural Soil for use in new tree planting trenches on Broadway, at locations indicated on the Drawings.

E20.2 Submittals

E20.2.1 At least 30 days prior to ordering materials, the Contractor shall submit to the Contract Administrator samples specified below. No materials shall be ordered until the required samples have been reviewed and approved by the Contract Administrator. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Contract Administrator reserves the right to reject, on or after delivery, any material that does not meet these Specifications.

E20.2.2 Topsoil: Submit two (2) – 500 millilitre representative samples of topsoil, labeled with source and date.

- E20.2.3 Crushed Stone: Submit two (2) - 1000 millilitre representative samples of crushed stone, labeled with source and date.
- E20.2.4 Structural Soil: Submit one (1) – 1000 millilitre representative sample of assembled Structural Soil, labeled with date.
- E20.2.5 Samples will be tested at the discretion of the Contract Administrator.
- E20.2.6 The approved Structural Soil samples shall be the standard of acceptance for the project.

E20.3 Delivery, Storage and Handling

- E20.3.1 Do not deliver or place soils in frozen, wet, or muddy conditions.
- E20.3.2 Protect soils and mixes from absorbing excess water and from erosion at all times. Do not store materials unprotected from large rainfall events. Do not allow excess water to enter site prior to compaction. If water is introduced into the material after grading, allow material to drain or aerate to optimum compaction moisture content.

E20.4 Materials

E20.4.1 Topsoil

Topsoil shall consist of a screened clay-textured or loam-textured dark topsoil, a fertile, friable material neither of heavy clay nor of very light sandy nature containing by volume, a minimum of 4% for clay loams and 2% for sandy loams to be maximum 25% organic matter (peat, well rotted manure or composted material) and capable of sustaining vigorous plant growth. Topsoil shall be free of subsoil contamination, roots, stones over 25 mm in diameter and other extraneous matter. Topsoil shall not contain quack grass rhizomes, Canada thistle roots or other noxious weeds. Salinity rating shall be 4.0 mmhos/cm or less on a saturated paste basis. The pH range shall be between 6.0 and 8.0. Soil shall not be blow-in dirt taken from wind-erosion sites and shall not be taken from fields abandoned to corn production where such soils may contain soil incorporated herbicides with lasting residual effects such as eradican and atrazine.

E20.4.2 Crushed Stone

A non-limestone granite aggregate will be preferred. The maximum allowable aggregate able to pass the 1/2 inch sieve is 10 percent. A ratio of nominal maximum to nominal minimum particle size of 2.

E20.4.3 Hydrogel

Hydrogel shall be a potassium propenoate-propenamide copolymer Hydrogel as manufactured by Gelscape by Amereq Corporation. (800) 832-8788.

E20.4.4 Water

The Contractor shall be responsible to furnish his own supply of water to the site at no extra cost. All work injured or damaged due to the lack of water, or the use of too much water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation.

E20.4.5 Structural Soil

A uniformly blended mixture of Crushed Stone, Topsoil and Hydrogel, mixed to the following proportion:

<u>MATERIAL</u>	<u>UNIT OF WEIGHT (either metric or English)</u>
Crushed Stone	100
Topsoil (dry)	(Approx. 20) determined by the test of the mix

Hydrogel 0.03

E20.4.6 The initial mix design for testing shall be determined by adjusting the ratio between the Crushed Stone and the Topsoil. Adjust final mix dry weight mixing proportion to decrease soil in mixture if CBR test results fail to meet acceptance (CBR #50).

E20.5 Construction Method

E20.5.1 Mix Design

Submit samples of each mix component for approval. Based on samples and the analysis of the mix components, the Contract Administrator and the Contractor will jointly determine a mix ratio to be tested for conformance with the requirements of the Specifications.

E20.5.2 Soil Mixing and Quality Control Testing

All Structural Soil mixing shall be performed at the Contractor's yard using appropriate soil measuring, mixing and shredding equipment of sufficient capacity and capability to assure proper quality control and consistent mix ratios. No mixing of Structural Soil at the project site shall be permitted.

Maintain adequate moisture content during the mixing process. Soils and mix components shall easily shred and break down without clumping. Soil clods shall easily break down into a fine crumbly texture. Soils shall not be overly wet or dry. The Contractor shall measure and monitor the amount of soil moisture at the mixing site periodically during the mixing process.

Mixing procedure for front-end loader shall be as follows:

- a. On a flat asphalt or concrete paved surface, spread an 8 inch to 12 inch layer of crushed stone.
- b. Spread evenly over the stone the specified amount of dry hydrogel.
- c. Spread over the dry hydrogel and crushed stone a proportional amount of clay loam according to the mix design.
- d. Blend the entire amount by turning, using a front-end loader or other suitable equipment until a consistent blend is produced.
- e. Add moisture gradually and evenly during the blending and turning operation as required to achieve the required moisture content. Delay applications of moisture for 10 minutes prior to successive applications. Once established, mixing should produce a material within 1% of the optimum moisture level for compaction.

Pugging operation mixing procedure may be as follows:

- a. Feed a known weight of crushed stone into the mixing trough.
- b. Add hydrogel as a slurry into trough and mix slurry and stone into a uniform blend.
- c. Meter in soil in proper proportion of Clay loam Soil While stone-slurry mixture is in motion.
- d. Add water to bring mixture to target moisture content after factoring in water from the slurry and the Clay-loam moisture.
- e. Auger out to stock pile or transport vehicle (or into pit if using a portable pugging operation).

The Contractor shall mix sufficient material in advance of the time needed at the job site to allow adequate time for final quality control testing as required by the progress of the work. Storage piles shall be protected from rain and erosion by covering with plastic sheeting.

E20.6 Method of Measurement

E20.6.1 Structural Soil

The supply and installation of Structural Soil shall be measured on a volume basis. The volume to be paid for shall be the number cubic metres manufactured and installed in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

E20.7 Basis of Payment

E20.7.1 Structural Soil

The supply and installation of Structural Soil shall be paid for at the Contract Unit Price per cubic metre for "Structural Soil" measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

E21. SPECIALTY UNIT PAVING

E21.1 Description

E21.1.1 This Specification shall cover the supply and installation of large-scale precast concrete unit paving slabs and granite pavers. Granite pavers will be used for the detectable warning strips on Broadway.

E21.1.2 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 Work as hereinafter specified.

E21.2 Submittals

E21.2.1 Concrete paving slabs:

1. Manufacturer's product catalog sheets with specifications.
2. One representative full-size sample of each paver type, thickness, colour, and finish.
3. Accepted samples become the standard of acceptance for the concrete paving slabs.

E21.2.2 Granite pavers:

2. Six (6) representative full-size samples of granite pavers.
3. Accepted samples become the standard of acceptance for granite pavers.

E21.3 Materials

E21.3.1 General

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

E21.3.2 Precast Concrete Paving Slabs

- .1 Pavers shall conform to the requirements of CAN3-A231.2, Precast Concrete Pavers.
- .2 'Canvas' colour concrete unit paving slabs supplied on special order by Permacon Group, 8375 5th Side Street, Milton, Ontario L9T 2X7. phone 1-800-265-0692. Alternate supplier: special order from Barkman Concrete Ltd., Winnipeg, phone 667-3310. Sizes: 100 x 150 x 300mm, 100 x 300 x 300mm 100 x 300 x 600mm, randomly set in 300 mm courses as indicated on the Drawings. Colour: Permacon 'Canvas' or approved equal. Finish shall be regular.
- .4 Further to CAN3-A231.2.6.1.1, where concrete paving slabs are shipped for installation before the paving slabs are 28 days old, the average compressive strength of these pavers at the time of delivery to the work site shall not be less than 40 MPa.

E21.3.3 Granite Pavers

- .1 Canadian Mahogany granite pavers manufactured by Nelson granite or approved alternate. Granite pavers shall be approximately 100 mm depth x 300 mm x 150 mm, lightly tumbled to remove sharp edges, thermal finish or approved alternate finish to attain a detectable texture that varies from true plane by no more than 3 mm (1/8").
- .2 All granite pavers shall be of standard architectural grade, free of cracks, seams or starts which may impair their structural integrity or function. Colour or other visual characteristics indigenous to the particular material and adequately demonstrated in the samples will be accepted provided they do not compromise the strength or durability of the materials. Texture, size and finish shall be within the range of samples approved by the Contract Administrator.

E21.3.4 Crushed Stone Base, Bedding and Joint Sand

- .1 Crushed stone base, bedding and joint sand shall conform to the requirements of Specification CW 3330-R3.

E21.4 Construction Method

E21.4.1 Inspection, Storage and Base Preparation

- .1 Verify that base preparation, depth and grades conform to specified requirements, and that the base course is free from standing water. Contract Administrator shall be notified to inspect the excavation prior to placement of the bedding material.
- .2 Adjust base course as required to meet the required grades by excavating or adding approved base material. Compact to 95% Proctor density. Adjustments to the base course shall be incidental to the Work under this Specification.
- .3 Stockpile sand and base materials such that they are free from standing water, uniformly graded, free of any organic material or sediment, debris, and ready for placement.
- .4 Remove any excess thickness of soil applied over the excavated soil subgrade to trap sediment from adjacent construction activities before application of the base materials.
- .5 Keep area where pavement is to be constructed free from sediment during entire job. Base and bedding materials contaminated with sediment shall be removed and replaced with clean materials.
- .6 Protect exposed roots and other appurtenances during installation. Report any damage immediately to the Contract Administrator.

E21.4.2 Bedding Layer

- .1 Moisten, spread and screed bedding sand.
- .2 Fill voids left by removed screed rails with approved bedding material.
- .3 The surface tolerance of the screeded bedding layer shall be ± 10 mm over a 3 m straightedge.
- .4 Do not subject screeded bedding material to any pedestrian or vehicular traffic before paving unit installation begins.

E21.4.3 Paving Units and Joint Sand

- .1 No concrete unit paving slabs or granite pavers shall be placed until the construction of the underlying layers has been approved by the Contract Administrator.
- .2 Lay the pavers and slabs in the pattern(s) and joint widths shown on the Drawings. Maintain straight pattern lines.
- .3 Fill gaps at the edges of the paved area with cut units. Cut pavers and slabs be no smaller than 1/4 of a whole unit.
- .4 Cut pavers and slabs and place along the edges with masonry saw.
- .5 Fill the openings and joints with bedding material or approved alternate to obtain adequate interlock.
- .6 Remove excess sand on the surface by sweeping pavers clean.
- .7 Compact and seat the paving units into the bedding layer using a low-amplitude, 75-90 Hz plate compactor capable of at least 18 kN centrifugal compaction force. This will require at least two passes with the plate compactor.
- .8 Do not compact within 2 m of the unrestrained edges of the paving units.
- .9 Apply additional joint sand to the openings and joints, filling them completely. Remove excess material by sweeping then compact the pavers. This will require at least two passes with the plate compactor.
- .10 All pavers and slabs within 2 m of the laying face must be left fully compacted at the completion of each day.

- .11 The final surface tolerance of compacted pavers and slabs shall not deviate more than ± 10 mm under a 3 m long straightedge.
- .12 The surface elevation of pavers and slabs shall be 3 to 6 mm above adjacent drainage inlets, concrete collars or channels.

E21.5 Quality Control

- E21.5.1 All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations, from the selection and production of materials, through to final acceptance of the Work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection of approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this Specification.

E21.6 Method of Measurement

E21.6.1 Precast Concrete Paving Slabs

- .1 The supply and installation of precast concrete paving slabs shall be measured on a surface area basis. The surface area to be paid for shall be the number square metres constructed in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

E21.6.2 Granite Pavers

- .1 The supply and installation of granite pavers shall be measured on a surface area basis. The surface area to be paid for shall be the number square metres constructed in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

E21.7 Basis of Payment

E21.7.1 Precast Concrete Paving Slabs

- .1 The supply and installation of precast concrete paving slabs shall be paid for at the Contract Unit Price per square metre for the 'Precast Concrete Paving Slabs', measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

E21.7.2 Granite Pavers

- .1 The supply and installation of granite shall be paid for at the Contract Unit Price per square metre for "Granite Pavers" measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

E22. MICRO IRRIGATION SYSTEM (PERFORMANCE SPECIFICATION)

E22.1 Description

This Specification shall cover the supply and installation of a micro-irrigation system delivering water to all boulevard tree wells in two reconstructed blocks on Broadway.

E22.2 General

E22.2.1 Protection

- .1 Prevent damage to fencing, trees, landscaping, natural features, benchmarks, existing buildings, existing pavement, surface or underground utility lines which are to remain. Make good any damage.

E22.2.2 Existing Buried Utilities and Structures:

- .1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
- .2 Prior to commencing any excavation work, notify Contract Administrator and utility company, establish location and state of use of buried locations to prevent disturbance during work.
- .3 Confirm locations of buried utilities by careful test excavations.
- .4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures as indicated. Obtain direction of Contract Administrator before moving or otherwise disturbing utilities or structures.
- .5 Advise Contract Administrator and utility company prior to excavation of new trench.

E22.2.3 Coordination

- .1 Coordinate work with other contractors who may be working concurrently on site.

E22.2.4 Maintenance Data and Demonstration Procedures

- .1 Provide maintenance data for operation and maintenance of irrigation system and equipment.
- .2 The maintenance manual shall include all original manufacturers' warranty certificates, controller operation and programming instructions, servicing and replacement procedures for all sprinklers and valves, and procedures for blowing out the system in the fall and charging the system in the spring.
- .3 Demonstrate procedures for Owner as directed by the Contract Administrator.

E22.2.5 As Built Plan

- .1 Upon completion of the work, submit an as-built plan showing exact location of all components of system.
- .2 Provide a control schedule that balances system hydraulics and watering requirements.

E22.2.6 System Design, Layout and Inspection

- .1 Provide detailed layout plan showing zoning, pipe layout and valve locations for approval by Contract Administrator.
- .2 All work shall be laid out by the Contractor in conformance to the layout shown on their approved plan. The Contractor shall be fully responsible for the accuracy thereof.
- .3 Stake locations of heads and valves and receive approval from the Contract Administrator prior to excavation and installation.
- .4 Install main lines and laterals and receive approval from Contract Administrator prior to backfilling.
- .5 Upon completion of the irrigation system, the entire system shall be tested and balanced. The Contractor shall notify the Contract Administrator for a final test to allow the Contract Administrator to be on site to consult. All components shall then be checked for proper operation; and the system shall not be accepted by the Contract Administrator until all portions are operating as intended and until all deficiencies have been corrected. Contractor shall provide all pumps, gauges and fittings required for testing.

- .6 Notify Contract Administrator a minimum of 24 hours prior to inspection. Do not proceed to subsequent work without the approval of Contract Administrator.

E22.2.7 Warranty

- .1 All irrigation system equipment and installation shall be guaranteed for a full year following the latter of the: date of acceptance by the Contract Administrator or the date of Substantial Performance. Provide manufacturers' warranty certificates for all products.
- .2 End of warranty inspection will be conducted.

E22.3 System Requirements

E22.3.1 Performance Criteria

- .1 Design automatic tree watering system to provide 300 gallons of actual precipitation per week within a 5 hour per day watering window. Provide one third of the water at an interval of three times per week.
- .2 System to provide complete wetting of the entire root area.
- .3 Over spray on hard surface areas beyond the tree pit is not acceptable.
- .4 Provide system for winterization.

E22.3.2 Water Source

- .1 Connect to supply as indicated on the Drawings. Provide complete hydraulic calculations indicating flow and pressure loss at representative zones around the site.

E22.3.3 Control System

- .1 Locate controllers at location as indicated on the Drawings.

E22.3.4 Distribution:

- .1 Use HDPE pipe for all mains and laterals.
- .2 Provide sleeves under all roadways.

E22.4 Materials

E22.4.1 HDPE pipe: Type 3, Series 100 or better, high density polyethylene to CGSB 41, Gp-25M. Join by thermal butt fusion in strict accordance with manufacturer's written instructions.

E22.4.2 Fittings for HDPE pipe: approved saddle fittings at head connections. Socket fusion fittings at pipe connections. Fittings to be approved by pipe manufacturer for fusion with pipe.

E22.4.3 Risers: galvanized steel pipe and fittings.

E22.4.4 Sleeves: Series 160 PVC pipe of sufficient diameter to allow clear passage of irrigation pipe and control wires.

E22.4.5 Manual isolation valves: minimum 200 psi rated, WOG, lever type ball or butterfly valves of approved manufacturer's quality. Sizes as indicated or as required to suit application.

E22.4.6 Battery operated automatic zone control valves: 150 psi rated, normally closed, 24 VAC electric solenoid valve with manual operation capability and flow control adjustment. Glass reinforced nylon body and bonnet or other approved durable material. Valve serviceable from top without removal from line. Control module to operate on 9 volt battery and provide scheduling features suitable for the intended installation.

E22.4.7 Valve boxes: high density polyethylene or fibreglass reinforced prefabricated plastic boxes complete with locking cover and stainless steel bolt. Size to suit valve clusters as indicated.

E22.4.8 Sprinklers:

- .1 Flood bubbler: bodies constructed of molded plastic. Pressure compensating low flow system. Arc to suit location.
- .2 Submit flow calculations and nozzle sizes with Shop Drawings for approval by Contract Administrator.
- .3 Provide check valves to risers of all sprinklers not equipped with an internal check valve.

E22.5 Construction Methods

E22.5.1 Excavation and Lateral Boring

- .1 Use lateral boring to install sleeves under major roads and sidewalks
- .2 Provide minimum 12" (300 mm) depth of cover over main line pipe, and lateral pipes.
- .3 Backfill with material free from rocks, large stones and other unsuitable substances that could damage the pipe or create unusual settling problems. Backfill in 6" (150 mm) lifts, each compacted to prevent excessive settling.
- .4 Backfill trenches containing plastic pipe when pipe is cool to avoid excessive contraction in cold weather. Such backfilling can be done in early morning hours or the pipe may be water cooled prior to backfilling procedures.
- .5 Avoid damage to any and all underground utilities and structures. The Contractor shall notify the Owner of all underground utilities including power, gas and telephone and have the locations staked prior to commencing excavations.

E22.5.2 Installation of Pipe

- .1 Install pipe and fittings in accordance with manufacturer's instructions, from point of connection of supply.
- .2 Stake out and obtain approval of Contract Administrator prior to installing pipe.
- .3 Make connections to the pipe for sprinkler with approved fittings.
- .4 Install sleeves where pipe will run under all roadways. Coordinate with other trades.

E22.5.3 Single Valve Controllers:

- .1 Install single valve controllers according to manufacturer's instructions, in valve box set plumb and flush with the finished grade.
- .2 Provide 6" (150 mm) depth of pea gravel sump below the valve.
- .3 Provide isolation valve on pressure side of control valve.

E22.5.4 Bubblers: Install all bubblers on risers firmly fixed in place to avoid toppling.

E22.5.5 Water Service Connections

- .1 Connect to water service at location as shown on plan.
- .2 Perform all work in a neat and workmanlike manner and in accordance with City of Winnipeg standards.
- .3 Use di-electric fittings at connection of galvanized pipe or fittings to copper irrigation mains as required.

E22.5.6 Coordination

- .1 Coordinate work with that of other trades to ensure a proper sequence of installations and minimal disruption of nursery stock or ground covers.

E22.5.7 Testing

- .1 Upon completion, test irrigation system for proper operation. Leave all joints and fittings exposed and pressure test in presence of the Contract Administrator.

- .2 Provide all pumps and gauges as required for testing as instructed by Contract Administrator.

E22.5.8 Balancing & Adjustment

- .1 Balance and adjust the various components of the sprinkler system so the overall operation is most efficient and coverage is uniform to the satisfaction of the Contract Administrator.

E22.5.9 Maintenance

- .1 Blow-out all irrigation water lines prior to freeze-up and reconnect the irrigation system in the spring of the following year.
- .2 Emergency repairs may be required to protect property or permit operation of the work. The Owners shall notify the Contractor immediately, who shall make all necessary repairs. The cost of such emergency repairs shall be paid by the Contractor. Maintenance not of an emergency nature shall be brought to the attention of the Contractor in writing and he shall take the necessary action to correct the faulty work.
- .3 The Contractor shall provide on site orientation as directed by the Contract Administrator to familiarize the maintenance personnel with the proper operation of the irrigation system and locations of control equipment.

E22.5.10 Clean Up

- .1 Promptly remove surplus material and debris from excavations and dispose of in locations and manner designated by the Contract Administrator.

E22.6 Method of Measurement

E22.6.1 Micro Irrigation System

- .1 Supply and installation of a micro irrigation system shall not be measured.

E22.7 Basis of Payment

E22.7.1 Micro Irrigation System

- .1 The supply and installation of the micro irrigation system will be paid for at the Lump Sum Price for "Micro Irrigation System". The Price shall be payment in full for supplying all materials and performing all operations herein described and all other items of Work incidental to the Work included in this Specification.

E23. VERTICAL MULCHING

E23.1 Description:

This section shall cover the special excavation and backfilling within the drip line of mature trees on Broadway to alleviate soil compaction and assist in root aeration.

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 other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E23.2 Materials

- E23.2.1 Mulch material: Clean, hard, coarse sand, well washed and free of impurities, chemical or organic matter. Provide sample to Contract Administrator for approval prior to installation.

E23.3 Construction Method

- E23.3.1 Utility Clearances
- .1 The Contractor shall obtain and maintain all utility clearances prior to commencing any excavation.
- E23.3.2 Protection
- .1 Protect adjacent pavements, curbs and existing elements from damage during excavation and backfilling operations. Damage resulting from these operations will be repaired at the Contractor's expense.
- E23.3.3 Air Spade Excavation
- .1 Using 'Air Spade' or approved alternate excavation method certified to prevent root damage, excavate 75 mm diameter holes on a 450 mm grid within the drip line of existing mature elm trees in the designated boulevards on Broadway. Holes to be 300 mm deep. Adjust Hole locations if impenetrable objects or large roots are encountered.
 - .2 Remove excavated material from site.
- E23.3.4 Backfilling
- .1 Backfill holes with coarse sand to top excavation.
- E23.3.5 Dust Control
- .1 The Contractor shall control dust caused by the work by dampening surfaces as required.
- E23.4 Method of Measurement
- E23.4.1 Vertical mulching will be measured on a per tree basis. The number of vertical mulching applications to be paid for shall be the total number of mature trees that have been treated in accordance with this Specification and accepted by the Contract Administrator, as calculated from measurements made by the Contract Administrator.
- E23.5 Basis of Payment
- E23.5.1 Vertical mulching will be paid for at the Contract Unit Price per mature tree for "Vertical Mulching" measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

E24. TREE GRATES

E24.1 Description:

This section shall cover the supply and installation of tree grates.

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 other things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E24.2 Materials

- E24.2.1 Exchange District Tree Grate: cast grey iron 1220 mm x 1220 mm (48" x 48") R-8706-1A tree grate by Neenah Foundry Company, as distributed by Crosier Agencies, Winnipeg, 774-6099 or approved alternate. Unfinished. Maximum opening width 6 mm (1/4") to

comply with Americans with Disabilities Act requirements. Supply grate complete with matching frame.

E24.2.2 Broadway Tree Grate: cast grey iron 1525 mm x 1525 mm (60" x 60") 'Boston' tree grate by Urban Accessories Company, as distributed by PlayWorks, Inc., 14550-116 Avenue, Edmonton Alberta, T5M 3E9, phone: 1.(800).667-4264 or approved alternate. Unfinished. Supply grate complete with matching frame.

E24.2.3 Submit manufacturers' shop drawings of grates and frames for approval prior to manufacture. Castings not conforming to this Specification and/or approved shop drawings shall be rejected.

E24.3 Construction Method

E24.3.1 Utility Clearances

.1 The Contractor shall obtain and maintain all utility clearances prior to commencing any excavation.

E24.3.2 Protection

.1 Protect adjacent pavements, curbs and existing elements from damage during excavation and backfilling operations. Damage resulting from these operations will be repaired at the Contractor's expense.

E24.3.3 Excavation

.1 Excavate to depths indicated on the Drawings to establish foundation for the tree wells.
.2 Remove excavated material from site.

E24.3.4 Setting Frame

.1 Assemble frame and grate and set assembly on concrete header formwork. Adjust height and alignment of forms as required to match grate elevation and grade with adjacent paving elevation and grade.
.2 On Broadway, ensure tree wells are located, sized and aligned to suit paver courses and minimize cutting.
.3 Install 10M rebar through lugs on the frame and support as required.

E24.3.5 Concrete

.1 Pour and finish concrete in accordance with CW 3310-R10. Do not remove tree grate until concrete is set up.

E24.4 Method of Measurement

E24.4.1 The supply and installation of tree grates will be measured on a Unit basis. The number of tree grates shall be the total number that are supplied and installed in accordance with this Specification and accepted by the Contract Administrator, as calculated from measurements made by the Contract Administrator.

E24.4.2 The supply and installation of tree grate frames and rebar ties shall be incidental to the supply and installation of tree grates.

E24.4.3 The supply and installation of concrete headers shall be measured and paid for under CW 3240-R6.

E24.5 Basis of Payment

E24.5.1 The supply or supply and installation of tree grates shall be paid for at the Contract Unit Price per unit for the "Items of Work" listed below, measured as specified herein, which price shall be payment in full for supplying or supplying and installing all materials and performing all operations herein described and all other items incidental to the Work included in this Specification.

Items of Work:

- (i) Exchange District Tree Grate
- (ii) Broadway Tree Grate