



THE CITY OF WINNIPEG

TENDER

TENDER NO. 186-2019

**2019 LOCAL STREET RENEWAL PROGRAM - HUDSON ST, VILLENEUVE BLVD
AND OTHER LOCATIONS**

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 2019 LOCAL STREET RENEWAL PROGRAM - HUDSON ST, VILLENEUVE BLVD AND OTHER LOCATIONS

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, May 15, 2019.

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

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

B3. ENQUIRIES

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

B3.2 If the Bidder finds errors, discrepancies or omissions in the Tender, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.

B3.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Tender will be provided by the Contract Administrator to all Bidders by issuing an addendum.

B3.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Tender will be provided by the Contract Administrator only to the Bidder who made the enquiry.

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

B4. CONFIDENTIALITY

B4.1 Information provided to a Bidder by the City or acquired by a Bidder by way of further enquiries or through investigation is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator. The use and disclosure of the confidential information shall not apply to information which:

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

B4.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Tender to the media or any member of the public without the prior written authorization of the Contract Administrator.

B5. ADDENDA

B5.1 The Contract Administrator may, at any time prior to the Submission deadline, issue addenda correcting errors, discrepancies or omissions in the Tender, 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.
- B5.3 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/bidopp.asp>
- B5.4 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B5.5 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.
- B5.6 Notwithstanding B3, enquiries related to an Addendum may be directed to the Contract Administrator indicated in D3.

B6. SUBSTITUTES

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

- B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/her Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B17.
- B6.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B7. BID COMPONENTS

- B7.1 The Bid shall consist of the following components:
- (a) Form A: Bid;
 - (b) Form B: Prices, hard copy;
 - (c) Form G1: Bid Bond and Agreement to Bond.
- B7.2 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.
- B7.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely.
- B7.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Tender number and the Bidder's name and address.
- B7.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Tender number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid.
- B7.4.2 A hard copy of Form B: Prices must be submitted with the Bid. If there is any discrepancy between the Adobe PDF version of Form B: Prices and the Microsoft Excel version of Form B: Prices, the PDF version shall take precedence.
- B7.5 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.
- B7.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Tender document, including the General Conditions, will be evaluated in accordance with B17.1(a).
- B7.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B7.8 Bids shall be submitted to:
- The City of Winnipeg
Corporate Finance Department
Materials Management Division
185 King Street, Main Floor
Winnipeg MB R3B 1J1

B8. BID

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

- B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, his/her name shall be inserted;
 - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
 - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
 - (d) if the Bidder is carrying on business under a name other than his/her own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.
- B8.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.
- B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.
- B8.4 Paragraph 13 of Form A: Bid shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, it shall be signed by the Bidder;
 - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
 - (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, shall be affixed;
 - (d) if the Bidder is carrying on business under a name other than his/her own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.
- B8.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.
- B8.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

B9. PRICES

- B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B9.1.1 For the convenience of Bidders, and pursuant to B7.4.2 and B17.4.2, an electronic spreadsheet Form B: Prices in Microsoft Excel (.xls) format is available along with the Adobe PDF documents for this Tender on the Bid Opportunities page at the Materials Management Division 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.
- B9.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).
- B9.5 Form B: Prices is organized into Parts: Part 1 of the Work and Part 2 of the Work. Bidders shall provide a total price for each Part and, on the summary sheet, a Total Bid Price consisting of the sum of prices for Part 1 and Part 2.

B10. DISCLOSURE

B10.1 Various Persons provided information or services with respect to this Work. In the City's opinion, this relationship or association does not create a conflict of interest because of this full disclosure. Where applicable, additional material available as a result of contact with these Persons is listed below.

B10.2 The Persons are:

(a) N/A

B11. CONFLICT OF INTEREST AND GOOD FAITH

B11.1 Bidders, by responding to this Tender, declare that no Conflict of Interest currently exists, or is reasonably expected to exist in the future.

B11.2 Conflict of Interest means any situation or circumstance where a Bidder or employee of the Bidder proposed for the Work has:

- (a) other commitments;
- (b) relationships;
- (c) financial interests; or
- (d) involvement in ongoing litigation;

that could or would be seen to:

- (i) exercise an improper influence over the objective, unbiased and impartial exercise of the independent judgment of the City with respect to the evaluation of Bids or award of the Contract; or
- (ii) compromise, impair or be incompatible with the effective performance of a Bidder's obligations under the Contract;
- (e) has contractual or other obligations to the City that could or would be seen to have been compromised or impaired as a result of its participation in the Tender process or the Work; or
- (f) has knowledge of confidential information (other than confidential information disclosed by the City in the normal course of the Tender process) of strategic and/or material relevance to the Tender process or to the Work that is not available to other bidders and that could or would be seen to give that Bidder an unfair competitive advantage.

B11.3 In connection with its Bid, each entity identified in B11.2 shall:

- (a) avoid any perceived, potential or actual Conflict of Interest in relation to the procurement process and the Work;
- (b) upon discovering any perceived, potential or actual Conflict of Interest at any time during the Tender process, promptly disclose a detailed description of the Conflict of Interest to the City in a written statement to the Contract Administrator; and
- (c) provide the City with the proposed means to avoid or mitigate, to the greatest extent practicable, any perceived, potential or actual Conflict of Interest and shall submit any additional information to the City that the City considers necessary to properly assess the perceived, potential or actual Conflict of Interest.

B11.4 Without limiting B11.3, the City may, in its sole discretion, waive any and all perceived, potential or actual Conflicts of Interest. The City's waiver may be based upon such terms and conditions as the City, in its sole discretion, requires to satisfy itself that the Conflict of Interest has been appropriately avoided or mitigated, including requiring the Bidder to put into place such policies, procedures, measures and other safeguards as may be required by and be acceptable to the City, in its sole discretion, to avoid or mitigate the impact of such Conflict of Interest.

B11.5 Without limiting B11.3, and in addition to all contractual or other rights or rights at law or in equity or legislation that may be available to the City, the City may, in its sole discretion:

- (a) disqualify a Bidder that fails to disclose a perceived, potential or actual Conflict of Interest of the Bidder or any of its employees proposed for the Work;
- (b) require the removal or replacement of any employees proposed for the Work that has a perceived, actual or potential Conflict of Interest that the City, in its sole discretion, determines cannot be avoided or mitigated;
- (c) disqualify a Bidder or employees proposed for the Work that fails to comply with any requirements prescribed by the City pursuant to B11.4 to avoid or mitigate a Conflict of Interest; and
- (d) disqualify a Bidder if the Bidder, or one of its employees proposed for the Work, has a perceived, potential or actual Conflict of Interest that, in the City's sole discretion, cannot be avoided or mitigated, or otherwise resolved.

B11.6 The final determination of whether a perceived, potential or actual Conflict of Interest exists shall be made by the City, in its sole discretion.

B12. QUALIFICATION

B12.1 The Bidder shall:

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

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

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

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

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

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

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

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

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

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

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

B13. BID SECURITY

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

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

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

B13.1.3 The Bidder shall sign the Bid Bond.

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

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

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

B14. OPENING OF BIDS AND RELEASE OF INFORMATION

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

B14.1.1 Bidders or their representatives may attend.

B14.1.2 Bids determined by the Manager of Materials, or his/her designate, to not include the bid security specified in B13 will not be read out.

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

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

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

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

B15. IRREVOCABLE BID

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

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

B16. WITHDRAWAL OF BIDS

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

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

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

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

- (a) retain the Bid until after the Submission Deadline has elapsed;
- (b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 13 of Form A: Bid; and
- (c) if the notice has been given by any one of the persons specified in B16.1.3(b), declare the Bid withdrawn.

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

B17. EVALUATION OF BIDS

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

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

(d) economic analysis of any approved alternative pursuant to B6.

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

B17.2.1 Any bid with an apparent imbalance between the unit prices in Part 1 and Part 2 may be determined to be non-responsive and rejected by the Award Authority in its sole discretion, acting reasonably.

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

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

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

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

B18. AWARD OF CONTRACT

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

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

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

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

B18.3 The Work of this Contract is contingent upon the City receiving funding from the Government of Manitoba and/or the Government of Canada by June 20, 2019. If the City does not receive sufficient funding for the Work, the City will have no obligation to award a Contract.

B18.4 If funding for the Work is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, Bidders are advised that the terms of D28 shall immediately take effect upon confirmation of such funding, regardless of when funding is confirmed.

B18.5 Where an award of Contract is made by the City, the award shall be made to the qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B17.

B18.5.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his/her Bid upon written request to the Contract Administrator.

- B18.6 As noted in D2 and identified in Form B: Prices, the Work of Part 2 will be contingent upon Manitoba Hydro approving funding for the Work. If sufficient funding for Part 2 Work is not approved by Manitoba Hydro the City shall have the right to eliminate all or any portion of Part 2 Work in accordance with D2.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

- C0.1 The *General Conditions for Construction* (Revision 2019-01-15) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm
- C0.2 A reference in the Tender to a section, clause or subclause with the prefix “C” designates a section, clause or subclause in the *General Conditions for Construction*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D2. SCOPE OF WORK

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

- (a) Part 1 – City Funded Work
- (b) Part 2 – Manitoba Hydro Funded Work.

Part 1 – City Funded Work

D2.2 Part 1 – City Funded Work shall consist of:

- (a) Asphalt Reconstruction
 - (i) Derek Street – Windermere Avenue to Parker Avenue
 - (ii) Hudson Street – Clarence Avenue to Chevrier Boulevard
- (b) Pavement Rehabilitation
 - (i) Thatcher Drive – University Crescent to Pembina Highway
 - (ii) Caledon Road – Mapleridge Avenue to Killarney Avenue
- (c) Concrete Reconstruction
 - (i) Villeneuve Boulevard – Ducharme Avenue to Des Trappistes Street
- (d) Sewer Repairs
 - (i) Hudson Street
 - (ii) Thatcher Drive

Part 2 – Manitoba Hydro Funded Work

D2.3 Part 2 – Manitoba Hydro Funded Work shall consist of:

- (a) Street Lighting and Associated Work
 - (i) Hudson Street – Clarence Avenue to Chevrier Boulevard
 - (ii) Villeneuve Boulevard – Ducharme Avenue to Des Trappistes Street

D2.4 The City currently has no approved funding in the Capital Budget for Part 2 of the Work, but is anticipating receiving notification about funding from Manitoba Hydro by the Award Date. Part 2 of the Work is contingent upon Manitoba Hydro approving sufficient funding.

D2.4.1 Further to C7.1, if notice of sufficient funding is not received, the City shall have the right to eliminate all or any portion of Part 2, and the Contract Price will be reduced accordingly.

D2.4.2 Further to C7.5, C7.5.1, and C7.6, a reduction in the Contract Price pursuant to D2.4.1 shall not be considered in calculating the aggregate reduction in the Contract Price for purposes of C7.5.

D2.4.3 If all or any portion of Part 2 is eliminated pursuant to D2.4.1, the time periods stipulated in D19 for Substantial Performance of the Work and in D20 for Total Performance of the Work will be reduced proportionally by the Contract Administrator acting reasonably.

D2.5 The major components of the Work are as follows:

- (a) Asphalt Reconstruction
 - (i) Removal of existing pavement
 - (ii) Complete required sewer repairs
 - (iii) Excavation
 - (iv) Installation of subdrains
 - (v) Compaction of existing sub-grade
 - (vi) Installation of catchbasins and sewer service pipe
 - (vii) Insulation of water services
 - (viii) Placement of separation/geotextile fabric
 - (ix) Installation of new light standards and street lighting cable
 - (x) Placement of sub-base and base course materials
 - (xi) Construction of curb and gutter utilizing slip-form paving equipment
 - (xii) Adjustment of existing manholes
 - (xiii) Placement of asphalt pavement (Type 1A 100 mm thick)
 - (xiv) Renewal of existing sidewalk
 - (xv) Boulevard restoration
- (b) Pavement Rehabilitation
 - (i) Planing of existing asphalt pavement
 - (ii) Complete required sewer repairs
 - (iii) Renewal of miscellaneous pavement slabs (150 mm reinforced concrete pavement)
 - (iv) Installation of pavement repair fabric at various locations
 - (v) Renewal of existing curb
 - (vi) Renewal of existing sidewalk
 - (vii) Adjustment of catchbasins and manholes
 - (viii) Installation of new catchbasins/catchpits
 - (ix) Placement of asphalt overlay (average thickness 85 mm)
 - (x) Adjustment of paving stones
 - (xi) Boulevard restoration
- (c) Concrete Reconstruction
 - (i) Removal of existing pavement
 - (ii) Excavation
 - (iii) Installation of subdrains
 - (iv) Compaction of existing sub-grade
 - (v) Installation of catchbasins and sewer service pipe
 - (vi) Insulation of water services
 - (vii) Placement of separation/geotextile fabric
 - (viii) Placement of sub-base and base course materials
 - (ix) Adjustment of existing manholes
 - (x) Construction of 150 mm reinforced concrete pavement utilizing slip form paving equipment c/w barrier curb
 - (xi) Renewal of existing sidewalk
 - (xii) Boulevard restoration

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is AECOM Canada Ltd., represented by:

Blair Cockrell
Project Coordinator

Telephone No. 204-928-8431
Email Address blair.cockrell@aecom.com

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

D3.3 Bids Submissions must be submitted to the address in B7.

D4. CONTRACTOR'S SUPERVISOR

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

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

D5. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

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

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

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

- (a) information provided to the Contractor by the City or acquired by the Contractor during the course of the Work;
- (b) the Contract, all deliverables produced or developed; and
- (c) any statement of fact or opinion regarding any aspect of the Contract.

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

D6. NOTICES

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

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

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

The City of Winnipeg

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

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

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

- D6.5 Bids Submissions must not be submitted to this facsimile number. Bids must be submitted in accordance with B7.**

D7. FURNISHING OF DOCUMENTS

- D7.1 Upon award of the Contract, the Contractor will be provided with five (5) complete sets of the Tender. If the Contractor requires additional sets of the Tender, they will be supplied to him/her at cost.

SUBMISSIONS

D8. AUTHORITY TO CARRY ON BUSINESS

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

D9. SAFE WORK PLAN

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

D10. INSURANCE

- D10.1 The Contractor shall provide and maintain the following insurance coverage:
- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability, broad form property damage cover and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period;
 - (b) if applicable, Automobile Liability Insurance covering all motor vehicles, owned and operated and used or to be used by the Contractor directly or indirectly in the performance of the Work. The Limit of Liability shall not be less than \$2,000,000 inclusive for loss or

damage including personal injuries and death resulting from any one accident or occurrence;

- (c) an all risks Installation Floater carrying adequate limits to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of any installation.

D10.2 Deductibles shall be borne by the Contractor.

D10.3 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in the C4.1 for the return of the executed Contract.

D10.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D11. CONTRACT SECURITY

D11.1 The Contractor shall provide and maintain the performance bond and the labour and material payment bond until the expiration of the warranty period in the form of:

- (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; and
- (b) a labour and material payment bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H2: Labour and Material Payment Bond), in an amount equal to fifty percent (50%) of the Contract Price.

D11.2 The Contractor shall provide the City Solicitor with the required performance and labour and material payment bonds within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D11.3 The Contractor shall, as soon as practicable after entering into a contract with a Subcontractor:

- (a) give the Subcontractor written notice of the existence of the labour and material payment bond in D11.1(b); and
- (b) post a notice of the bond and/or a copy of that bond in a conspicuous location at the Site of the Work.

D12. SUBCONTRACTOR LIST

D12.1 The Contractor shall provide the Contract Administrator with a complete list of the Subcontractors whom the Contractor proposes to engage (Form J: Subcontractor List) at or prior to a pre-construction meeting, or at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the C4.1 for the return of the executed Contract.

D13. DETAILED WORK SCHEDULE

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

D13.2 If, after submitting the Detailed Work Schedule, the Contractor receives notification that all or any portion of Part 2 of the Work may be commenced, he/she shall submit a revised Detailed Work Schedule no later than two (2) Business Days from receipt of the notification.

- D13.3 The detailed work schedule shall consist of the following:
- (a) a Gantt chart for the Work based on the C.P.M. schedule; all acceptable to the Contract Administrator.
- D13.4 Further to D13.3(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

D14. COMMENCEMENT

- D14.1 The Contractor shall not commence any Work until he/she is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.
- D14.2 The Contractor shall not commence any Work on the Site until:
- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence of authority to carry on business specified in D8;
 - (ii) evidence of the workers compensation coverage specified in C6.15;
 - (iii) the twenty-four (24) hour emergency response phone number specified in D4.2.
 - (iv) the Safe Work Plan specified in D9;
 - (v) evidence of the insurance specified in D10;
 - (vi) the contract security specified in D11;
 - (vii) the subcontractor list specified in D12;
 - (viii) the detailed work schedule specified in D13.
 - (b) the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.
- D14.3 The Contractor shall not commence the Work on the Site before July 2, 2019, and shall commence the Work on Site no later than July 15, 2019, as directed by the Contract Administrator and weather permitting.
- D14.4 The Contractor shall not commence Part 2 of the Work as described in D2 and identified in Form B: Prices, unless prior to July 15, he/she has received notification from the Contract Administrator that the City has received notice of sufficient funding from Manitoba Hydro.
- D14.5 The City intends to award this Contract by June 20, 2019.
- D14.5.1 If the actual date of award is later than the intended date, the dates specified for Critical Stages, Substantial Performance, and Total Performance will be adjusted by the difference between the aforementioned intended and actual dates.

D15. WORKING DAYS

- D15.1 Further to C1.1(II);
- D15.1.1 The Contract Administrator will determine daily if a Working Day has elapsed and will record his/her assessment. On a weekly basis the Contract Administrator will provide the Contractor with a record of the Working Days assessed for the preceding week. The Contractor shall sign each report signifying that he/she agrees with the Contract Administrator's determination of the Working Days assessed for the report period.
- D15.1.2 Work done to restore the Site to a condition suitable for Work, shall not be considered "work" as defined in the definition of a Working Day.
- D15.1.3 When the Work includes two or more major types of Work that can be performed under different atmospheric conditions, the Contract Administrator shall consider all major types

of Work in determining whether the Contractor was able to work in assessing Working Days.

D16. RESTRICTED WORK HOURS

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

D17. WORK BY OTHERS

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

- (a) Manitoba Hydro Gas Division – lowering and/or rock wrapping of gas main and services, on an as-required basis;
- (b) Manitoba Hydro – electrical supply and inspection of new street lighting hardware (to be installed by the Contractor) and the energizing of the new street light plant;
- (c) City of Winnipeg – Proposed sewer lining project adjacent to Hudson Street coordination required;
- (d) City of Winnipeg – watermain renewal on Hudson Street coordination required
- (e) City of Winnipeg – Proposed sewer lining project adjacent to Thatcher Drive coordination required;
- (f) City of Winnipeg – Proposed sewer lining project on Villeneuve Boulevard coordination required;
- (g) City of Winnipeg – 2018 watermain renewal on Killarney Avenue, confirmation of completion or coordination required.

D18. SEQUENCE OF WORK

D18.1 Further to C6.1, the sequence of work shall comply with the following:

D18.1.1 Providing that the Work on each street is completed in a similar order to the order that the Work was commenced in, the Contractor will be permitted to have a maximum of three (3) streets under construction at any one time. Completion of a street means that all of the necessary concrete, asphalt including approaches and landscaping Work is completed to the satisfaction of the Contract Administrator.

D18.1.2 Where the Contractor utilizes two (2) or more crews that work independently on the same major component of the Work as identified in D2, the Contract Administrator may approve an increase to the maximum number of streets under construction at any time.

D18.1.3 Placing the topsoil and finished grading of all boulevard and median areas shall be completed prior to commencing construction of asphaltic concrete overlays, including scratch courses.

D18.1.4 Work on Villeneuve Boulevard shall be completed in two stages:

- (a) Stage 1 – Villeneuve Boulevard from the north line of Gendreau Avenue to Ducharme Avenue. The Contractor shall complete all works including topsoil and sod to the satisfaction of the Contract Administrator prior to commencement of Stage 2 work.
- (b) Stage 2 – Villeneuve Boulevard from Des Trappistes Street to the north line of Gendreau Avenue. The Contractor shall commence work on Stage 2 after all Stage 1 work has been completed.

D18.2 Work on Hudson Street shall commence after the completion of the 2019 Watermain Renewal Contract, estimated completion by July 1, 2019, Contact Trevor Steffens (204)226-2256.

D18.3 Work on Villeneuve Boulevard shall commence after completion of the 2019 Sewer Lining Contract, estimated to completion by July 1, 2019, Contact Nathan Kehlers (204)928-7436.

D19. SUBSTANTIAL PERFORMANCE

D19.1 The Contractor shall achieve Substantial Performance within sixty (60) consecutive Working Days of the commencement of the Work as specified in D14.

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

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

D20. TOTAL PERFORMANCE

D20.1 The Contractor shall achieve Total Performance within sixty five (65) consecutive Working Days of the commencement of the Work as specified in D14.

D20.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.

D20.3 The date on which the Work has been certified by the Contract Administrator as being totally performed to the requirements of the Contract through the issue of a certificate of Total Performance is the date on which Total Performance has been achieved.

D21. LIQUIDATED DAMAGES

D21.1 If the Contractor fails to achieve Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Working Day for each and every Working Day following the days fixed herein for same during which such failure continues:

- (a) Substantial Performance – Three Thousand dollars (\$3,000.00);
- (b) Total Performance – One Thousand dollars (\$1,000.00).

D21.2 The amounts specified for liquidated damages in D21.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve Substantial Performance or Total Performance by the days fixed herein for same.

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

D22. SCHEDULED MAINTENANCE

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

- (a) Reflective Crack Maintenance on Derek Street, Hudson Street, Thatcher Drive and Caledon Road as specified in CW 3520-R7.;
- (b) Sod maintenance as specified in CW 3510-R9.

- D22.2 Determination of Substantial Performance and Total Performance shall be exclusive of scheduled maintenance identified herein. All scheduled maintenance shall be completed prior to the expiration of the warranty period. Where the scheduled maintenance cannot be completed during the warranty period, the warranty period shall be extended for such period of time as it takes the Contractor to complete the scheduled maintenance.

CONTROL OF WORK

D23. JOB MEETINGS

- D23.1 Regular weekly job meetings will be held at the 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.
- D23.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

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

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

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

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

MEASUREMENT AND PAYMENT

D26. PAYMENT

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

WARRANTY

D27. WARRANTY

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

THIRD PARTY AGREEMENTS

D28. FUNDING AND/OR CONTRIBUTION AGREEMENT OBLIGATIONS

- D28.1 In the event that funding for the Work of the Contract is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, the following terms and conditions shall apply, as required by the applicable funding agreements.

D28.2 Further to D28.1, in the event that the obligations in D28 apply, actual costs legitimately incurred by the Contractor as a direct result of these obligations (“Funding Costs”) shall be determined by the actual cost to the Contractor and not by the valuation method(s) outlined in C7.4. In all other respects Funding Costs will be processed in accordance with Changes in Work under C7.

D28.3 For the purposes of D28:

- (a) **“Government of Canada”** includes the authorized officials, auditors, and representatives of the Government of Canada; and
- (b) **“Government of Manitoba”** includes the authorized officials, auditors, and representatives of the Government of Manitoba.

D28.4 Modified Insurance Requirements

D28.4.1 If not already required under the insurance requirements identified in D10, the Contractor will be required to provide wrap-up liability insurance in an amount of no less than two million dollars (\$2,000,000) inclusive per occurrence. Such policy will be written in the joint names of the City, Contractor, Consultants and all sub-contractors and sub-consultants and include twelve (12) months completed operations. The Government of Manitoba and its Ministers, officers, employees, and agents shall be added as additional insureds.

D28.4.2 If not already required under the insurance requirements identified in D10, the Contractor will be required to provide builders’ risk insurance (including boiler and machinery insurance, as applicable) providing all risks coverage at full replacement cost, or such lower level of insurance that the City may identify on a case-by-case basis, such as an installation floater.

D28.4.3 The Contractor shall obtain and maintain third party liability insurance with minimum coverage of two million dollars (\$2,000,000.00) per occurrence on all licensed vehicles operated at the Site. In the event that this requirement conflicts with another licensed vehicle insurance requirement in this Contract, then the requirement that provides the higher level of insurance shall apply.

D28.4.4 Further to D10.3, insurers shall provide satisfactory Certificates of Insurance to the Government of Manitoba prior to commencement of Work as written evidence of the insurance required. The Certificates of Insurance must provide for a minimum of thirty (30) days’ prior written notice to the Government of Manitoba in case of insurance cancellation.

D28.4.5 All policies must be taken out with insurers licensed to carry on business in the Province of Manitoba.

D28.5 Indemnification By Contractor

D28.5.1 In addition to the indemnity obligations outlined in C17 of the General Conditions for Construction, the Contractor agrees to indemnify and save harmless the Government of Canada and the Government of Manitoba and each of their respective Ministers, officers, servants, employees, and agents from and against all claims and demands, losses, costs, damages, actions, suit or other proceedings brought or pursued in any manner in respect of any matter caused by the Contractor or arising from this Contract or the Work, or from the goods or services provided or required to be provided by the Contractor, except those resulting from the negligence of any of the Government of Canada’s or the Government of Manitoba’s Ministers, officers, servants, employees, or agents, as the case may be.

D28.6 Records Retention and Audits

D28.6.1 The Contractor shall maintain and preserve accurate and complete records in respect of this Contract and the Work, including all accounting records, financial documents, copies of contracts with other parties and other records relating to this Contract and the Work during the term of the Contract and for at least six (6) years after Total Performance. Those records bearing original signatures or professional seals or stamps must be preserved in paper form; other records may be retained in electronic form.

D28.6.2 In addition to the record keeping and inspection obligations outlined in C6 of the General Conditions for Construction, the Contractor shall keep available for inspection and audit at all reasonable times while this Contract is in effect and until at least six (6) years after Total Performance, all records, documents, and contracts referred to in D28.6.1 for inspection, copying and audit by the City of Winnipeg, the Government of Manitoba and/or the Government of Canada and their respective representatives and auditors, and to produce them on demand; to provide reasonable facilities for such inspections, copying and audits, to provide copies of and extracts from such records, documents, or contracts upon request by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada and their respective representatives and auditors, and to promptly provide such other information and explanations as may be reasonably requested by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada from time-to-time.

D28.7 Other Obligations

D28.7.1 The Contractor consents to the City providing a copy of the Contract to the Government of Manitoba and/or the Government of Canada upon request from either entity.

D28.7.2 If the Lobbyists Registration Act (Manitoba) applies to the Contractor, the Contractor represents and warrants that it has filed a return and is registered and in full compliance with the obligations of that Act, and covenants that it will continue to comply for the duration of this Contract.

D28.7.3 The Contractor shall comply with all applicable legislation and standards, whether federal, provincial, or municipal, including (without limitation) labour, environmental, and human rights laws, in the course of providing the Work.

D28.7.4 The Contractor shall properly account for the Work provided under this Contract and payment received in this respect, prepared in accordance with generally accepted accounting principles in effect in Canada, including those principles and standards approved or recommended from time-to-time by the Chartered Professional Accountants of Canada or the Public Sector Accounting Board, as applicable, applied on a consistent basis.

FORM H1: PERFORMANCE BOND
(See D11)

KNOW ALL MEN BY THESE PRESENTS THAT

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

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

_____ dollars (\$_____)

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

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

TENDER NO. 186-2019

2019 LOCAL STREET RENEWAL PROGRAM - HUDSON ST, VILLENEUVE BLVD AND OTHER LOCATIONS

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

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

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

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

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

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

_____ day of _____, 20____ .

SIGNED AND SEALED
in the presence of:

(Witness as to Principal if no seal)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

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

FORM H2: LABOUR AND MATERIAL PAYMENT BOND
(See D11)

KNOW ALL MEN BY THESE PRESENTS THAT

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

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

_____ dollars (\$_____)

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

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

TENDER NO. 186-2019

2019 LOCAL STREET RENEWAL PROGRAM - HUDSON ST, VILLENEUVE BLVD AND OTHER LOCATIONS

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

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

- (a) A claimant is defined as one having a direct contract with the Principal for labour, service and material, or any of them, used or reasonably required for use in the performance of the contract, labour, service and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment (but excluding rent of equipment where the rent pursuant to an agreement is to be applied towards the purchase price thereof) directly applicable to the Contract;
- (b) The above-named Principal and Surety hereby jointly and severally agree with the Obligee that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work, labour or service was done or performed, or materials were furnished by such claimant, may sue on this bond, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon;
- (c) No suit or action shall be commenced hereunder by any claimant
 - (ii) unless claimant shall have given written notice to the Principal and the Surety above-named, within one hundred and twenty (120) days after such claimant did or performed the last of the work, labour or service, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work, labour or service was done or performed. Such notice shall be served by mailing the same by registered mail to the Principal, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the Province of Manitoba;

- (iii) after the expiration of one (1) year following the date on which Principal ceased work on said Contract; including work performed under the guarantees provided in the Contract;
 - (iv) other than in a court of competent jurisdiction in the Province of Manitoba.
- (d) The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.
- (e) The Surety shall not be liable for a greater sum than the specified penalty of this bond.

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

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

_____ day of _____, 20_____ .

SIGNED AND SEALED
in the presence of:

(Witness as to Principal if no seal)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

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

FORM J: SUBCONTRACTOR LIST
 (See D12)

2019 LOCAL STREET RENEWAL PROGRAM - HUDSON ST, VILLENEUVE BLVD AND OTHER LOCATIONS

<u>Portion of the Work</u>	<u>Name</u>	<u>Address</u>
SURFACE WORKS:		
Supply of Materials:		
Concrete		
Asphalt		
Base Course & Sub-Base		
Sod		
Geotextile Fabric		
Installation/Placement:		
Concrete		
Asphalt		
Base Course & Sub-Base		
Street Lighting		
Sod		
Joint Sealant		
UNDERGROUND WORKS:		
Supply of Materials:		
Sewer Service Pipe/Drainage Pipe		
Subdrains		
Catchbasins/Catchpits		
Frames and Covers		
Installation/Placement:		
Catchbasins/Catchpits		

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

- E1.1 These Specifications shall apply to the Work.
- E1.2 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/Spec/Default.stm>
- E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.2.3 Further to C2.4(d), Specifications included in the Tender shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.3 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B6. In every instance where a brand name or design specification is used, the City will also consider approved equals and/or approved alternatives in accordance with B6.
- E1.4 The following are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
CT-00	Cover Page and Location Plan	A1
CT-01	Derek Street – Parker Avenue to Station 0+210	A1
CT-02	Derek Street – Station 0+210 to Station 0+340	A1
CT-03	Derek Street – Station 0+340 to Windermere Avenue	A1
CT-04	Hudson Street – Chevrier Boulevard to Station 0+210	A1
CT-05	Hudson Street – Station 0+210 to Station 0+340	A1
CT-06	Hudson Street – Station 0+340 to Station 0+470	A1
CT-07	Hudson Street – Station 0+470 to Clarence Avenue	A1
CT-08	Thatcher Drive – Pembina Highway to Station 0+180	A1
CT-09	Thatcher Drive – Station 0+180 to Station 0+290	A1
CT-10	Thatcher Drive – Station 0+290 to Station 0+390	A1
CT-11	Thatcher Drive – Station 0+390 to University Crescent	A1
CT-12	Villeneuve Boulevard – Ducharme Avenue to Station 0+210	A1
CT-13	Villeneuve Boulevard – Station 0+210 to Station 0+340	A1
CT-14	Villeneuve Boulevard – Station 0+340 to Station 0+470	A1
CT-15	Villeneuve Boulevard – Station 0+470 to Des Trappistes Street	A1
CT-16	Caledon Road – Killarney Avenue to Station 0+200	A1
CT-17	Caledon Road – Station 0+200 to Mapleridge Avenue	A1
1-04707-DE-50000-0471 0001	Street Lighting Project – Villeneuve Boulevard	A1
1-04707-DD-50000-0473 0001	Street Lighting Project – Hudson Street	A1

E2. GEOTECHNICAL REPORT

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

E3. PROTECTION OF EXISTING TREES

- E3.1 The Contractor shall take the following precautionary steps to prevent damage from construction activities to existing boulevard trees within the limits of the construction area:
- (a) The Contractor shall not stockpile materials and soil or park vehicles and equipment on boulevards within 2 metres of trees.
 - (b) Trees identified to be at risk by the Contract Administrator are to be strapped with 25 x 100 x 2400mm wood planks, or suitably protected as approved by the Contract Administrator.
 - (c) 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.
 - (d) Operation of equipment within the dripline of the trees shall be kept to the minimum required to perform the work required. Equipment shall not be parked, repaired, refuelled; construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines of trees. The dripline of a tree shall be considered to be the ground surface directly beneath the tips of its outermost branches. The Contractor shall ensure that the operations do not cause flooding or sediment deposition on areas where trees are located.
 - (e) Work on-site shall be carried out in such a manner so as to minimize damage to existing tree branches. Where damage to branches does occur, they shall be neatly pruned.
- E3.2 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 Forester or his/her designate.
- E3.3 No separate measurement or payment will be made for the protection of trees.
- E3.4 Except as required in clause E3.1(c) and E3.1(e), Elm trees shall not be pruned at any time between April 1 and July 31.

E4. TRAFFIC CONTROL

- E4.1 Further to clauses 3.6, 3.7 and 3.8 of CW 1130:
- (a) Where directed by the Contract Administrator, the Contractor shall construct and maintain temporary asphalt ramps to alleviate vertical pavement obstructions such as manholes and planing drop-offs to the satisfaction of the Contract Administrator. Payment shall be in accordance with CW3410.
 - (b) In accordance with the Manual of Temporary Traffic Control on City Streets (MTTC), the Contractor ("Construction Agency" in the manual) shall be responsible for placing, maintaining and removing the appropriate temporary traffic control devices as specified by the MTTC or by the Traffic Management Branch of the City of Winnipeg Public Works Department. The Contractor shall bear all costs associated with the placement of temporary traffic control devices by their own forces or subcontractor.
- E4.2 Notwithstanding E4.1, in accordance with the MTTC, the Contract Administrator shall make arrangements with the **Traffic Services Branch of the City of Winnipeg** to place, maintain, and remove all **regulatory signs** and traffic control devices authorized and/or required by the Traffic Management Branch in the following situations:
- (a) Parking restrictions,
 - (b) Stopping restrictions,
 - (c) Turn restrictions,
 - (d) Diamond lane removal,
 - (e) Full or directional closures on a Regional Street,

- (f) Traffic routed across a median,
- (g) Full or directional closure of a non-regional street where there is a requirement for regulatory signs (turn restrictions, bus stop relocations, etc.) to implement the closure.
- (h) Approved Designated Construction Zones with a temporary posted speed limit reduction. Traffic Services will be responsible for placing all of the advance signs and 'Construction Ends' (TC-4) signs. The Contractor is still responsible for all other temporary traffic control including but not limited to barricades, barrels and tall cones.

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

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

E5. TRAFFIC MANAGEMENT

E5.1 Further to clause 3.7 of CW 1130:

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

E5.1 Further to clause 3.7 of CW 1130:

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

- (a) On Thatcher Drive and Caledon Road at least one lane for local access traffic shall be maintained along these streets during construction. At least one intersection on adjacent bays shall be open at a time.
- (b) Derek Street, Hudson Street, and Villeneuve Boulevard will be closed to all traffic. The Contractor shall sign the street "Road Closed – No Exit" in accordance with the Manual of Temporary Traffic Control.

E5.1.2 Should the Contractor be unable to maintain an existing access to a residence or business, he/she shall review the planned disruption with the business or residence and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 24 hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access.

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

E6. REFUSE AND RECYCLING COLLECTION

E6.1 While access to refuse and/or recycling collection vehicles is restricted, on collection day(s) the Contractor shall move all of the affected property owners refuse and/or recycling materials to a nearby common area, prior to an established time, in accordance with E6.2 to permit the normal collection vehicles to collect the materials. Immediately following recycling collection the Contractor shall return recycling receptacles to the addresses marked on the receptacles.

E6.2 Collection Schedule:

Derek Street Street from Windermere Avenue to Parker Avenue.

Collection Day(s): **Wednesday**

Collection Time: **7:00 am**

Common Collection Area: **No Issues**

Hudson Street from Clarence Avenue to Chevrier Boulevard^.

Collection Day(s): **Wednesday**
Collection Time: **7:00 am**
Common Collection Area: **Front Street^**

Thatcher Drive from University Crescent to Pembina Highway.

Collection Day(s): **Wednesday**
Collection Time: **7:00 am**
Common Collection Area: **Front Street**

Villeneuve Boulevard from Ducharme Avenue to Des Trappistes Street.

Collection Day(s): **Wednesday**
Collection Time: **7:00 am**
Common Collection Area: **Front Street**

Caledon Road from Mapleridge Avenue to Killarney Avenue.

Collection Day(s): **Wednesday**
Collection Time: **7:00 am**
Common Collection Area: **No Issues**

E6.3 No measurement or payment will be made for the work associated with this specification.

E7. WATER OBTAINED FROM THE CITY

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

E8. SURFACE RESTORATIONS

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

E9. INFRASTRUCTURE SIGNS

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

E10. SUPPLY AND INSTALLATION OF PAVEMENT REPAIR FABRIC

DESCRIPTION

E10.1 General

E10.1.1 This specification covers the supply and installation of pavement repair fabric.

E10.1.2 Referenced Standard Construction

(a) CW 3130 – Supply and Installation of Geotextile Fabrics.

MATERIALS

E10.2 Storage and Handling

E10.2.1 Store and handle material in accordance with Section 2 of CW 3130.

E10.3 Pavement Repair Fabric

E10.3.1 Pavement repair fabric will be Glas Grid Road Reinforcement Mesh - Style 8501.

CONSTRUCTION METHODS

E10.4 General

E10.4.1 Install pavement repair fabric at random locations as directed by the Contract Administrator.

E10.4.2 The extent of the placement limits and quantities required will be determined by the Contract Administrator and provided 48 hours prior to the placement of asphalt.

E10.4.3 Proceed with installation upon completion and acceptance of the asphalt levelling course.

E10.4.4 Install fabric in accordance with the manufacturer's specifications and recommendations.

E10.4.5 Only construction equipment required to place the final asphalt surface course will be allowed to travel on the exposed fabric.

E10.4.6 Replace damaged or improperly placed fabric.

E10.4.7 Ensure temperature of the asphalt material does not exceed the melting point of the fabric.

MEASUREMENT AND PAYMENT

E10.5 Pavement Repair Fabric

E10.5.1 The supply and installation of the pavement repair fabric will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Pavement Repair Fabric". The area to be paid for will be the total number of square metres of pavement repair fabric supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

E11. INSTALLATION OF STREET LIGHTING AND ASSOCIATED WORKS

E11.1 Definitions

E11.1.1 **LIMITS OF APPROACH** means the shortest distance that is permissible between live high voltage (>750 volts) conductors or apparatus and any part of a worker's body, material or tools being handled, or equipment operated.

E11.1.2 **MANITOBA HYDRO CENTRAL STORES** means Manitoba Hydro's Waverley Service and Reclaim Centre - 1840 Chevrier Blvd - Winnipeg, Manitoba

E11.1.3 **OVERHEAD FEED** means an electrical supply via an overhead conductor connected between streetlight standards. Typically strung between standards on a temporary basis.

- E11.1.4 OVERHEAD SOURCE means an electrical supply from Manitoba Hydro's system. (Typically an overhead conductor from a wooden distribution pole or a DIP/RISER located on a wooden distribution pole.)
- E11.1.5 RECLAIM material means existing material that has been removed from Manitoba Hydro's system and to be returned to Manitoba Hydro.
- E11.1.6 SCRAP material means existing material that has been removed from Manitoba Hydro's system and to be recycled/disposed of by the Contractor.
- E11.1.7 SURPLUS material means new material that has been requisitioned by the Contractor and not incorporated into the work at the end of the Contract.
- E11.1.8 WORK CLEARANCE means an ELECTRICAL AND/OR NATURAL GAS FACILITIES LOCATE form (see SAMPLE ONLY included as Appendix D) issued by each of Manitoba Hydro's Customer Service Centre (CSC) affected to permit work to commence (Permit to work).
- E11.2 Description
- E11.2.1 The work shall consist of the supply of all supervision, labour, materials (except as indicated under MATERIAL SUPPLIED BY MANITOBA HYDRO below) insurance, tools, backfill and equipment (and their maintenance), transportation, fuel, oil, meals and lodging, mobilization and de-mobilization, and warranty of workmanship as required to install and remove temporary Overhead Feeds, remove existing street light poles as required, install new street light poles and associated underground cables/conduits, all in accordance with the requirements specified in the tender documents.
- E11.3 Work Locations
- E11.3.1 The proposed street light installation and removals are shown on construction drawings and are as follows:
- (a) Villeneuve Boulevard from Ducharme Avenue to Rue des Trappistes
 - (b) Hudson Street from Clarence Avenue to Chevrier Boulevard
- E11.4 Coordination of Work
- E11.4.1 The Contractor shall provide a minimum of ten (10) working days notice to Manitoba Hydro prior to the start of construction. The work shall be conducted and coordinated with Manitoba Hydro in a manner to ensure street lighting is maintained at all times for the duration of the work. The construction drawings provide the Proposed Sequence of Construction.
- E11.4.2 The Contractor shall obtain Work Clearance from Manitoba Hydro's Customer Service Centre(s) (CSC) affected prior to the work commencing. No additional compensation shall be paid to the Contractor for delays obtaining Work Clearance for any reason.
- E11.4.3 Manitoba Hydro's CSC will provide the Limits of Approach applicable to the Contractor on the Work Clearance form.
- E11.5 Orientation
- E11.5.1 Prior to the commencement of the proposed work, the Contractor's crew foremen, electricians, and other key personnel shall attend one (1) day of orientation provided by Manitoba Hydro for various operations such as cable handling, cable splicing/termination, installation of street light poles, concrete bases, luminaires and various other construction standards and procedures. The Contractor will be responsible for all costs associated with personnel salaries, travel, sustenance and overheads, etc., during training.
- E11.6 Pre-Construction Meeting

- E11.6.1 Prior to the commencement of the work, the Contractor shall attend a pre-construction meeting with Manitoba Hydro. The agenda for this meeting shall include but not be limited to the following:
- (a) Reference the Contractor's Safe work Procedures;
 - (b) Prime Contractor;
 - (c) materials;
 - (d) sequence of construction;
 - (e) communication plan;
 - (f) any training requirements & qualifications;
 - (g) Drawing and Project review;
 - (h) a review of the Contractor's proposed work schedule; and
 - (i) any and all other topics of clarification that the Contractor and the Contract Administrator may wish to discuss.

E11.6.2 The Contractor's cost to attend this pre-construction meeting shall be incorporated into the unit prices for the work.

E11.7 Qualifications and Certification

E11.7.1 The Contractor's Crew Foreman, installers and other key Contractor's Personnel shall possess the necessary certification, licensing, training, experience and familiarity with safety rules, procedures and hazards relating to the work. Journeyman Power Line Technician (PLT), Journeyman Lineman, Journeyman Cableman or Journeyman Electricians shall be required to perform portions of this work.

E11.7.2 Journeyman Power Line Technician (PLT), Journeyman Cableman and Journeyman Lineman are also required to possess a "Limited Specialized Trade Licence – 'M-P' Licence – Power Line" issued by the Province of Manitoba.

E11.7.3 Manitoba "Safe work" Bulletin M&E010 dated January 5, 2011 regarding Electrician Licenses discusses the requirements for a "Limited Specialized Trade Licence – 'M-P' Licence – Power Line".

For more information contact:
Manitoba
Mechanical and Engineering Branch
500-401 York Avenue
Winnipeg, Manitoba R3C 0P8
Tel. 204-945-3373
Fax 204-948-2309

or see link http://www.firecomm.gov.mb.ca/docs/ofc_itsm_11_010electlic.pdf

E11.7.4 Licensed Journeyman Electricians or Journeyman PLT or Journeyman Cableman or Journeyman Lineman ARE REQUIRED for all cable handling operations included but not limited to: disconnecting cables in the handhole, installation and removal of temporary overhead feeds, installation and connection of ground rods, streetlight cable splices, termination of streetlight cables in handholds and at luminaires. The Contractor shall employ sufficient qualified personnel on its crews to conform to the Electrician's Licensing Act. The Contractor shall be prepared to provide proof of licences to Manitoba Hydro upon request.

E11.7.5 The Contractor shall assess the hazards associated with the work and have documented Safe work Procedures to perform the work. It is the Contractor's responsibility to train employees on these procedures. The Contractor shall be prepared to provide proof of training to Manitoba Hydro upon request.

E11.8 Referenced Standard Construction Specifications

E11.8.1 In addition to these Specifications, the work to be performed by the Contractor relative to the installation and/or replacement of street lighting poles, concrete bases and associated cabling shall be in accordance with the following:

- (a) Manitoba Hydro 66kV and Below Standards;
- (b) CSA C22.3 No. 7 (latest edition);
- (c) Canadian Electrical Code (CEC) Part 1 (latest edition); and
- (d) Any other applicable codes.
- (e) (collectively, the “Standards”).

E11.8.2 Revisions and updates to the Manitoba Hydro 66kV and Below Standards are issued periodically and the latest issued version of the Standard will apply. For the convenience of the Contractor for bidding purposes, excerpts of the Manitoba Hydro 66kV and Below Standards have been included as Appendix A.

E11.8.3 In some cases, Municipal, Provincial or Federal laws or this Technical Specification may be more stringent than the CSA Standards. Whenever conflict exists, the Contractor shall comply with the most stringent requirements applicable at the place of the work.

E11.9 Tools, Equipment and Materials

E11.9.1 The Contractor shall be required to provide all tools and equipment required for performing the specified tasks. Equipment shall be in good operating condition, shall be properly maintained using original equipment manufacturer replacement parts and shall be provided with letters of testing/inspection from the manufacturer when requested. Where the equipment is provided as a kit with multiple parts and tools, the kit shall be complete with all parts required to perform the designed task. Contractor fabricated tools or equipment will not be accepted for use.

E11.9.2 The Contractor shall obtain the following specific Electrical Equipment including but not limited to:

- (a) Compression tool or tools and associated dies to perform compressions to a maximum size of 1/0 AL (MD-6 compression tools shall not be used).
- (b) Approved compression tools are:

Manufacture	Type	Model No.	Range
Burndy	In-line, battery	PATMD68-14V	350 Kcmil AL
Cembre	In-line, battery	B54Y (06V081E)	4/0 AWG AL
Burndy	Pistol, battery	BUR PAT60018V	350 Kcmil AL

E11.9.3 Dies shall be of the type shown in Standard CD210-21 and CD 210-24 only, must have identical markings, and compression tool die must match die number stamped on connector.

- (a) Modiewark Model #4444 or Fluke 1AC-II Volt Alert potential Indicator
- (b) Voltage meter – Fluke model #T3C
- (c) Insulated wire cutters – used for cutting cable ends square.

E11.9.4 Alternative equipment manufacturers may be considered upon request by the Contractor and shall be approved for use by Manitoba Hydro prior to use.

E11.9.5 Manitoba Hydro may reject any tools or equipment that do not appear to be in good condition or fail to successfully provide the required function.

E11.10 Material Supplied by Manitoba Hydro

E11.10.1 Manitoba Hydro shall supply all street light poles, concrete bases, breakaway bases, luminaires, street light arms, ground rods, compression sleeves, grommets, nuts, electrical cables, conduits, relays, cable guards, Gel-caps and all other materials noted in the

Standards. The Contractor shall sign receipts indicating the location on which the materials are to be used. The material shall be picked up by the contractor from the following locations:

- E11.10.2 Manitoba Hydro Central Stores (contact personnel will be provided to the successful contractor).
- E11.10.3 Materials requested will be supplied to the Contractor by Manitoba Hydro upon presentation of Manitoba Hydro's Stores Material Order Form. The Contractor shall assume all responsibilities for the loading, unloading, transportation, proper handling, secure storage and working of the materials and shall make replacements at its own expense in case any material is damaged, stolen or lost due to improper handling, storage or poor workmanship.
- E11.10.4 The Contractor shall, at the time of materials release, check and confirm the quantity of materials. Shortages, discrepancies, or damages to materials shall be immediately reported in writing to Manitoba Hydro.
- E11.10.5 After commencing performance of the work, the Contractor shall continually monitor all material required for the timely completion of the work and shall report additional material requirements to Manitoba Hydro a minimum of 72 hours prior to materials being required to perform the work. No additional compensation shall be paid as a result of delays due to material shortages where additional material requirements were not reported a minimum of 72 hours prior to being required for the work on an active project.
- E11.11 Material Supplied by Contractor
- E11.11.1 The Contractor shall be responsible to furnish gravel, sand, ¾ down limestone, ¼ down limestone, protective hose (i.e. typically 2" fire hose), duct seal and pit-run material for backfilling around street light poles and around cables as per the Standards. The cost of furnishing the above listed materials shall be incorporated into the unit prices for the work.
- E11.12 Surplus, Reclaim and Scrap Material
- E11.12.1 Upon completion of the work, the Contractor shall, at its own expense, deliver to Manitoba Hydro Central Stores, all Surplus materials furnished by Manitoba Hydro and not used in the work, regardless of the location of said material at that time.
- E11.12.2 In addition, the Contractor shall, at its own expense, deliver to Manitoba Hydro Central Stores all Reclaim materials from the work specifically HPS luminaires. Manitoba Hydro shall be responsible for the proper disposal of Reclaim HPS luminaires. The HPS bulb shall remain installed and unbroken in the Reclaim luminaire. The Contractor shall handle the Reclaim luminaires with care and shall avoid breaking the bulb or refractor.
- E11.12.3 Manitoba Hydro's preference is to recycle as much Scrap Material as practicable. The Contractor is responsible to remove the Scrap Material, transport to the recycler or Manitoba Hydro approved disposal site, pay for any disposal fees and may retain any recycling value.
- E11.13 De-Energization and Lockout
- E11.13.1 **Manitoba Hydro** - Where a standard is supplied from an Overhead Source, Manitoba Hydro's staff shall be responsible to disconnect and isolate the street light standard or standards between the standard and Overhead Source. Some street light standards may be temporarily fed from an Overhead Source. This Overhead Source shall be disconnected and removed by Manitoba Hydro staff prior to commencing with the work. The streetlight circuits will not be Locked Out by Manitoba Hydro.
- E11.13.2 **The Contractor** - The Contractor shall assess the hazards associated with the work and employ its own Safe Work Procedure for the work to be performed. The Contractor's Safe Work Procedure shall include provisions that the street light circuits will not be Locked Out by Manitoba Hydro. The Contractor's Safe Work Procedure shall achieve Lock Out or techniques equivalent to Lock Out.

E11.13.3 The Contractor shall complete a job planning form (an example is included as Appendix E) on a daily basis before any work commences and provide Manitoba Hydro with copies of the job plans if requested.

E11.14 Temporary Overhead Feeds

E11.14.1 Manitoba Hydro in consultation with the Contractor will determine if temporary lighting will be provided by the existing street lights or from the new street lights.

E11.14.2 When using the existing poles for temporary lighting, Manitoba Hydro shall remove an Overhead Source in accordance with DE-ENERGIZATION AND LOCKOUT above, prior to the Contractor installing a #4 duplex overhead conductor between the existing poles. The #4 duplex overhead conductor will normally be attached to the tenon of the davit arm near the luminaire with a pre-form grip. Older poles may require a spool insulator be attached to the pole using a pre-form grip to support the #4 duplex overhead conductor. A short length of 2C/#12 copper conductor is connected to the terminals of the luminaire brought out and connected to the #4 duplex overhead conductor. The final span to the Overhead Source shall be installed by Manitoba Hydro.

E11.14.3 When using the new poles for temporary lighting, the Contractor shall install the new bases, poles and #4 duplex overhead conductor. The #4 duplex overhead conductor will be attached to the tenon of the davit arm near the luminaire with a pre-form grip. A short length of 2C/#12 copper conductor is connected to the terminals of the luminaire brought out and connected to the #4 duplex overhead conductor. The final span to the Overhead Source shall be installed by Manitoba Hydro.

E11.14.4 All material used to provide the temporary overhead feed shall be returned to Manitoba Hydro. Care shall be taken to coil and tag Reclaim conductor for reuse. If used, insulators shall be handled carefully to prevent breakage.

E11.15 Safe Excavation

E11.15.1 The work shall be performed in accordance with the requirements of Manitoba Hydro's Safe Excavation and Safety Watch Guidelines included as Appendix B and Manitoba Workplace Safety and Health Regulation 217 latest revision.

E11.16 Safe Handling

E11.16.1 The Contractor shall apply handling techniques in accordance with Manitoba Workplace Health and Safety Regulation 217 latest revision.

E11.17 Electric Cables and Conduits

E11.17.1 The Contractor shall use diligent care and proper equipment in handling of all cables, so as not to injure the jacket and avoid gouging, kinking, scratching or abrading the cables. If any material is damaged to any extent, the Contractor shall repair the damages at its own expense, in a manner approved by Manitoba Hydro or will be charged the full cost of the damaged items.

E11.17.2 Cable reels shall not be dropped and must be handled and placed/stored in an upright position at all times and shall not be laid flat for any purpose or reason. Cable reels shall be adequately supported on hard surface to prevent the reel from sinking into the ground that can cause undue stress on the cables. Cable reels should be inspected for damages prior to use. If a cable reel is found to be defective, such defect shall be reported immediately to Manitoba Hydro.

E11.17.3 The Contractor shall place all material and string the cables in such a manner as to cause the least interference with normal use of the land, street or roadway. All material shall be unloaded in a manner to preserve its condition, prevent loss and/or theft and permit easy access for Manitoba Hydro's inspection.

E11.17.4 The Contractor shall provide Manitoba Hydro's inspector sufficient opportunity, in the sole discretion of Manitoba Hydro, to inspect the work.

E11.18 Precast Concrete Bases

- E11.18.1 The Contractor shall handle, store, transport and unload the precast concrete bases in a manner to prevent damage to the threaded bolts and conduit casing.
- E11.18.2 Precast Concrete Bases are extremely heavy. Approximate weight of pre-cast concrete bases are found in the Standards. The Contractor shall only use equipment rated for such weight.

E11.19 Street Light Poles and Arms

- E11.19.1 The Contractor shall handle, store, transport, and provide proper load securement for the poles and arms in a manner to prevent damage.

E11.20 Luminaires

- E11.20.1 The Contractor shall handle, store, transport and unload the luminaires in their original packaging and in a manner to prevent damage.

E11.21 Small Material

- E11.21.1 Photo electric cells, shorting caps, shims, nut covers and associated supplies shall be kept in a suitable warehouse provided by the Contractor at its own expense. Photo electric cells shall be transported and stored in such a manner as to prevent breakage.

E11.22 Care of Materials

- E11.22.1 The Contractor shall assume all responsibilities of all the materials and shall replace, at its own expense, any materials damaged, stolen or lost due to improper handling or poor workmanship.

E11.23 Wire and Cable Reel Storage

- E11.23.1 Cable reels shall be stored with the flanges upright and resting on a hard surface. At temporary storage sites where the soil may be soft, preservative-treated plywood sheets may be used to keep the flanges from sinking into the ground.
- E11.23.2 If cable reels must be pancaked or stored on their side in vertical racks, do not lift the reel by the top flange. Spacers (two 2 X 4s placed wide side up) should be placed under the bottom flange and between the reels in order to create a space to insert the forks and lift the reels without damaging the cable.

E11.24 Reel Handling

- E11.24.1 When off-loading reels from a truck, reels shall be lowered using a hydraulic gate, hoist or forklift truck. When a reel is rolled from one point to another, care must be taken to see that the reel does not straddle objects such as rocks, pipes, curbs or wooden blocks which could damage the cable or protective covering. A reel should always be rolled on hard surfaces to avoid sinkage and in the opposite direction to the cable wraps to ensure that the reel is rolled in such a direction as to tighten the cable on the reel.
- E11.24.2 When using a hoist, install a mandrel through the reel arbour hole and attach a sling. Use a spreader bar approximately 6 inches longer than the overall reel width placed between the sling ends just above the reel flanges. This will prevent bending of the reel flanges and damage to the cable.
- E11.24.3 If a forklift is used to move a reel, the reel is to be approached from the flange side. Position the forks such that the reel is lifted by both reel flanges. The lift forks shall not contact the cable.
- E11.24.4 Returnable reels shall be returned promptly to Manitoba Hydro Central Stores and in no case later than three (3) days after the completion of the work unless otherwise mutually agreed between the Contractor and Manitoba Hydro.

E11.25 Pressurized Water/Vacuum Excavation

- E11.25.1 Pressurized water/vacuum excavation (PW/VE) shall be used to daylight all buried utilities and structures where excavation by other mechanical means would be expected to provide a physical risk to that utility or structure.
- E11.25.2 The work shall be performed in accordance with the requirements of Manitoba Hydro's Safe Excavation and Safety Watch Guidelines included as Appendix B.

E11.26 Removal of Street Light Pole from Existing Base

- E11.26.1 This shall include all work required to remove a street light pole from an existing base as set forth in this Technical Specification. The pole may be on an existing precast concrete base, steel power installed screw base or poured in place concrete base.
- E11.26.2 The Contractor shall furnish all labour, supplies and materials (except as indicated in the Section "MATERIAL SUPPLIED BY MANITOBA HYDRO") necessary for the removal of the street light pole from the existing base. Care shall be taken to preserve the luminaire. The luminaire shall be reinstalled on the new street light pole or returned to Manitoba Hydro's stores as instructed by the Manitoba Hydro.
- E11.26.3 The Contractor shall be responsible to transport all Surplus and Reclaim materials to Manitoba Hydro Central Stores and transport and dispose of all Scrap material as set forth in this Specification.

E11.27 Removal of Base and Direct Buried Street Light Pole

- E11.27.1 This shall include all excavation, whether by auger, pressurized water/vacuum excavation, by hand, or by other methods which may be necessary to remove a base or direct buried street light pole. The base may be poured in place concrete, steel power installed or precast concrete.
- E11.27.2 The Contractor shall be responsible to transport all Surplus and Reclaim materials to Manitoba Hydro Central Stores and transport and dispose of all Scrap material as set forth in this Specification.
- E11.27.3 The Contractor is responsible to supply all backfill material as specified in the Standards and carry out all backfill, compacting and leveling of all excavations and voids for removed bases and direct buried street light poles so as to be ready for top soil and seed or sod or as directed by Manitoba Hydro.

E11.28 Installation of Foundation – Concrete Base

- E11.28.1 This shall include all excavation, whether by auger, pressurized water/vacuum excavation, by hand, or by other methods which may be necessary to replace or install a concrete base as set forth in this Specification.
- E11.28.2 The Contractor shall furnish all labour, supplies and material (except as indicated in the Section "MATERIAL SUPPLIED BY MANITOBA HYDRO") necessary to install a new or replace a concrete base. Excavation for the precast concrete base shall be to a diameter and depth specified in Standard CD 300-6. All excess material is to be removed by the Contractor.
- E11.28.3 The concrete base shall be set on a bed of $\frac{3}{4}$ down limestone. The concrete base backfill material shall be compacted in lifts no more than 150 mm. Backfill material shall be $\frac{3}{4}$ down limestone. Compacting of backfill material shall be done using a hydraulic tamper. Alternative tamping methods shall be approved by Manitoba Hydro. Underground cables entering the concrete base shall be protected by a length of protective hose supplied by the Contractor and a layer of sand surrounding the cables to protect it from the limestone. The concrete base shall be installed level in all 4 directions. Final grade must be established prior to installing the concrete bases.

- E11.28.4 The completed backfill shall be at least equal in compaction to undisturbed soil, as required by the Municipal authorities or elsewhere in this Specification. The Contractor shall level all excavations.
- E11.28.5 Should settlement occur in the excavation and cause a depression in the surface, the Contractor shall repair the surface. Placing of additional backfill material due to settlement shall be at the Contractor's expense.
- E11.28.6 The concrete base shall be oriented in the proper direction to allow the easy entrance of the underground cables into the plastic pipe preinstalled in the concrete base. Care shall be taken to prevent damage to the insulation or jacket of the conductors. The cable shall be left long enough to extend one (1) metre beyond the top of the hand hole.
- E11.29 Base Mounted Street Light Poles
- E11.29.1 This shall include all work required to install the street light pole on the concrete base as set forth in this Specification.
- E11.29.2 The Contractor shall furnish all labour, supplies and material (except as indicated in the Section "MATERIAL SUPPLIED BY MANITOBA HYDRO") necessary for the installation of the pole (straight shaft or davit) on the concrete base.
- E11.29.3 Unless otherwise specified on the construction drawings, the Contractor shall orient the poles so that the hand hole is on the left side of the pole when viewed from the road. A worker should be able to see oncoming traffic when working in the hand hole.
- E11.29.4 The Contractor shall level the street light pole in all 4 directions. Leveling shims may be used.
- E11.29.5 Tightening of bolts shall be performed in a manner that brings the surfaces up evenly. All nuts shall be tightened and torqued in accordance with Standard CD 300-9. The Contractor shall install the nut covers included with the pole. Nut covers are typically not supplied for the 55' and 65' street light poles.
- E11.29.6 Unless otherwise specified, excess underground cable and 2C-12 wire shall be left inside the hand hole with the hand hole cover loosely installed.
- E11.29.7 Existing street light poles may have street signs attached. The Contractor shall remove the signs from the existing pole and temporarily reattach the signs to the new pole. The Contractor shall notify Manitoba Hydro of the location where the signs have been removed.
- E11.30 Luminaires and Associated Wiring
- E11.30.1 The Contractor shall furnish labour, supplies and material (except as indicated in the Section "MATERIAL SUPPLIED BY MANITOBA HYDRO") necessary to install the luminaire and associated wiring. Unless otherwise specified, the luminaire shall be installed with a tilt of zero (0) degrees. The Contractor shall install a length of 2 conductor No. 12 gauge (2C-12) wire from the terminals of the luminaire, through the arm (if applicable), down the pole to the hand hole. One (1) metre of 2C-12 wire shall be left at the hand hole. Impact equipment (air or electric) shall not be used to tighten luminaire mounting bolts. The Contractor shall be liable for damage due to over tightening.
- E11.30.2 The Contractor shall verify the luminaire voltage matches the source voltage as shown on the construction drawings. If luminaire voltage does not match the source voltage, the Contractor shall re-wire the luminaire in accordance with the wiring diagram provided.
NOTE: Not applicable for LED luminaires.
- E11.30.3 As specified on the construction drawings, the luminaire will require either a photo electric cell (PEC) or shorting cap installed. When installing the PEC the eye shall be oriented north. The Contractor shall also install the appropriate wattage bulb in the luminaire.
NOTE: Bulb installation not applicable for LED luminaires.

E11.31 Break Away Bases

- E11.31.1 Break away bases shall be installed in accordance with Standard CD 300-10. The height of the concrete base above grade shall not exceed 50mm. The surface of the concrete base shall be flat and level. A reaction plate shall be installed between the concrete base and the break-away base.
- E11.31.2 The Contractor shall torque the couplers in accordance with Standard CD 300-10. Impact tools shall not be used to tighten or torque couplers or nuts associated with a break away base.

E11.32 Splicing/Connecting Cables

- E11.32.1 The electric cable shall be spliced/terminated as per Standards CD 215-12, CD 215-13, CD 310-1, CD 310-4, CD 310-9 and CD 310-10 with the exception that the Contractor will use a GELCAP-SL-2/0 splice kit (See Appendix C). Termination in the hand hole may include the installation of an inline fuse holder.
- E11.32.2 The Contractor shall furnish all labour, supplies and material (except as indicated in the Section "MATERIAL SUPPLIED BY MANITOBA HYDRO") necessary to splice/terminate the street light conductor(s).

E11.33 Excavation

- E11.33.1 The Contractor shall furnish all labour, supplies and material (except as indicated in the Section "MATERIAL SUPPLIED BY MANITOBA HYDRO") necessary for the completion and maintenance of grade and line of the street light cables and conduit including water control if found to be necessary. The trench shall be graded to conform to the street light cables and conduit so that the street light cables and conduit rest firmly on a smooth surface throughout its length. All stones or other objects which, in the opinion of Manitoba Hydro might damage the street light cable jacket and conduit shall be removed. Where the presence of rock or other condition prevent a satisfactory bed for the cables, 150 mm of well-tamped, clean soil or ¼ down crushed limestone shall be placed in the bottom of the trench. In this case, the spoil bank from trenching operations shall not be allowed to fall into the trench or mix with the soil to be used in backfilling the trench. Loose debris or foreign matter and the spoil bank shall be placed so as not to hinder drainage, damage property, or obstruct traffic.
- E11.33.2 Trenches shall be dug to such a depth that will provide a minimum cover of 600 mm from final grade in sodded areas and 1000 mm in roadways in accordance with Standard CD 305-1.

E11.34 Laying Cables

- E11.34.1 Cables are to be lowered in the trench in an orderly fashion so as to maintain a consistent path and straight alignment. All cables shall be lowered in a continuous run (NO SPLICING) and in accordance with the construction drawings; and shall maintain the necessary separation, where required. All cables shall be of continuous runs and capped and sealed if they are not being installed in the pole at that time. Cables shall not be dragged over paved surfaces.
- E11.34.2 Once a cable is cut its ends must be sealed immediately with an approved and appropriately sized, heat shrink or cold shrink sealing cap to prevent moisture ingress unless the cable is being installed in the pole at that time.
- E11.34.3 During the removal of the cable, the reels shall be placed on jacks, stands or trailers with a bar through the arbour holes which will allow the reel to be turned easily, and the cable to be paid out. Cables can be paid out from the bottom or the top of the reel. Cable in coils shall be handled in a similar manner. This can be achieved by supporting the coil in a vertical plane and rotating it by hand as the cable is carefully uncoiled. The cable shall never be pulled over the flange of a reel, or pulled off the side of a coil, since this will introduce a twist in the cable.

- E11.34.4 During installation, under no circumstance is the cable to be subjected to a bending radius tighter than that detailed in the Standards.
- E11.34.5 Where specified in the Standards or on the construction drawings, the Contractor shall install the street light cable in a conduit.
- E11.35 Installing Conduit and Cable by Boring (Horizontal Directional Drilling)
- E11.35.1 The Contractor shall dig the approaches and openings necessary to install boring equipment, and the boring equipment used shall be of such a nature as to minimize the opening size required. The boring equipment shall produce a straight hole without unnecessary dips or bends. The bore hole shall be only slightly larger than the outside diameter of the conduits or cables to minimize possible settlement. Cables and conduits shall be pulled in with pulling eyes or using a kelly grip in a manner so as to guard against damage.
- E11.35.2 During construction as the drill bit crosses each existing facility a lookout shall be assigned by the Contractor to visually confirm the drill bit is maintaining a minimum 300 mm clearance from the existing facility all in accordance with Manitoba Hydro Safe Excavation and Safety Watch Guidelines included as Appendix B. Maximum pulling tensions on any streetlight cable shall be limited to 2.9 kN/0.65 kips.
- E11.35.3 Drilling fluids and associated waste materials shall be disposed of in a manner that minimizes environmental effects.
- E11.35.4 The Contractor shall properly compact the backfill material and will be responsible for placing additional material should settlement occur for the duration of the warranty period.
- E11.36 Buried Utility Crossings
- E11.36.1 All buried obstructions are not necessarily shown on the reference drawings and the locations of those indicated are approximate only.
- E11.36.2 The Contractor shall determine the location of all buried obstructions and shall notify the appropriate authorities and obtain all necessary permits prior to excavation, trenching and directional drilling near or across such obstructions. All buried obstructions where the new buried cable route crosses other utilities including but not limited to gas, water, sewer, telephone and electric lines shall be exposed as per each utilities guidelines by the Contractor, including the use of Pressurized Water/Vacuum Equipment (PW/VE) where necessary. Should any damage occur to such lines during the course of the work, the Contractor shall be responsible for the damage and the costs of repairs to buried obstructions caused by its operations and shall fully indemnify the City of Winnipeg and Manitoba Hydro from and against all claims arising out of such damage. Manitoba Hydro Safe Excavation and Safety Watch Guidelines included as Appendix B shall be followed when crossing natural gas pipelines and electrical cables by the directional boring method.
- E11.36.3 The PW/VE technique, used to expose underground plant in certain conditions, must be performed in accordance with each utility's requirements, including but not limited to Manitoba Hydro, Manitoba Telecom Services, Shaw Cable, etc. PW/VE costs that the Contractor will incur during the work must be factored into the Contractor's bid prices. The Contractor shall not be entitled to extra compensation for the use of PW/VE on the work.
- E11.36.4 The Contractor shall be responsible to supply all backfill material and carry out all backfill, compacting and leveling of all excavations so as to be ready for topsoil and seed or sod or as directed by Manitoba Hydro.
- E11.37 Bending Cables/Conduits and Installation into Standards
- E11.37.1 It is desired to reduce to a minimum the required number of bends and to lay the cables/conduits to conform to the contour of the ground and maintain a normal covering. This shall be accomplished by cutting the trench slightly deeper in approaches to road crossings and drainage ditches. It is intended that the Contractor shall eliminate unnecessary bending by operating the trenching machine at various depths rather than by finishing grading the trench by hand whenever practical.

- E11.37.2 Sharp bends of the cables/conduits shall be avoided at all times. All bends shall meet the requirements set out in this Specification. If excessive bending was exerted on any cable, the cable shall be replaced at the Contractor's cost. During installation, under no circumstance is the cable to be subjected to a bending radius tighter than that detailed in the Standards. At street light poles the Contractor shall install the ends of the cables into the plastic pipe preinstalled in the concrete base. Care shall be taken to prevent damage to the insulation or jacket of the conductors. Underground cables entering the concrete base shall be protected by a length of protective hose supplied by the Contractor and by a layer of sand surrounding the cables to protect it from the limestone. The cable shall be left long enough to extend one (1) metre beyond the hand hole. The street light cable in the trench shall be installed in conduit for mechanical protection and the ends sealed with duct seal supplied by the Contractor. Care shall be taken to prevent damaging the cable where it exists the conduit. The conduit shall only be installed into the concrete base if conduit sizes make it practicable.
- E11.37.3 Unless otherwise directed, excess underground cable and 2C-12 wire shall be left inside the hand hole with the hand hole cover loosely installed.
- E11.38 Backfill
- E11.38.1 All backfilling material within 300 mm of the cables/conduits shall be clean, free of sod, vegetation, organic material, stones or other debris, and of a consistency as to not create significant voids or air spaces around the cables/conduits. Other backfilling material shall be free of stones greater than 150 mm on their maximum dimension. Where cinders or very acid soil are encountered or where gravel or incompressible fill is required by Municipal authorities, ¼ down crushed limestone shall be placed all around the cables for a depth of at least 300 mm. The completed backfill shall be at least equal in compaction to undisturbed soil or as directed by Manitoba Hydro. Backfill material is to be placed and compacted in lifts not exceeding 300 mm. All excess material is to be removed by the Contractor.
- E11.38.2 Tamping or flushing methods must be used where necessary to give the required compaction. Where tamping is used, hand tampers shall be used to at least 300 mm above the cable before machine tamping may be used. The Contractor shall level all excavations so as to be ready for topsoil and seed or sod or as directed by the Manitoba Hydro. Should settlement occur in the excavation and cause a depression in the surface, the Contractor shall repair the surface to the satisfaction of the Manitoba Hydro at the Contractor's cost.
- E11.38.3 Excavations remaining where poles have been removed shall be backfilled with spoil, pit run gravel or 3/4 down limestone and compacted in lifts of 150mm as directed by Manitoba Hydro. The top 300 mm of the excavation shall be backfilled with topsoil.
- E11.38.4 Excavations remaining where utility crossings have been exposed shall be backfilled with sand or clean spoil and compacted in lifts of 150mm. The top 300 mm of the excavation shall be backfilled with topsoil.
- E11.38.5 Backfill of all excavations shall be in accordance with City of Winnipeg Standard Construction Specification CW 2030 (latest revision), to the satisfaction of the authority having jurisdiction and Manitoba Hydro.
- E11.39 Defective Work & Warranty
- E11.39.1 If any portion of the work fails to comply with the requirements of this Specification, fails within the Warranty period, or if the final tests prove or indicate the existence of any fault or defect in the work, or any part thereof, Manitoba Hydro may forthwith re-execute or make good the faulty or defective work or alter the same to make it comply with requirements of the Specification at the Contractor's expense. Manitoba Hydro shall give the Contractor notice together with particulars of such failure, fault or defect, Manitoba Hydro's cost to re-execute or make good the faulty or defective work and the Cost shall be deducted from the Contract.
- E11.39.2 At the completion of the work for each location, Manitoba Hydro shall prepare and issue a Network Commissioning Report, a sample of which is included as Appendix F, to the

Contractor. The Network Commissioning Report shall be dated indicating the commencement of the Warranty period for the work performed at the location.

E11.40 As-Built Drawing

E11.40.1 The Contractor shall provide an as-built drawing or mark-up drawing to Manitoba Hydro which accurately displays the "as-built" location of the buried street light cables, conduits and street light poles.

E11.41 Measurement and Payment

E11.41.1 Removal of 25' to 35' street light pole and precast, poured in place concrete, steel power installed base or direct buried including davit arm, luminaire and appurtenances

(a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Removal of 25' to 35' street light pole and precast, poured in place concrete, steel power installed base or direct buried including davit arm, luminaire and appurtenances". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including removal of the pole, base, luminaire, appurtenances, use of pressurized water/vacuum excavation, transportation of Reclaim, Surplus and Scrap material, payment of associated disposal fees and all other items incidental to the work included in the Specification.

E11.41.2 Installation of Conduit and #4 AL C/N or 1/0 AL Triplex Streetlight Cable in Conduit by Open Trench Method

(a) This pay item will be measured on a linear metre basis and paid for at the Contract Unit Price per linear metre for "Installation of Conduit and #4 AL C/N or 1/0 AL Triplex streetlight cable in Conduit by open trench method." The number of meters to be paid for at the Contract Unit Price shall be measured and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including installation of the conduit, pulling cable into the conduit, backfilling the trench, buried utility crossings, use of pressurized water/vacuum excavation and all other items incidental to the work included in the Specification.

E11.41.3 Installation of 50 mm Conduit by Boring Method complete with Cable Insertion (#4 AL C/N or 1/0 AL Triplex)

(a) This pay item will be measured on a linear metre basis and paid for at the Contract Unit Price per linear metre for "Installation of 50 mm conduit or conduits by boring method complete with cable insertion (#4 AL C/N or 1/0 AL Triplex)." The number of meters to be paid for at the Contract Unit Price shall be measured and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including installation of 50mm conduit or conduits by boring method, inserting the #4 AL C/N or 1/0 AL Triplex streetlight cable into the conduit(s), buried utility crossings, use of pressurized water/vacuum excavation and all other items incidental to the work included in the Specification.

E11.41.4 Installation of cable (#4 AL C/N or 1/0 AL Triplex) by boring method.

(a) This pay item will be measured on a linear metre basis and paid for at the Contract Unit Price per linear metre for "Installation of cable(s) (#4 AL C/N or 1/0 AL Triplex) by boring method." The number of meters to be paid for at the Contract Unit Price shall be measured and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including installation of the cable or cables by boring method, buried utility crossings, use of pressurized water/vacuum excavation and all other items incidental to the work included in the Specification.

E11.41.5 Installation of 25'/35' Pole, Davit Arm and Precast Concrete Base Including Luminaire and Appurtenances

(a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Installation of 25'/35' pole, davit arm and precast concrete base including luminaire and appurtenances." The number of units to be paid for at the Contract Unit

Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including installation of the pole, davit arm, base, luminaire, appurtenances, placing the cable(s) into the base, use of pressurized water/vacuum excavation and all other items incidental to the work included in the Specification.

E11.41.6 Installation of One (1) 10' Ground Rod at End of Street Light Circuit. Trench #4 Ground Wire up to 1 m From Rod Location to New Street Light and Connect (Hammerlock) to Top of Ground Rod

- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Installation of one (1) 10' ground rod at end of street light circuit. Trench #4 ground wire up to 1 m from rod location to new street light and connect (hammerlock) to top of the ground rod." The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including install one (1) 10' ground rod, trench the #4 ground wire to the new streetlight pole, connect (hammerlock) ground wire to rod and all other items incidental to the work included in the Specification.

E11.41.7 Install Lower 3 m of Cable Guard, Ground Lug, Cable Up Pole, and First 3 M Section of Ground Rod Per Standard CD 315-5

- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Install/lower 3 m of Cable Guard, ground lug, cable up pole, and first 3 m section of ground rod per Standard CD 315-5". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including installing the lower section of cable guard, ground lug, ground rod, coiling cable(s) up the pole and all other items incidental to the work included in the Specification.

E11.41.8 Installation and Connection of Externally-Mounted Relay and PEC Per Standards CD 315-12 and CD 315-13

- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Installation and connection of externally-mounted relay and PEC per Standards CD 315-12 and CD 315-13". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including mounting the relay, PEC, wiring as per the schematic and all other items incidental to the work included in the Specification.

E11.41.9 Terminate 2/C #12 Copper Conductor to Street Light Cables Per Standard CD310-4, CD310-9 or CD310-10

- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Terminate 2/C #12 copper conductor to street light cables per Standard CD310-4, CD310-9 or CD310-10". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including connection of the 2/C # 12 copper conductor to the #4 C/N or 1/0 Al Triplex cable(s) using a GELCAP-SL-2/0 splice kit and all other items incidental to the work included in the Specification.

E11.41.10 Splicing #4 AL C/N or 2 Single Conductor Street Light Cables

- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Splicing #4 Al C/N or 2 single conductor street light cables". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including splicing the #4 AL C/N or 2 single conductor cables in accordance with Standard CD 215-12 and CD 215-13 and all other items incidental to the work included in the Specification.

- E11.41.11 Splicing 1/0 AL Triplex Cable or 3 Single Conductor Street Light Cables
- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Splicing 1/0 AL triplex cable or 3 single conductor street light cables". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including splicing the 1/0 Al triplex cable or set of 3 single conductor cables in accordance with Standard CD 215-12 and CD 215-13 and all other items incidental to the work included in the Specification.
- E11.41.12 Installation of Break-Away Base and Reaction Plate on Base-Mounted Poles up to 35'
- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Installation of break-away base and reaction plate on base mounted poles up to 35'". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including installation of the reaction plate, break-away base and all other items incidental to the work included in the Specification.
- E11.41.13 Installation of Overhead Span of #4 Duplex Between New or Existing Streetlight Poles and Connect Luminaire to Provide Temporary Overhead Feed
- (a) This pay item will be measured on per span basis and paid for at the Contract Unit Price per span for "Installation of Overhead Span of #4 duplex Between New or Existing Streetlight Poles and Connect Luminaire to Provide Temporary Overhead Feed". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including attachment of the #4 duplex overhead conductor using a perform grip (c/w spool insulator(s) to davit arm if necessary), sagging conductor, connection of luminaire using 2C#12 copper conductor and all other items incidental to the work included in the Specification.
- E11.41.14 Removal of Overhead Span of #4 Duplex Between New or Existing Streetlight Poles to Remove Temporary Overhead Feed
- (a) This pay item will be measured on a per span basis and paid for at the Contract Unit Price per span for "Removal of Overhead Span of #4 duplex Between New or Existing Streetlight Poles to Remove Temporary Overhead Feed". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by the Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including removal of the #4 duplex overhead conductor, spool insulator(s) and all other items incidental to the work included in the Specification.
- E11.41.15 Expose Underground Cable Entrance of Existing Streetlight Pole and Install New Streetlight Cable(s).
- (a) This pay item will be measured on a unit basis and paid for at the Contract Unit Price per unit for "Expose Underground Cable Entrance of Existing Streetlight Pole and Install New Streetlight Cable(s)". The number of units to be paid for at the Contract Unit Price shall be verified and accepted by Manitoba Hydro. The Price shall be payment in full for performing all operations herein described including excavation and exposure of the underground cable entrance by any means necessary including use of pressurized water/vacuum excavation, installation of the new streetlight cables(s), backfill, compaction and all other items incidental to the work included in the Specification.

E12. SUB-GRADE, SUB-BASE AND BASE COURSE CONSTRUCTION

DESCRIPTION

E12.1 General

- E12.1.1 Further to City of Winnipeg Standard Construction Specifications, this document replaces CW 3110-R19.
- E12.1.2 This specification covers pavement removal, excavation, preparation of sub-grade, supply and placement of sub-base and base course materials, ditch grading and boulevard grading for pavements, slab renewals, curbs, miscellaneous concrete slabs, sidewalks and other related works.
- E12.2 Definitions
- E12.2.1 Sub-grade – the natural in-situ material.
- E12.2.2 Sub-base – the layer of material provided between the sub-grade and the base course.
- E12.2.3 Base course – the layer of base course material immediately underlying the pavement wearing surface.
- E12.2.4 Leveling course – a non-structural layer of base course material, up to 50mm in depth, placed immediately underlying the pavement wearing surface.
- E12.2.5 Crushed Aggregate – Crushed aggregate from glacial till pits.
- E12.2.6 Crushed Limestone – Crushed limestone from a limestone quarry.
- E12.2.7 Crushed Granite – Crushed granite from a granite quarry.
- E12.2.8 Crushed Recycled Concrete – Crushed Portland Cement Concrete that has been crushed into pieces that are a group of aggregate particles cemented together which may or may not include the host (dominant) particle.
- E12.2.9 Deleterious Material – soft material that would decay or disintegrate from weathering, porcelain, vegetation, organic material, wood, glass, plastic, metal, reinforcing steel, building rubble, brick, shale, and friable particles.
- E12.3 Referenced Standard Construction Specifications
- E12.3.1 CW 1130 – Work Site Requirements.
- E12.3.2 CW 3130 – Supply and Installation of Geotextile Fabrics.
- E12.3.3 CW 3450 – Planing of Pavement.

MATERIALS

- E12.4 Sub-Base Materials
- E12.4.1 Sub-base material of the type(s) shown on the Drawings or indicated in the Specifications will be supplied in accordance with the following requirements:
- Suitable site sub-base material will be of a type approved by the Contract Administrator and meet the requirements of this Specification.
 - Clay borrow sub-base material will be of a type approved by the Contract Administrator.
 - Crushed sub-base material will be crushed aggregate, crushed granite, crushed limestone or crushed recycled concrete.
 - Crushed sub-base material shall conform to the following grading requirements:

TABLE CW 3110.1 - Sub-Base Material Grading Requirements

CANADIAN METRIC SIEVE SIZE	Percent Of Total Dry Weight Passing Each Sieve	
	Maximum Aggregate Size	
	50 mm	100 mm
150 000		100%
100 000		90% - 100%

50 000	100%	50% - 75%
25 000	50% - 84%	25% - 50%
10 000	25% - 60%	20% - 40%
5 000	20% - 48%	16% - 34%
2 500	15% - 40%	12% - 28%
1 250	12% - 32%	8% - 22%
315	5% - 20%	4% - 14%
80	2% - 8%	0% - 8%

- (e) The percentage passing the designated sieve sizes for any representative sample, when plotted on a semi-log grading chart, shall show a free flowing concave curve without sharp breaks, and shall be free from abrupt changes from one side of the grading envelope to the other to avoid gap grading.
- (f) When crushed concrete is used, crushed concrete shall not contain loose reinforcing materials and shall have the following classifications based on weight percentages:
- (i) minimum of 85% Crushed Recycled Concrete
 - (ii) maximum of 8% of recycled asphaltic concrete
 - (iii) maximum of 3% clay
 - (iv) maximum of 1% deleterious material
- (g) Crushed sub-base material shall conform to the following requirements:

TABLE CW 3110.3 - Physical Property Requirements

Tests	Testing Method	Crushed Aggregate, Granite and Limestone		Crushed Recycled Concrete	
		Maximum Aggregate Size		Maximum Aggregate Size	
		50 mm	100mm	50 mm	100 mm
Los Angeles Abrasion, % maximum	ASTM C535 (Grading 1)	--	40	--	40
Los Angeles Abrasion, % maximum	ASTM C131 (Grading A)	35	--	35	
California Bearing Ratio (CBR) – 4 days soaked, % minimum @ 5.08 mm	ASTM D1883	80	--	80	--
Micro-Deval Abrasion, % maximum	ASTM D6928	15	15	15	15
Percentage of Fractured Particles, minimum two or more fractured faces, % mass	ASTM D5821	--	--	80	70
Liquid Limit, % maximum	ASTM D4318	--	--	22	25
Plasticity Index, % maximum	ASTM D4318	--	--	4	6

E12.5 Base Course Materials

E12.5.1 Base course material will be approved by the Contract Administrator.

E12.5.2 Base course material will consist of sound, hard, crushed rock, crushed gravel, or crushed concrete.

E12.5.3 Base course material should be sound durable particles produced by crushing, screening and grading of recovered materials, free from organic and soft material that would decay or disintegrate from weathering.

E12.5.4 Crushed concrete base course material shall not contain any deleterious material.

E12.5.5 The base course material will be well graded and conform to the following grading requirements:

TABLE CW 3110.4 - Base Course Material Grading Requirements

CANADIAN METRIC SIEVE SIZE	Percent Of Total Dry Weight, Passing Each Sieve
25 000	100%
20 000	94% - 100%
10 000	60% - 80%
5 000	35% - 65%
2 500	20% - 48%
1 250	12% - 34%
630	8% - 26%
315	5% - 18%
80	2% - 8%

E12.5.6 The percentage passing the designated sieve sizes for any representative sample, when plotted on a semi-log grading chart, shall show a free flowing concave curve without sharp breaks, and shall be free from abrupt changes from one side of the grading envelope to the other to avoid gap grading.

E12.5.7 Base course material shall conform to the following requirements:

TABLE CW 3110.4 - Physical Property Requirements

TESTS	TESTING METHOD	Crushed Aggregate, Granite and Limestone	Crushed Recycled Concrete
Los Angeles Abrasion, % maximum	ASTM C131 (Grading B)	35	35
California Bearing Ratio (CBR) - 4 days soaked, % minimum @ 5.08 mm	ASTM D1883	90	90
Micro-Deval Abrasion, % maximum	ASTM D6928	14	14
Percentage of Fractured Particles, % mass: - one or more fractured faces - two or more fractured faces	ASTM D5821	--	90 80
Liquid Limit, % maximum	ASTM D4318	--	20
Plasticity Index, % maximum	ASTM D4318	--	Non plastic

E12.6 Lime or Portland Cement

E12.6.1 Use either Lime or General Use Cement for drying the sub-grade.

E12.6.2 Supply Lime in accordance with CSA A82.43.

E12.6.3 Supply Portland Cement in accordance with CSA - Section 4.

E12.7 Imported Fill Material

E12.7.1 Imported fill material will consist of low to medium plastic clays or mixtures of sand and clay, uniform in texture.

E12.7.2 The fill material shall be free of wood, vegetation, concrete rubble or stones larger than 25 millimetres in diameter.

CONSTRUCTION METHODS

E12.8 Pavement Removal

E12.8.1 Remove existing concrete pavement, including curbs and asphalt overlays at locations as shown on the Drawings or as directed by the Contract Administrator. Remove all pavements to a combined thickness of 300 millimetres, unless otherwise indicated in the Specifications.

E12.8.2 Remove existing asphalt pavement including asphalt curbs at locations as shown on the Drawings or as directed by the Contract Administrator. Remove pavement to a maximum thickness of 150 millimetres, unless otherwise indicated in the Specifications.

E12.8.3 Saw-cut the existing pavement full-depth along the limits designated for removal.

E12.8.4 Utilize backhoe type equipment unless approved otherwise by the Contract Administrator.

E12.8.5 Dispose of material in accordance with Section 3.4 of CW 1130.

E12.9 Excavation

E12.9.1 Excavate in-situ material to the depth to accommodate the pavement structure as shown on the Drawings or as directed by the Contract Administrator.

E12.9.2 Stockpile suitable in-situ material and suitable site sub-base material at locations on site as directed by the Contract Administrator.

E12.9.3 Dispose of surplus suitable site material and unsuitable material such as frost heaving clays, silts, rocks and rubble in accordance with Section 3.4 of CW 1130.

E12.9.4 Strip and stockpile topsoil from the site in a manner which will prevent contamination of topsoil with underlying soil materials. Stockpile the stripped topsoil at locations on site for later use.

E12.9.5 The limits of excavation will be taken as a vertical plane 450 millimetres beyond the limits of the proposed pavement except when slip form paving equipment is specified for placement of the concrete pavement, the limits of excavation will be increased to a vertical plane 750 millimetres beyond the limits of the proposed pavement.

E12.9.6 During excavation, the Contractor will be advised by the Contract Administrator as to which areas have an unsuitable sub-grade.

E12.9.7 Remove wooden poles, concrete bases, or tree stumps encountered under pavements to the top of subgrade or 1 metre below the bottom of the pavement surface, whichever depth is greater.

E12.9.8 Backfill and compact over-excavated areas with sub-base material approved by the Contract Administrator.

E12.9.9 Excavate additional material beyond the boulevard grading and ditch grading limits as directed by the Contract Administrator.

E12.10 Preparation of Sub-Grade and Placement of Sub-Base Material

E12.10.1 Compact the sub-grade after the bottom of the excavation has been approved by the Contract Administrator.

E12.10.2 Compact areas of suitable sub-grade material, the full width of the excavation, to a minimum of 95% Standard Proctor Density.

- E12.10.3 If the sub-grade material cannot be compacted to the required density due to unstable soils, high water table, high moisture, or other conditions, the Contractor shall proceed as directed by the Contract Administrator and approved by the City of Winnipeg, Research and Standards Engineer.
- E12.10.4 Sub-base material shall not be placed over frozen subsoil.
- E12.10.5 Place and compact suitable site sub-base material before placing any new sub-base material, as directed by the Contract Administrator.
- E12.10.6 Place and compact crushed sub-base material with or without geogrid as directed by the Contract Administrator in accordance with CW 3135.
- E12.10.7 Place and compact sub-base materials in layers to a depth of 3 times the maximum aggregate size. Compact to a minimum of 100% Standard Proctor Density, for the full width of the excavation, and each layer must be levelled and approved by the Contract Administrator before the succeeding layer may be placed.
- E12.10.8 Layering, mixing or blending of crushed concrete with crushed aggregate or crushed limestone sub-base materials is not allowed.
- E12.10.9 Recompact or replace any layer, which has been rejected as directed by the Contract Administrator.
- E12.10.10 When excess water has been applied, either by sprinkling operations or by precipitation, to cause local or continuous pondage, soil compaction will not be permitted until sufficient soil drying has occurred, creating a condition lending itself favourably to compacting operations. Exercise necessary precautions to protect compacted areas against excess wetting from any natural or artificial sources of water application.
- E12.10.11 Should excess moisture from continuous or heavy precipitation threaten to unduly delay the completion of the Contract, apply in writing to the Contract Administrator requesting permission to use Lime or Portland Cement to dry out the clay sub-grade or sub-base material at specific location(s).
- E12.11 Placement of Sub-Base Material with Geotextile Fabric
- E12.11.1 Install separation or separation/reinforcement geotextile fabric in accordance with CW 3130.
- E12.11.2 For stable sub-grades, place and compact sub-base material to a minimum depth of 150 millimetres.
- E12.11.3 For unstable sub-grades, place and compact sub-base material to a minimum depth of 300 millimetres or greater thickness as directed by the Contract Administrator.
- E12.11.4 Place sub-base material by end-dumping methods and level with front-end loader type of equipment as approved by the Contract Administrator to avoid damage to the geotextile fabric and minimize sub-grade failures.
- E12.11.5 Layering, mixing or blending of crushed concrete with crushed aggregate or crushed limestone sub-base materials is not allowed.
- E12.11.6 Avoid sudden stops or sharp turns by construction equipment during placement of sub-base materials.
- E12.11.7 Construction traffic will not be allowed to travel on the placed sub-base material until approved by the Contract Administrator.
- E12.12 Placement of Crushed Sub-Base Material with Geotextile Fabric and Geogrid for Unstable Sub-Grades
- E12.12.1 Prepare the subgrade in accordance with Section 3.3 of this Specification.
- E12.12.2 Supply and install separation (non-woven) geotextile fabric over the subgrade in accordance with CW 3130.

- E12.12.3 Supply and install geogrid over the separation (non-woven) fabric in accordance with CW 3135.
- E12.12.4 Supply crushed sub-base material in accordance with Section 2.1 of CW 3110.
- E12.12.5 Place crushed sub-base material by end dumping down the centre of the excavation. The sub-base shall be pushed forward and levelled using a track type dozer where possible, to build a thickened section to support the hauling operations and avoid damage to the subgrade, geotextile fabric or geogrid. This procedure shall continue until all sub-base material has been placed down the centre of the excavation.
- E12.12.6 Spread the crushed sub-base material to facilitate final grades utilizing a track type dozer.
- E12.12.7 Initial compaction of the crushed sub-base material shall consist of two complete passes utilizing vibratory type equipment capable of compacting the material. Each pass shall be over lapped by half the width of the roller. All additional compaction shall be completed utilizing static type equipment. No trucks, rubber tire loaders or graders will be allowed to travel on the sub-base material until the Contract Administrator has approved the compaction of the sub-base.
- E12.13 Placement of Base Course Material
- E12.13.1 Place and compact base course material to a minimum 75 millimetres thickness for pavement and approaches to a minimum of 100% Standard Proctor Density for the full width of the excavation unless otherwise shown on the Drawings or as directed by the Contract Administrator.
- E12.13.2 Level the compacted base course to the finished base course elevation.
- E12.13.3 Maintain the finished base course until the pavement is placed.
- E12.13.4 Spread base course material uniformly to avoid segregation, free of pockets of fine and coarse material.
- E12.13.5 Place and compact leveling course to a maximum thickness of 50 millimetres for sidewalks, renewal of existing curbs and miscellaneous concrete slabs, to 95% Standard Proctor Density.
- E12.13.6 Place and compact base course material immediately beneath pavement and forms to provide firm support.
- E12.14 Placement of Imported Fill
- E12.14.1 Place fill materials to satisfy the grading requirements of boulevard and ditches.
- E12.14.2 Supply material in accordance with Section 2.5 of this specification.
- E12.14.3 Compact to a minimum of 95% Standard Proctor Density.
- E12.14.4 Imported fill shall be free of frozen lumps and shall be placed and compacted in an unfrozen state. Imported fill shall not be placed over frozen subsoil.
- E12.15 Grading of Boulevards
- E12.15.1 Grading of the boulevards and medians to receive sod will be understood to mean the required excavation or backfilling to a depth up to 150 millimetres so that the boulevards and medians, after compaction, are at a uniform depth of 100 millimetres below finished boulevard grade, as shown on the Drawings.
- E12.15.2 Remove all debris, stones and concrete rubble from the boulevards and medians before commencing grading.
- E12.15.3 Grade the boulevards and medians to receive sod, unless otherwise shown on the Drawings or as directed by the Contractor Administrator.
- E12.15.4 Remove all debris, stones and concrete rubble from the boulevards and medians before commencing grading.

- E12.15.5 Excavate to a depth of up to 150 millimetres to meet the final grade 100 millimetres below finished boulevard grade.
- E12.15.6 Place and compact suitable backfill material as approved by the Contract Administrator to a depth of up to 150 millimetres to meet the final grade 100 millimetres below finished boulevard grade.
- E12.15.7 Supply backfill material in accordance with Section 2.5 of this specification.
- E12.15.8 Compact backfill materials to a minimum of 95% Standard Proctor Density.
- E12.16 Grading of Ditches
- E12.16.1 Grading of ditches will be understood to mean the required excavation or backfilling to a depth up to 300 millimetres so that the ditches, after compaction are at finished grade where no sodding is required or at a uniform depth of 100 millimetres below finished grade where sodding is required.
- E12.16.2 Grade ditches as shown on the Drawings or as directed by the Contract Administrator.
- E12.16.3 Excavate to a depth of up to 300 millimetres to meet the final ditch grade requirements.
- E12.16.4 Place and compact suitable backfill material as approved by the Contract Administrator to a depth of up to 300 millimetres to meet the final ditch grade requirements.
- E12.16.5 Supply backfill material in accordance with Section 2.5 of this specification.
- E12.16.6 Compact backfill materials to a minimum of 95% Standard Proctor Density.
- E12.17 Quality of Sub-Grade, Sub-Base and Base Course Layers
- E12.17.1 Utilize quality control tests to determine the acceptability of the sub-grade, sub-base and base course layers, as placed and compacted before the succeeding layer may be applied.
- E12.17.2 Promptly fill holes made by sampling with appropriate material and thoroughly compact to conform with the adjoining material.
- E12.17.3 Where Field Density Tests cannot be performed, the Contractor shall proof roll to verify the stability and uniformity of compaction. Proof rolling procedures shall comply with the following requirements:
- (a) The test roller equipment shall be either a tandem-axle rear dump truck or a tri-axle rear dump truck (with raised third axle) loaded to a minimum gross weight of 30 tonnes. The Contractor may, with the approval of the Contract Administrator, use alternate equipment that produces similar results;
 - (b) Tire pressure shall be no less than 90 percent of the manufacturer's recommended maximum inflation;
 - (c) Operate the equipment between 4.0 and 8.0 km/hr;
 - (d) Proof rolling must be carried out the same calendar day that compaction is completed, otherwise the surface must be watered and given a minimum of three passes with the roller prior to the commencement of proof rolling;
 - (e) Rutting in excess of 25 mm but not more than 150 mm shall not be accepted and the layer will be reworked and compacted to the required density. No substantial surface cracking or lateral movement of the layer shall be allowed; and
 - (f) Where the rutting exceeds 150 mm, proceed as directed by the Contract Administrator.
- E12.17.4 The frequency and number of tests will be as directed by the Contract Administrator.
- E12.18 Removal of Existing Concrete Bases
- E12.18.1 Remove existing concrete bases as shown on the Drawings or as directed by the Contract Administrator.

- E12.18.2 Remove to a depth of 1.0 metre below finished grade.
- E12.18.3 Dispose of material in accordance with Section 3.4 of CW 1130.
- E12.18.4 Backfill holes remaining with base course material and compact to the satisfaction of the Contract Administrator.
- E12.19 Quality Assurance Testing
- E12.19.1 The Contract Administrator shall ensure that a minimum of one sample of base course and sub-base materials are tested prior to starting construction in accordance with Sections 2.1 and 2.2. The Contract Administrator shall ensure that the materials are sampled in accordance with ASTM D75 Standard Practice for Sampling Aggregates. Copies of the test results shall be sent to the City of Winnipeg, Research and Standards Engineer.
- E12.19.2 The Contractor shall not deliver materials to site prior to approval of the Contract Administrator.
- E12.19.3 If one test fails to meet the requirements of this Specification, the material shall be re-tested. If the material fails a second test, the Contractor shall designate a new source for supply of the material. The Contractor shall reimburse the City for any additional costs the City incurs as a result of failed tests.
- E12.19.4 The Contract Administrator shall confirm that materials delivered to site are equal to or better than the materials tested prior to construction by sampling from site and testing in accordance with Section 4.7. The Contract Administrator shall be present to witness that the sampling is in accordance with ASTM D75 Standard Practice for Sampling Aggregates. Where required, the Contractor shall supply and operate a front-end loader to assist with sampling.
- E12.19.5 If circumstances make it necessary to collect samples from the quarry rather than the site, the Contractor shall provide a written explanation to the Contract Administrator and the City of Winnipeg, Research and Standards Engineer for approval.
- E12.19.6 The Contractor shall provide a weekly estimate of the material supplied to the Contract Administrator.
- E12.19.7 The Contract Administrator shall ensure the frequency of quality assurance tests during construction is as follows:
- (a) Gradation and Micro-Deval Abrasion tests for crushed aggregate, crushed granite, and crushed limestone:
 - (i) For subbase: <2000 tonnes per project – The minimum testing frequency for each size shall be one sample, then sample every 3000 tonnes for 50 mm aggregate and 5000 tonnes for 100 mm aggregate.
 - (ii) For base: <500 m³ per project – The minimum testing frequency shall be one sample, then sample every 750 m³.
 - (b) Gradation, Los Angeles Abrasion, Micro-Deval Abrasion, CBR, Percentage of Fractured Particles, Liquid Limit and Plasticity Index for crushed recycled concrete:
 - (i) For subbase: <1200 tonnes per project – The minimum testing frequency for each size shall be one sample, then sample every 2000 tonnes for 50 mm aggregate and 3000 tonnes for 100 mm aggregate.
 - (ii) For base: <300 m³ per project – The minimum testing frequency shall be one sample, then sample every 500 m³.
- E12.19.8 When a change in the properties of the materials occurs or when the performance of materials is found to be unsatisfactory, the use of the materials shall be discontinued until the Contractor, with the approval of the Contract Administrator, proves the source to be satisfactory. Copies of the new test results shall be sent to the City of Winnipeg, Research and Standards Engineer.
- E12.19.9 The Contractor shall cease using the non-complying materials and at the discretion of the Contract Administrator, remove the unacceptable materials, including those that have

already been placed and compacted. No payment shall be made for unacceptable materials.

- E12.19.10 The Contract Administrator shall be allowed access to all sampling locations and reserves the right to take a sample at any time.
- E12.19.11 When more than one source is used for supplying materials, test data from each source and material shall be managed independently.
- E12.19.12 The Contractor shall provide written notification to the Contract Administrator and the City of Winnipeg, Research and Standards Engineer prior to changing the aggregate source. The Contractor shall reimburse the City for any additional costs the City incurs as a result of the change.
- E12.19.13 Determine the Standard Proctor Density for the sub-grade, sub-base and base course materials at the optimum moisture content in accordance with ASTM Standard D698. The field density of each sub-grade, sub-base and base course layers will be a percentage of the applicable Standard Proctor Density, in Sections 3.3, 3.4, 3.5 and 3.6 of this specification.
- E12.19.14 Verify the field density of the compacted layers by Field Density Tests in accordance with ASTM Standard D1556, Test for Density of Soil in Place by the Sand-Cone Method, or ASTM Standard D6938, Standard Test Methods for In-Place Density and Water Content of Soil and Soil Aggregate by Nuclear Methods (Shallow Depth). The Contractor shall reimburse the City for any additional costs the City incurs as a result of failed tests.
- E12.19.15 Testing in addition to the requirements of this Specification shall be as directed by the Contract Administrator.
- E12.19.16 There shall be no charge for any materials taken for testing purposes.

MEASUREMENT AND PAYMENT

E12.20 Pavement Removal

- E12.20.1 Pavement removal will be measured on an area basis and paid for at the Contract Unit Price per square meter for the "Items of Work" listed here below. The area to be paid for will be the total number of square metres of existing pavement removed in accordance with this specification, accepted and measured by the Contract Administrator.

Items of Work:

- (a) Pavement Removal
 - (i) Concrete Pavement
 - (ii) Asphalt Pavement

- E12.20.2 Disposal of material will be included in the payment for the "Items of Works" listed for pavement removal.
- E12.20.3 Curb and asphalt overlay will be included in the payment for the Item of Work if both are removed in one operation with the pavement.
- E12.20.4 Payment for pavement over 300mm in thickness will be paid in ratio to the thickness over 300mm.

E12.21 Stripping and Stockpiling Topsoil

- E12.21.1 Stripping and stockpiling topsoil will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Stripping and Stockpiling Topsoil". The volume to be paid for will be the total number of cubic metres of existing topsoil stripped and stockpiled in accordance with this specification, accepted and measured by the Contract Administrator.

E12.22 Excavation

- E12.22.1 Excavation will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Excavation". The volume to be paid for will be the total number of cubic metres excavated in accordance with this specification, accepted and measured by the Contract Administrator.
- E12.22.2 The volume of excavation will be measured by cross-sections in its original position and computed by the method of Average End Areas.
- E12.22.3 Only material excavated within the limits of excavation will be included in the payment for "Excavation".
- E12.22.4 Disposal of material, removal of miscellaneous trees, shrub and concrete bases unless otherwise indicated in the Specifications, will be included in payment for "Excavation".
- E12.22.5 Excavation of solid bedrock, glacial till, boulders, loose rock, concrete rubble and foundations which are located within the limits of excavation and which require the use of additional or unconventional excavation equipment will be measured and paid for in addition to the unit price for excavation.
- E12.23 Sub-Grade Compaction
- E12.23.1 Sub-grade compaction will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Sub-Grade Compaction". The area to be paid for will be the total number of square metres of sub-grade compacted in accordance with this specification, accepted and measured by the Contract Administrator.
- E12.24 Sub-Base Material
- E12.24.1 Suitable Site Sub-Base Material
- (a) The reloading, hauling, placing and compaction of suitable site sub-base material will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Placing Suitable Site Sub-base Material". The volume to be paid for will be the total number of cubic metres of suitable site sub-base material placed in accordance with this specification, accepted and measured by the Contract Administrator.
 - (b) The volume of suitable sub-base material will be measured by cross-sections and computed by the method of Average End Areas.
 - (c) Only material placed within the limits of excavation will be included in the payment for "Placing Suitable Site Sub-base Material".
 - (d) No measurement or payment will be made for materials rejected by the Contract Administrator.
- E12.24.2 Clay Borrow Sub-Base Material
- (a) The supplying, placing and compaction of clay borrow sub-base material will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Supplying and Placing Clay Borrow Sub-base Material". The volume to be paid for will be the total number of cubic metres of material compacted in place in accordance with this specification, accepted and measured by the Contract Administrator.
 - (b) The volume of clay borrow sub-base material will be measured by cross-sections and computed by the method of Average End Areas.
 - (c) Only material placed within the limits of excavation will be included in the payment for "Supplying and Placing Clay Borrow Sub-base Material".
 - (d) No measurement or payment will be made for materials rejected by the Contract Administrator.
- E12.24.3 Crushed Sub-Base Material
- (a) The supplying, placing and compaction of crushed sub-base material will be measured on a weight basis and paid for at the Contract Unit Price per tonne for the

“Items of Work” listed here below. The weight to be paid for will be the total number of tonnes of crushed sub-base material supplied and placed in accordance with this specification, accepted and measured by the Contract Administrator.

Items of Work:

(i) Crushed Sub-Base Material

- i.) 50 mm*
- ii.) 100mm*

*Limestone, Granular or Crushed Concrete Material may be specified.

- (b) The weight to be paid for will be the total number of tonnes of crushed sub-base material as measured on a certified weigh scale.
- (c) Only material placed within the limits of excavation will be included in the payment for the “Items of Work” listed for crushed sub-base material.
- (d) No measurement or payment will be made for materials rejected by the Contract Administrator.

E12.25 Base Course Material

E12.25.1 The supplying, placing and compaction of base course material will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for the “Supplying and Placing Base Course Material*”. The volume to be paid for will be the total number of cubic metres of base course material supplied and placed in accordance with this specification, accepted and measured by the Contract Administrator.

* Limestone, Granular or Crushed Concrete Material may be specified.

E12.25.2 The volume of base course material will be measured by cross-sections and computed by the method of Average End Areas.

E12.25.3 Only material placed within the limits of excavation will be included in payment for “Supplying and Placing Base Course Material” or “Asphalt Cuttings Base Course Material”.

E12.25.4 No measurement or payment will be made for materials rejected by the Contract Administrator.

E12.26 Leveling Course

E12.26.1 No payment will be made for leveling course.

E12.27 Grading of Boulevards

E12.27.1 The grading of boulevards will be measured on an area basis and paid for at the Contract Unit Price per square metre for “Grading of Boulevards”. The area to be paid for will be the total number of square metres of boulevards graded in accordance with this specification, accepted and measured by the Contract Administrator.

E12.27.2 Additional excavation over 150 millimetres in depth required to complete boulevard grading will be paid for as “Boulevard Excavation”.

E12.27.3 Additional placement of backfill material over 150 millimetres in depth required to complete boulevard grading will be paid as “Imported Fill Material”.

E12.28 Ditch Grading

E12.28.1 Ditch grading will be measured on an area basis and paid for at the Contract Unit Price per square metre for “Ditch Grading”. The area to be paid for will be the total number of square metres of ditch graded in accordance with this specification, accepted and measured by the Contract Administrator.

E12.28.2 Additional excavation over 300 millimetres in depth required to complete the ditch grading will be paid for as “Ditch Excavation”.

E12.28.3 Additional placement of backfill material over 300 millimetres in depth required to complete the ditch grading will be paid as "Imported Fill Material".

E12.29 Boulevard Excavation

E12.29.1 Boulevard excavation will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Boulevard Excavation". The volume to be paid for will be the total number of cubic metres of boulevard excavated in accordance with this specification, accepted and measured by the Contract Administrator.

E12.29.2 The volume of excavation will be as measured by cross-sections in its original position and computed by the method of Average End Areas.

E12.30 Ditch Excavation

E12.30.1 Ditch excavation will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Ditch Excavation". The volume to be paid for will be the total number of cubic metres of ditches excavated in accordance with this specification, accepted and measured by the Contract Administrator.

E12.30.2 The volume of excavation will be as measured by cross-sections in its original position and computed by the method of Average End Areas.

E12.31 Removal of Existing Concrete Bases

E12.31.1 Removal of existing concrete bases will be measured on a unit basis and paid for at the Contract Unit Price per unit for the "Items of Work" listed here below. The number of units to be paid for will be the total number of existing concrete bases removed in accordance with this specification, accepted and measured by the Contract Administrator.

Items of Work:

(a) Removal of Existing Concrete Bases

(i) 600 mm Diameter or Less

(ii) Greater than 600 mm Diameter

E12.31.2 No measurement or payment will be made for concrete bases removed for parking metres and precast concrete bases for traffic signs.

E12.32 Imported Fill Material

E12.32.1 Imported material fill will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Imported Fill Material". The volume to be paid for will be the total number of cubic metres of imported fill material supplied and placed in accordance with this specification, accepted and measured by the Contract Administrator.

E12.32.2 The volume of imported fill material will be computed from cross-sections by the method of Average End Areas.

E12.33 Lime or Portland Cement

E12.33.1 Lime for drying the sub-grade will be measured on a weight basis and paid for at the Contract Unit Price per tonne for "Supplying and Placing Lime". The weight to be paid for will be the total number of tonnes of Lime supplied and placed in accordance with this specification, accepted and measured by the Contract Administrator.

E12.33.2 Portland Cement for drying the sub-grade will be measured on a weight basis and paid for at the Contract Unit Price per tonne for "Supplying and Placing Portland Cement". The weight to be paid for will be the total number of tonnes of Portland Cement supplied and placed in accordance with this specification, accepted and measured by the Contract Administrator.

E12.33.3 The weight to be paid for will be the total number of tonnes of Lime or Portland Cement as measured on a certified weigh scale.

E13. SUPPLY AND INSTALLATION OF GEOTEXTILE FABRICS

DESCRIPTION

E13.1 General

E13.1.1 Further to City of Winnipeg Standard Construction Specifications, this document replaces CW 3130-R4.

E13.1.2 This specification covers the supply and installation of Separation (slit-tape or slit-film woven), Separation/Filtration (nonwoven), and Subgrade Stabilization fabrics relating to Surface Works construction.

E13.1.3 All property values, with the exception of apparent opening size, represent minimum average roll values (MARV) in the weakest principle direction. Values for apparent opening size represent maximum roll values.

E13.2 Definitions

E13.2.1 Nonwoven Geotextile: A planar geosynthetic made of randomly orientated yarns produced by bonding fibres, or interlocking fibres, or both bonding and interlocking fibres by mechanical, chemical, or thermal means.

E13.2.2 Slit-Tape / Slit-Film Woven Geotextile: A planar geosynthetic made from flat, tape-like yarns that are produced by slitting and extruded film. Unsuitable for applications in which high groundwater or moderate to high moisture contents are present.

E13.2.3 Multi-Filament Fibrillated Yarn High Strength Woven Geotextile: A planar woven geotextile made from high-tenacity long-chain synthetic polymers composed of at least 95 percent by weight polyolefins. They shall form a stable network such that the filaments or yarns retain their dimensional stability relative to each other, including selvages.

E13.2.4 Minimum Average Roll Value (MARV): Property value calculated as typical minus two standard deviations. It shall yield a 97.7 percent degree of confidence that any sample taken during quality assurance testing will exceed value reported.

E13.2.5 Typical Value (TV): The mean value calculated from documented manufacturing quality control test results for a defined population obtained from one test method associated with one specific property.

E13.2.6 Minimum Value (MV): The lowest sample value from documented manufacturing quality control test results for a defined population from one test method associated with one specific property.

E13.2.7 Separation: A geosynthetic function in which a geotextile is used to prevent mixing of two dissimilar materials to maintain their engineering properties such as a subgrade soil and an aggregate cover.

E13.2.8 Filtration: A geosynthetic function in which a geotextile is placed between two dissimilar soils to allow for long-term passage of water into a subsurface drainage system and retain the in-situ soil.

E13.2.9 Reinforcement: A geosynthetic function in which a geotextile acts as a tensile member in the surface structure of a pavement.

E13.2.10 Confinement: A geosynthetic function in which a geosynthetic prevents the lateral movement (rutting) of aggregate.

E13.2.11 Stabilization: The use of a geosynthetic or combination of geosynthetics and geogrid on weak to very weak subgrade conditions (CBR \leq 3.0%) to provide the coincident functions of separation, filtration, reinforcement, and confinement.

E13.2.12 California bearing ratio (CBR) Standard test method for evaluation of the mechanical strength of materials in accordance with ASTM Standard D1883.

E13.3 Referenced Standard Construction Specifications

E13.3.1 CW 3110 – Sub-Grade, Sub-Base and Base Course Construction.

E13.3.2 CW 3120 – Installation of Subdrains

E13.3.3 CW 3135 – Supply and Installation of Geogrid.

E13.3.4 Approved Products for Surface Works.

MATERIALS

E13.4 Approved Products

E13.4.1 Use only those materials listed as Approved Products for Surface Works. The Approved Products are available in Adobe Acrobat (.pdf) format at the City of Winnipeg, Corporate Finance, Material Management Internet site at:
https://www.winnipeg.ca/finance/findata/matmgt/std_const_spec/current/Docs/Approved_Products_Surface_Works.pdf

E13.5 Material Identification

E13.5.1 Geotextile fabric is to be labelled in accordance with ASTM D4873/D4873M, and must clearly show the manufacturer name, product style number and roll number.

E13.5.2 Products without proper identification or labelling, mislabelling, or misrepresentation of materials shall be rejected.

E13.6 Shipment, Storage and Handling

E13.6.1 Geotextile rolls shall be wrapped with a material that will protect the geosynthetic, including the ends of the roll, from damage due to shipment, water, sunlight, and contaminants.

E13.6.2 Protective wrapping shall be maintained during shipment and storage and shall remain on the geotextile fabric until installation.

E13.6.3 During storage, geotextile rolls shall be elevated off the ground and adequately covered to protect them from site construction damage, precipitation, contamination of dirt or dust, extended ultraviolet radiation, and any other environmental condition that may damage the physical property values of the geosynthetic.

E13.7 Certification

E13.7.1 The Contractor shall provide Mill Certificate and MARV Roll Data to the Contract Administrator prior to installation. The Certification shall state that the furnished geotextile meets MARV requirements of the specification as evaluated under the Manufacturer's quality control program. The Certification shall be attested to by a person having legal authority to bind the Manufacturer.

E13.7.2 The Contractor shall provide a letter to the Contract Administrator stating the product name, manufacturer, style number, chemical composition of the filaments or yarns and other pertinent information to fully describe the geotextile.

E13.7.3 All testing and data to be in accordance with approved ASTM standards. Data reported in accordance with other standards will not be accepted.

E13.8 Geotextile Property Requirements for Separation, Filtration, and Stabilization

E13.8.1 Separation Geotextile Fabric

(a) Separation geotextile fabric will be a slit-tape or slit-film woven fabric and will be used where the subgrade contains low fines (less than 15% passing the 0.075 mm sieve) with CBR \geq 3.0% and not subject to seasonal increases in moisture content or fluctuating water table.

(b) Separation geotextile fabric shall meet or exceed the following requirements:

Table CW 3130.1 – Separation Fabric Requirements

Physical Property	Statistical Reporting	Standard	Test Method
Grab Tensile Strength, minimum	MARV	1400 N	ASTM D4632
Elongation, maximum	MARV	<50%	ASTM D4632
CBR Puncture, minimum	MARV	4000 N	ASTM D 6241
Trapezoid Tear, minimum	MARV	500 N	ASTM D4533
Apparent Opening Size, maximum	TV	0.43 mm	ASTM D4751
Permittivity, minimum	MV	0.05 sec ⁻¹	ASTM D4491
Flow Rate, minimum	MV	160 l/min/m ²	ASTM D4491
U.V. Resistance, minimum	MV	70% after 500 hrs	ASTM D4355

- (c) All physical property requirements shall be provided using the appropriate statistical reporting method in Table CW 3130.1 and as defined by ASTM D4759.

E13.8.2 Filtration Geotextile Fabric

- (a) Separation/Filtration geotextile fabric will be nonwoven and will be used for unsaturated subgrade soils containing high fines (more than 15% passing the 0.075 mm sieve) with CBR ≥ 3.0% and subject to seasonal increases in moisture content or fluctuating water table.
- (b) Separation/Filtration geotextile fabric shall meet or exceed the following requirements:

Table CW 3130.2 – Separation/Filtration Fabric Requirements

Physical Property	Statistical Reporting	Standard	Test Method
Grab Tensile Strength, minimum	MARV	900 N	ASTM D4632
Elongation, minimum	MARV	50%	ASTM D4632
CBR Puncture, minimum	MARV	2200 N	ASTM D 6241
Trapezoid Tear, minimum	MARV	350 N	ASTM D4533
Apparent Opening Size, maximum	TV	0.18 mm	ASTM D4751
Permittivity, minimum	MV	1.4 sec ⁻¹	ASTM D4491
Flow Rate, minimum	MV	3870 l/min/m ²	ASTM D4491
U.V. Resistance, minimum	MV	70% after 500 hrs	ASTM D4355

- (c) All physical property requirements shall be provided using the appropriate statistical reporting method in Table CW 3130.2 and as defined by ASTM D4759.

E13.8.3 Stabilization Geotextile Fabric

- (a) Stabilization fabric will be either a multi-filament fibrillated yarn high strength woven geotextile or separation/filtration geotextile fabric (non-woven) and geogrid, and will be used for saturated fine-grained subgrade (more than 15% passing the 0.075 mm sieve) with CBR less than 3.0% and/or subject to thaw weakening, or erodible silt subgrades to provide the coincident functions of separation, filtration, and reinforcement.
- (b) The multi-filament fibrillated yarn high strength woven geotextile shall meet or exceed the following requirements:

Table CW 3130.3 – Subgrade Stabilization Geotextile Fabric Requirements

Physical Property	Statistical Reporting	Machine Direction	Cross-Machine Direction	Test Method
Ultimate Tensile Strength, minimum	MARV	70.0 kN/m	70.0 kN/m	ASTM D4595
Tensile Strength (at 5% Strain), minimum	MARV	35.0 kN/m	43.8 kN/m	ASTM D4595
Flow Rate, minimum	MV	1222 l/min/m ²		ASTM D4491
Apparent Opening Size, maximum	TV	0.60 mm – maximum		ASTM D4751
Permittivity, minimum	MV	0.5 sec ⁻¹		ASTM D4491
U.V. Resistance, minimum	MV	>70% after 500 hrs		ASTM D4355

- (c) All physical property requirements shall be provided using the appropriate statistical reporting method in Table CW 3130.3 and as defined by ASTM D4759.
- (d) Separation/filtration geotextile fabric (non-woven) and geogrid must meet the requirements of both CW 3130 Section 2.5.2 and CW 3135 Section 2.5.

CONSTRUCTION

E13.9 Construction Methods

- E13.9.1 Commence installation of geotextile fabric after material has been approved by the Contract Administrator and the preparation of the sub-grade has been completed and accepted in accordance with CW 3110.
- E13.9.2 The surface of the subgrade should be relatively smooth and level. Depressions or humps greater than 50 mm should be removed.
- E13.9.3 The geotextile fabric shall be laid smooth without wrinkles or folds on the prepared sub-grade in the direction of the construction traffic. The geotextile fabric shall be free from any tension or stress.
- E13.9.4 Adjacent geotextile rolls should be overlapped along their sides and ends as a function of subgrade strength as follows:
 - CBR > 3%: 450 mm overlap
 - 3% ≥ CBR > 2%: 750 mm overlap
 - 2% ≥ CBR > 0.5%: 900 mm overlap or sewn
 - CBR ≤ 0.5%: Sewn
 - All roll ends 1000 mm or sewn
- E13.9.5 For every 500 metres, the average CBR value shall be used to determine the overlap.
- E13.9.6 On curves, the geotextile may be cut or folded to conform to the curves.
- E13.9.7 Install pins or place piles of sub-base material as required in order to hold geotextile fabric in place.
- E13.9.8 Install geotextile fabric to the complete limits of the roadway sub-grade including intersections and turning lanes or as directed by the Contract Administrator.
- E13.9.9 Prior to covering, the geotextile shall be inspected by the Contract Administrator for damage (e.g. holes, tears, rips) during installation.
- E13.9.10 Cover the damaged area with a geotextile patch that extends an amount equal to the required overlap beyond the damaged area.
- E13.9.11 Remove and replace geotextile fabric that is improperly installed or damaged as directed by the Contract Administrator.

- E13.9.12 Construction vehicles are not permitted directly on the geosynthetic. Turning of vehicles shall not be permitted on the first lift above the geotextile.
- E13.9.13 Install geotextile fabric in accordance with this specification and procedures recommended by the manufacturer.
- E13.9.14 Place and compact the sub-base over the geotextile fabric in accordance with CW3110.
- E13.9.15 For sub-grades with CBR \geq 3.0%, place and compact sub-base material to a minimum of 150 mm over the geotextile fabric prior to allowing construction traffic to travel on the sub-base.
- E13.9.16 For subgrades with CBR $<$ 3.0%, place and compact sub-base material to a minimum of 300 mm over the geotextile fabric prior to allowing construction traffic to travel on the sub-base.
- E13.9.17 The minimum lift thickness may need to be increased for very weak subgrades to prevent spreading equipment from damaging the geosynthetic as directed by the Contract Administrator.

MEASUREMENT AND PAYMENT

E13.10 Measurement and Payment

- E13.10.1 Supply and installation of "Geotextile Fabric" will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Geotextile Fabric". The area to be paid for will be the total number of square metres of "Geotextile Fabric" (*), supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

(*) - Specify Separation, Separation/Filtration, or Stabilization.
- E13.10.2 Only material placed within the designated sub-grade limits will be included in the payment for "Geotextile Fabric".
- E13.10.3 No measurement or payment will be made for geotextile fabric removed and replaced due to improper installation or damaged materials.
- E13.10.4 No measurement or payment will be made for overlapped material described in this Specification.

E14. SUPPLY AND INSTALLATION OF GEOGRID

DESCRIPTION

E14.1 General

- E14.1.1 Further to City of Winnipeg Standard Construction Specifications, this document replaces CW 3135-R1.
- E14.1.2 This specification covers the supply and installation of geogrid for use as reinforcement of base or subbase layers for pavement structures.
- E14.1.3 This specification also covers the supply and installation of geogrid in conjunction with a separation/filtration (nonwoven) geotextile fabric for use in subgrade stabilization applications.

E14.2 Definitions

- E14.2.1 Geogrids: A synthetic planar structure formed by a regular network of tensile strength elements with apertures of sufficiently large size to allow for interlocking with the surrounding soil to perform the primary function of reinforcement.
- E14.2.2 Minimum Average Roll Value (MARV): Property value calculated as typical minus two standard deviations. It shall yield a 97.7 percent degree of confidence that any sample taken during quality assurance testing will exceed value reported.

- E14.2.3 Apertures: The open spaces formed between the interconnected network of longitudinal and transverse ribs of a geogrid.
- E14.2.4 Separation: A geosynthetic function in which a geotextile is used to prevent mixing of two dissimilar materials to maintain their engineering properties such as a subgrade soil and an aggregate cover.
- E14.2.5 Filtration: A geosynthetic function in which a geotextile is placed between two dissimilar soils to allow for long-term passage of water into a subsurface drainage system and retain the in-situ soil.
- E14.2.6 Reinforcement: A geosynthetic function in which a geotextile acts as a tensile member in the surface structure of a pavement.
- E14.2.7 Confinement: A geosynthetic function in which a geosynthetic prevents the lateral movement (rutting) of aggregate.
- E14.2.8 Stabilization: The use of a geosynthetic or combination of geosynthetics and geogrid on weak to very weak subgrade conditions ($CBR \leq 3.0\%$) to provide the coincident functions of separation, filtration, reinforcement, and confinement.
- E14.2.9 California bearing ratio (CBR) Standard test method for evaluation of the mechanical strength of materials in accordance with ASTM Standard D1883.
- E14.2.10 D50 Value of the particle diameter at 50% in the cumulative particle size distribution for the aggregate above the geogrid.
- E14.2.11 D85 Value of the particle diameter at 85% in the cumulative particle size distribution for the aggregate above the geogrid.
- E14.3 Referenced Standard Construction Specifications
- E14.3.1 CW 3110 – Sub-grade, Sub-base and Base Course Construction.
- E14.3.2 CW 3130 – Supply and Installation of Geotextile Fabrics.
- E14.3.3 Approved Products for Surface Works.
- MATERIALS
- E14.4 Approved Products
- E14.4.1 Use only those materials listed as Approved Products for Surface Works. The Approved Products are available in Adobe Acrobat (.pdf) format at the City of Winnipeg, Corporate Finance, Material Management Internet site at:
https://www.winnipeg.ca/finance/findata/matmgt/std_const_spec/current/Docs/Approved_Products_Surface_Works.pdf
- E14.5 Material Identification
- E14.5.1 Geogrid is to be labelled in accordance with ASTM D4873/D4873M, and must clearly show the manufacturer name, product style number and roll number.
- E14.5.2 Products without proper identification or labelling, mislabelling, or misrepresentation of materials shall be rejected.
- E14.6 Storage and Handling
- E14.6.1 Geogrid rolls shall be elevated off the ground and adequately covered to protect them from site construction damage, precipitation, any contamination of dirt, dust any other deleterious materials.
- E14.6.2 Geogrid rolls shall be protected from extended ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, flames including welding sparks, excess temperatures, and any other environmental conditions that may damage the physical properties of the geotextile.

E14.6.3 Store and handle the geogrid in accordance with the manufacturer's recommendations.

E14.7 Certification

E14.7.1 The Contractor shall provide Mill Certificate and MARV Roll Data to the Contract Administrator prior to installation. The Certification shall state that the geogrid meets MARV requirements of the specification as evaluated under the Manufacturer's quality control program. The Certification shall be attested to by a person having legal authority to bind the Manufacturer.

E14.7.2 The Contractor shall provide a letter to the Contract Administrator stating the product name, manufacturer, style number, and other pertinent information to fully describe the geogrid.

E14.7.3 All testing and data to be in accordance with approved ASTM standards. Data reported in accordance with other standards will not be accepted.

E14.8 Geogrid Properties for Reinforcement of Base Course or Sub-Base Layers

E14.8.1 Geogrid will be extruded polypropylene, bi-axial, single layer with opening configuration either square or rectangular in shape.

E14.8.2 The axis with the least strength will be taken as the ultimate strength of the geogrid for any given property.

Table CW 3135.1 – Geogrid Property Requirements

Physical Property	Machine Direction	Cross-Machine Direction	Test Method
Ultimate Tensile Strength	19.2 kN/m ²	28.8 kN/m ²	ASTM D 6637
Tensile Strength @ 2% Strain	6.0 kN/m	9.0 kN/m	ASTM D 6637
Tensile Strength @ 5% Strain	11.8 kN/m	19.6 kN/m	ASTM D 6637
Junction Efficiency	90%		ASTM D 6637
Aperture Size	25 – 75 mm		Direct Measure
U.V. Resistance	70% after 500 hrs		ASTM D4355

E14.8.3 All physical property requirements are Minimum Average Roll Values (MARV) determined in accordance with ASTM 4759. Values not labelled as MARV will not be accepted.

E14.9 Separation/Filtration Geotextile Fabric (non-woven) and Geogrid for Separation, Filtration, and Reinforcement

E14.9.1 Separation/filtration geotextile fabric (non-woven) and geogrid must meet the requirements of both CW 3130 Section 2.5.2 and CW 3135.

E14.9.2 Geotextile/Geogrid composite products must meet the requirements of both CW 3135 and CW 3130.

CONSTRUCTION METHODS

E14.10 Geogrid

E14.10.1 The Aperture Size shall be as follows:

Aperture Size ≥ D50 of aggregate immediately above geogrid

Aperture Size ≤ 2 x D85 of aggregate immediately above geogrid

E14.10.2 The geogrid shall be laid smooth without wrinkles or folds on the Separation/Filtration geotextile fabric or prepared sub-grade in the direction of construction traffic. The geogrid shall be free from any tension or stress.

- E14.10.3 Adjacent geogrid rolls should be overlapped along their sides and ends as a function of subgrade strength as follows:
- | | |
|------------------|---|
| CBR > 3%: | 450 mm overlap |
| 3% ≥ CBR > 2%: | 750 mm overlap |
| 2% ≥ CBR > 0.5%: | 900 mm overlap or sewn |
| CBR ≤ 0.5%: | A multi-filament fibrillated yarn high strength woven geotextile in accordance with CW 3130 shall be used |
- E14.10.4 Cut geogrid to conform to curves.
- E14.10.5 Place piles of base or sub-base material as required to hold geogrid in place. Pins and washers are not permitted.
- E14.10.6 Install geogrid to the limits of the roadway sub-grade including intersections and turning lanes or as directed by the Contract Administrator.
- E14.10.7 Prior to covering, the geogrid shall be inspected by the Contract Administrator for damage during installation.
- E14.10.8 Cover the damaged area with a geogrid patch that extends an amount equal to the required overlap beyond the damaged area.
- E14.10.9 Remove and replace geogrid that is improperly installed or damaged as directed by the Contract Administrator.
- E14.10.10 For sub-grades with CBR ≥ 3.0%, place and compact sub-base material to a minimum of 150 mm over the geogrid prior to allowing construction traffic to travel on the sub-base.
- E14.10.11 For subgrades with CBR < 3.0%, place and compact sub-base material to a minimum of 300 mm over the geogrid prior to allowing construction traffic to travel on the sub-base.
- E14.10.12 The minimum lift thickness may need to be increased for very weak subgrades to prevent spreading equipment from damaging the geogrid as directed by the Contract Administrator.
- E14.10.13 Construction vehicles are not permitted directly on the geogrid. Turning of vehicles shall not be permitted on the first lift above the geogrid.
- E14.10.14 Avoid sudden stops or sharp turns by construction equipment during placement of sub-base materials.
- E14.10.15 Install geogrid in accordance with this specification and the manufacturer's recommendations.

MEASUREMENT AND PAYMENT

- E14.11 Geogrid
- E14.11.1 Supply and installation of geogrid will be measured on an area basis and paid for at the Contract Unit Price per square metre for "Supply and Install Geogrid". The area to be paid for will be the total number of square metres of geogrid, supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.
- E14.11.2 Only material placed within the designated sub-grade limits will be included in the payment for "Supply and Install Geogrid".
- E14.11.3 No measurement or payment will be made for geogrid removed and replaced due to improper installation or damaged materials.
- E14.11.4 No measurement or payment will be made for the overlap described in this Specification.