



THE CITY OF WINNIPEG

TENDER

TENDER NO. 376-2023

**KEEWATIN STREET PATHWAY FROM GALLAGHER AVENUE WEST TO
BURROWS AVENUE**

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 Keewatin Street Pathway from Gallagher Avenue West to Burrows Avenue

B2. SUBMISSION DEADLINE

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

B2.2 The Contract Administrator or the Manager of Purchasing may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

B3. ENQUIRIES

B3.1 All enquiries shall be directed to the Contract Administrator identified in D6.1.

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.

B3.6 Any enquiries concerning submitting through MERX should be addressed to:
MERX Customer Support
Phone: 1-800-964-6379
Email: merx@merx.com

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 MERX website at www.merx.com.
- B5.4 The Bidder is responsible for ensuring that they have received all addenda and is advised to check the MERX website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B5.5 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid/Proposal. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.
- B5.6 Notwithstanding B3, enquiries related to an Addendum may be directed to the Contract Administrator indicated in D6.

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 their sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- 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 they wish 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 their Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with 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;
 - (c) Form G1: Bid Bond and Agreement to Bond.
- B7.2 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely.
- B7.3 The Bid shall be submitted electronically through MERX at www.merx.com.
- B7.3.1 Bids will **only** be accepted electronically through MERX.
- B7.4 Bidders are advised that inclusion of terms and conditions inconsistent with the Tender document, including the General Conditions, will be evaluated in accordance with B17.1(a).

B8. BID

- B8.1 The Bidder shall complete Form A: Bid/Proposal, making all required entries.
- B8.2 Paragraph 2 of Form A: Bid/Proposal shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in their own name, their name shall be inserted;
 - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
 - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
 - (d) if the Bidder is carrying on business under a name other than their own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.
- 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/Proposal, 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/Proposal shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in their own name, it shall be signed by the Bidder;
 - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
 - (c) if the Bidder is a corporation, it shall be signed by their duly authorized officer or officers;

- (d) if the Bidder is carrying on business under a name other than their own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.

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

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

B9. PRICES

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

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

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

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

B9.5 The Bidder shall enter the Total Bid Price from Form B: Prices into the Total Bid Price field in MERX.

B9.5.1 Bidders are advised that the calculation indicated in B17.4 will prevail over the Total Bid Price entered in MERX.

B9.6 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 Further to C3.2, Bidders, by responding to this Tender, declare that no Conflict of Interest currently exists, or is reasonably expected to exist in the future.

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

B11.3 In connection with their 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 their sole discretion, waive any and all perceived, potential or actual Conflicts of Interest. The City's waiver may be based upon such terms and conditions as the City, in their sole discretion, requires to satisfy itself that the Conflict of Interest has been appropriately avoided or mitigated, including requiring the Bidder to put into place such policies, procedures, measures and other safeguards as may be required by and be acceptable to the City, in their sole discretion, to avoid or mitigate the impact of such Conflict of Interest.

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 their sole discretion:

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

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

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, Purchasing Division website at <https://www.winnipeg.ca/matmgt/Templates/files/debar.pdf>
- 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);
 - (d) have completed the Accessible Customer Service online training required by the Accessibility for Manitobans Act (AMA) (see B12.5 and D8)
- 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, Purchasing Division website at <http://www.winnipeg.ca/matmgt/>).
- B12.5 Further to B12.3(d), the Bidder acknowledges they and all Subcontractors have obtained training required by the Accessibility for Manitobans Act (AMA) available at <http://www.accessibilitymb.ca/training.html> for anyone that may have any interaction with the public on behalf of the City of Winnipeg.
- B12.6 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.
- B12.7 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B13. BID SECURITY

- B13.1 The Bidder shall include in their Bid Submission bid security in the form of a digital bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in Form G1: Bid Bond and Agreement to Bond, available on The City of Winnipeg, Corporate Finance, Purchasing Division website at <https://www.winnipeg.ca/MatMgt/templates/files/eBidsecurity.pdf>.
- B13.2 Bid security shall be submitted in a digital format meeting the following criteria:
- (a) The version submitted by the Bidder must have valid digital signatures and seals;
 - (b) The version submitted by the Bidder must be verifiable by the City with respect to the totality and wholeness of the bond form, including: the content; all digital signatures and digital seals; with the surety company, or an approved verification service provider of the surety company.
 - (c) The version submitted must be viewable, printable and storable in standard electronic file formats compatible with the City, and in a single file. Allowable formats include pdf.
 - (d) The verification may be conducted by the City immediately or at any time during the life of the bond and at the discretion of the City with no requirement for passwords or fees.
 - (e) The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding B13.2(a).
- B13.3 Bonds failing the verification process will not be considered to be valid and the bid shall be determined to be non-responsive in accordance with B17.1(a).
- B13.4 Bonds passing the verification process will be treated as original and authentic.
- B13.4.1 If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.
- B13.5 The bid security of the successful Bidder and the next two lowest evaluated responsive and responsible Bidders will be released by the City when a Contract for the Work has been duly formed with the successful Bidder and the contract securities are furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.
- B13.6 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Tender.

B14. OPENING OF BIDS AND RELEASE OF INFORMATION

- B14.1 Bids will not be opened publicly.
- 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 MERX website at www.merx.com.
- B14.3 After award of Contract, the name(s) of the successful Bidder(s) and their Contract amount(s) will be available on the MERX website at www.merx.com.
- 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/Proposal.
- 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 formed and the contract securities have been furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid/Proposal.

B16. WITHDRAWAL OF BIDS

- B16.1 A Bidder may withdraw their Bid without penalty prior to the Submission Deadline.

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 their 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 their Bid or in other information required to be submitted, that they are 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 may determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.
- B17.4.2 Bidders are advised that the calculation indicated in B17.4 will prevail over the Total Bid Price entered in MERX.

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 their own forces;
- (d) only one Bid is received; or
- (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.

B18.3 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.

B18.3.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of their Bid upon written request to the Contract Administrator.

B18.4 As noted in D3 and identified in Form B: Prices, the Work of section E will be contingent upon a signed agreement between the City and CPKC. If an agreement to fully execute the scope of work in 2024 is not reached, the City shall have the right to eliminate all or any portion of Section E work in accordance with D2.

B18.5 As noted in D3 and identified in Form B: Prices, the Work of Part 2 will be contingent upon the Province approving funding for the Work. If sufficient funding for Part 2 Work is not approved by the Province 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 2020-01-31) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Purchasing Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm
- C0.2 A reference in the Tender to a section, clause or subclause with the prefix “**C**” designates a section, clause or subclause in the *General Conditions for Construction*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D2. FORM OF CONTRACT DOCUMENTS

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

D3. SCOPE OF WORK

D3.1 The Work to be done under the Contract shall consist of two parts:

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

Part 1 – City Funded Work

D3.2 Part 1 – City Funded Work shall consist of:

- (a) Structural Works
 - (i) Sta 0+90 to Stat 3+22 (at the Keewatin CPR Underpass)
- (b) Asphalt Pathway
 - (i) Gallagher Avenue West to Sta 0+90
 - (ii) Sta 3+22 to Selkirk Avenue
 - (iii) Selkirk Avenue to Burrows Avenue
- (c) Traffic Signals Works
 - (i) Keewatin Street and Selkirk Avenue – Signal Pole Relocations
 - (ii) Keewatin Street and Manitoba Avenue – New Half Signals Installation
 - (iii) Keewatin Street and Tyndall Avenue – New Half Signals Installation
 - (iv) Keewatin Street and Burrows Avenue – Signal Pole Relocations

D3.3 The City currently has no signed agreement with CPKC for work within CPKC right of way described in D3.2(a) as well as Form B – prices section E but is anticipating a signed agreement by May 2024.

D3.3.1 Further to C7.1, Should an agreement not be reached prior to construction commencing the City shall have the right to remove the scope of work identified in D3.2(a) and section E of the Form B - prices and no work is to be performed within CP right of way and the Contract Price will be reduced accordingly.

D3.3.2 Further to C7.5, C7.5.1, and C7.6, a reduction in the Contract Price pursuant to D3.3.1 shall not be considered in calculating the aggregate reduction in the Contract Price for purposes of C7.5.

D3.3.3 If all or any portion of Part 1(a) is eliminated pursuant to D3.3.1, the time periods stipulated in D25 for Substantial Performance of the Work and in D26 for Total Performance of the Work will be reduced proportionally by the Contract Administrator acting reasonably.

Part 2 – Provincially Funded Work

- D3.4 Part 2 – Provincially Funded Work shall consist of:
- (a) Street Light Renewal
 - (i) Keewatin Street from Selkirk Avenue to Burrows Avenue
- D3.5 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 the Province of Manitoba by late May. Part 2 of the Work is contingent upon the Province approving sufficient funding.
- D3.5.1 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.
- D3.5.2 Further to C7.5, C7.5.1, and C7.6, a reduction in the Contract Price pursuant to D3.5.1 shall not be considered in calculating the aggregate reduction in the Contract Price for purposes of C7.5.
- D3.5.3 If all or any portion of Part 2 is eliminated pursuant to D3.5.1, the time periods stipulated in D25 for Substantial Performance of the Work and in D26 for Total Performance of the Work will be reduced proportionally by the Contract Administrator acting reasonably.
- D3.6 The major components of the Work are as follows:
- (a) Structural Works
 - (i) Excavation into existing embankments;
 - (ii) Modification to existing concrete slope paving;
 - (iii) Supply and installation of granular base course;
 - (iv) Construction of reinforced concrete sidewalk;
 - (v) Construction of 150mm thick reinforced concrete sidewalk with shear key;
 - (vi) Construction of 300mm thick reinforced concrete sidewalk with shear key;
 - (vii) Construction of retaining wall (300mm, 400mm and varying height up to 850mm);
 - (viii) Regrading of embankments; and
 - (ix) Installation of topsoil, sod, and naturalized landscaping.
 - (b) Asphalt Pathway from Gallagher Avenue West to Sta 0+90 and from Sta 3+22 to Selkirk Avenue
 - (i) Sidewalk removal;
 - (ii) Curb ramp removal;
 - (iii) Installation of curb ramps;
 - (iv) Renewal of existing barrier curb with integral splash strip;
 - (v) Excavation;
 - (vi) Placement of separation/filtration geotextile
 - (vii) Placement of geo-grid;
 - (viii) Placement of 50mm sub-base and base course;
 - (ix) Placement of 75mm asphalt pathway surface;
 - (x) Resurfacing of existing private approaches;
 - (xi) Boulevard grading;
 - (xii) Installation of top soil and sod;
 - (xiii) Renewal of 200mm reinforced concrete private approaches;
 - (xiv) Asphalt tie-ins;
 - (xv) Construction of 100mm concrete sidewalk; and
 - (xvi) Installation of detectable warning tiles.
 - (c) Asphalt Pathway from Selkirk Avenue to Burrows Avenue
 - (i) Sidewalk removal;

- (ii) Curb removal;
- (iii) Installation of curb ramps;
- (iv) Installation barrier curb with integral splash strip using slip-form paving;
- (v) Excavation;
- (vi) Placement of separation/filtration geotextile
- (vii) Placement of geo-grid;
- (viii) Placement of 50mm sub-base and base course;
- (ix) Placement of 75mm asphalt pathway surface;
- (x) Resurfacing of existing private approaches;
- (xi) Installation of back of sidewalk retaining curb;
- (xii) Asphalt tie-ins;
- (xiii) Boulevard grading;
- (xiv) Installation of top soil and sod;
- (xv) Renewal of 200mm reinforced concrete private approaches; and
- (xvi) Construction of 100mm concrete sidewalk,
- (xvii) Installation of detectable warning tiles.
- (xviii) Installation of Traffic Signals Conduit, Concrete Bases; Service Boxes and Ground Rods; and
- (xix) Removal of concrete bases.

D4. SITE INVESTIGATION DUE DILIGENCE AND RISK

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

- (a) the location of any utility which can be determined from the records or other information available at the offices of any public authority or person, including a municipal corporation and any board or commission thereof, having jurisdiction or control over the utility;
- (b) the Site conditions, including but not limited to subsurface hazardous materials or other concealed physical conditions;
- (c) the location, nature, quality or quantity of the materials to be removed or to be employed in the performance of the Work;
- (d) the nature, quality or quantity of the Plant needed to perform the Work;
- (e) all matters concerning access to the Site, power supplies, location of existing services, utilities or materials necessary for the completion of the Work; and
- (f) all other matters which could in any way affect the performance of the Work;

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

D5. DEFINITIONS

D5.1 When used in this Tender:

- (a) **“Supply Chain Disruption”** means an inability by the Contractor to obtain goods or services from third parties necessary to perform the Work of the Contract within the schedule specified therein, despite the Contractor making all reasonable commercial

efforts to procure same. Contractors are advised that increased costs do not, in and of themselves, amount to a Supply Chain Disruption;

D6. CONTRACT ADMINISTRATOR

D6.1 The Contract Administrator is WSP Canada, represented by:

Mark Vogt, M.Sc. P.Eng
Project Engineer

Telephone No. 204 259 5452
Email Address Mark.Vogt@wsp.com

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

D7. CONTRACTOR'S SUPERVISOR

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

D7.2 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 D7.1 or an alternate can be contacted twenty-four (24) hours a day to respond to an emergency.

D8. ACCESSIBLE CUSTOMER SERVICE REQUIREMENTS

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

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

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

- (a) providing barrier-free access to goods and services;
- (b) providing reasonable accommodations;
- (c) reasonably accommodating assistive devices, support persons, and support animals;
- (d) providing accessibility features e.g. ramps, wide aisles, accessible washrooms, power doors and elevators;
- (e) inform the public when accessibility features are not available;
- (f) providing a mechanism or process for receiving and responding to public feedback on the accessibility of all goods and services; and
- (g) providing adequate training of staff and documentation of same.

D9. UNFAIR LABOUR PRACTICES

D9.1 Further to C3.2, the Contractor declares that in bidding for the Work and in entering into this Contract, the Contractor and any proposed Subcontractor(s) conduct their respective business in accordance with established international codes embodied in United Nations Universal Declaration of Human Rights (UDHR) <https://www.un.org/en/about-us/universal-declaration-of->

[human-rights](https://www.ilo.org/global/lang-en/index.htm) International Labour Organization (ILO) <https://www.ilo.org/global/lang-en/index.htm> conventions as ratified by Canada.

- D9.2 The City of Winnipeg is committed and requires its Contractors and their Subcontractors, to be committed to upholding and promoting international human and labour rights, including fundamental principles and rights at work covered by ILO eight (8) fundamental conventions and the United Nations Universal Declaration of Human Rights which includes child and forced labour.
- D9.3 Upon request from the Contract Administrator, the Contractor shall provide disclosure of the sources (by company and country) of the raw materials used in the Work and a description of the manufacturing environment or processes (labour unions, minimum wages, safety, etc.).
- D9.4 Failure to provide the evidence required under D9.3, may be determined to be an event of default in accordance with C18.
- D9.5 In the event that the City, in its sole discretion, determines the Contractor to have violated the requirements of this section, it will be considered a fundamental breach of the Contract and the Contractor shall pay to the City a sum specified by the Contract Administrator in writing (“Unfair Labour Practice Penalty”). Such a violation shall also be considered an Event of Default, and shall entitle the City to pursue all other remedies it is entitled to in connection with same pursuant to the Contract.
- D9.5.1 The Unfair Labour Practice Penalty shall be such a sum as determined appropriate by the City, having due regard to the gravity of the Contractor’s violation of the above requirements, any cost of obtaining replacement goods/ services or rectification of the breach, and the impact upon the City’s reputation in the eyes of the public as a result of same.
- D9.5.2 The Contractor shall pay the Unfair Labour Practice Penalty to the City within thirty (30) Calendar Days of receiving a demand for same in accordance with D9.5. The City may also hold back the amount of the Unfair Labour Practice Penalty from payment for any amount it owes the Contractor.
- D9.5.3 The obligations and rights conveyed by this clause survive the expiry or termination of this Contract, and may be exercised by the City following the performance of the Work, should the City determine, that a violation by the Contractor of the above clauses has occurred following same. In no instance shall the Unfair Labour Practice Penalty exceed the total of twice the Contract value.

D10. FURNISHING OF DOCUMENTS

- D10.1 Upon award of the Contract, the Contractor will be provided with ‘issued for construction’ Contract Documents electronically, including Drawings in PDF format only.

SUBMISSIONS

D11. AUTHORITY TO CARRY ON BUSINESS

- D11.1 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.

D12. SAFE WORK PLAN

- D12.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, if applicable.
- D12.2 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, Purchasing Division website at <http://www.winnipeg.ca/matmgt/safety/default.stm>
- D12.3 Notwithstanding B12.4 at any time during the term of the Contract, the City may, at their sole discretion and acting reasonably, require an updated COR Certificate or Annual Letter of good Standing. A Contractor, who fails to provide a satisfactory COR Certificate or Annual Letter of good Standing, will not be permitted to continue to perform any Work.

D13. INSURANCE

- D13.1 The Contractor shall provide and maintain the following insurance coverage:
- (a) commercial general liability insurance, in the amount of at least five million dollars (\$5,000,000.00) inclusive, with The City of Winnipeg, Manitoba its ministers, officers, employees and agents, and CP Indemnified Group added as 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, sudden and accidental pollution liability, and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period; Certificate of insurance to clearly indicate that it does not exclude operations on or in the vicinity of the railway right of way
 - (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 \$5,000,000 inclusive for loss or damage including personal injuries and death resulting from any one accident or occurrence;
 - (c) Pollution Liability insurance, in the amount of at least one million dollars (\$1,000,000.00) inclusive, with the City of Winnipeg and CP Indemnified Group added as additional insured. Covering third party injury and property damage claims, including clean up costs and transported cargo as a result of pollution conditions arising from the contractor's operations and completed operations. Policy to remain in place during the performance of the works and through out the warranty period.
 - (d) an all risks Installation Floater carrying adequate limits to cover all supplies and/or materials intended to enter into and form part of any installation.
 - (e) Property insurance for all field offices, portable toilets, machinery and equipment
- D13.2 Deductibles shall be borne by the Contractor.
- D13.3 All subcontractors performing work on the project shall provide the Contractor with evidence of the insurances as outlined in D13.1(a) and (b) above and be registered with Workers Compensation Board of Manitoba and maintain insured and workers compensation coverage throughout the performance of the work. The contractor shall provide the contract administrator with evidence of the same prior to the commencement of any work by the subcontractor.
- D13.4 All policies shall be taken out with insurers licensed to carry on business in the Province of Manitoba.
- D13.5 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in the C4.1 for the return of the executed Contract Documents, as applicable.

D13.6 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D14. CONTRACT SECURITY

D14.1 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.

D14.1.1 Where the contract security is a performance bond, it may be submitted in hard copy or digital format. If submitted in digital format the contract security must meet the following criteria:

- (a) the version submitted by the Contractor must have valid digital signatures and seals;
- (b) the version submitted by the Contractor must be verifiable by the City with respect to the totality and wholeness of the bond form, including: the content; all digital signatures and digital seals; with the surety company, or an approved verification service provider of the surety company.
- (c) the version submitted must be viewable, printable and storable in standard electronic file formats compatible with the City, and in a single file. Allowable formats include pdf.
- (d) the verification may be conducted by the City immediately or at any time during the life of the bond and at the discretion of the City with no requirement for passwords or fees.
- (e) the results of the verification must provide a clear, immediate and printable indication of pass or fail regarding D14.1(b).

D14.1.2 Digital bonds failing the verification process will not be considered to be valid and may be determined to be an event of default in accordance with C18.1. If a digital bond fails the verification process, the Contractor may provide a replacement bond (in hard copy or digital format) within seven (7) Calendar Days of the City's request or within such greater period of time as the City in their discretion, exercised reasonably, allows.

D14.1.3 Digital bonds passing the verification process will be treated as original and authentic.

D14.2 The Contractor shall provide the Contract Administrator identified in D6 with the required performance and labour and material payment bonds within seven (7) Calendar Days of notification of the award of the Contract by way of an award letter and prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, if applicable.

D14.3 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 D14.1(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.

D15. SUBCONTRACTOR LIST

D15.1 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 ten (10) 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 Documents, if applicable.

D16. EQUIPMENT LIST

D16.1 The Contractor shall provide the Contract Administrator with a complete list of the equipment which the Contractor proposes to utilize (Form K: Equipment List) at or prior to a pre-construction meeting, or at least ten (10) 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 Documents, if applicable.

D17. DETAILED WORK SCHEDULE

D17.1 The Contractor shall provide the Contract Administrator with a detailed work schedule at least ten (10) 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 Documents, as applicable. A schedule specifically detailing all items of work required to complete Structural Works is required to be submitted ten (10) Business days following the receipt of award and subject to approval by the Contract Administrator and CPKC.

D17.2 The detailed work schedule shall consist of the following:

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

D17.3 Further to D17.2(b), the Gantt chart shall show the time on a weekly basis, required to carry out the Work of each trade, or specification division. The time shall be on the horizontal axis, and the type of trade shall be on the vertical axis.

D18. REQUIREMENTS FOR SITE ACCESSIBILITY PLAN

D18.1 The Contractor shall provide the Contract Administrator with an Accessibility Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, if applicable.

D18.2 The Accessibility Plan shall demonstrate how the Contractor will accommodate the safe passage of pedestrians and cyclists in accordance with the Manual of Temporary Traffic Control, the Contract Drawings, Staging Plans, and Streets By-Law No. 1481/77 at all times for the duration of the Construction. Unless noted in the Contract, the Accessibility Plan must include a written plan for the following:

- (a) How the Contractor will maintain at least one crossing in each direction for each intersection (one north/south crosswalk and one east/west crosswalk).
- (b) How the Contractor will maintain access to bus stops within the site.
- (c) How the Contractor will maintain access to pedestrian corridors and half signals.
- (d) How the Contractor will maintain access to residents and businesses unless otherwise noted in the Contract.
- (e) Where the Contractor will install temporary chain link fencing around CPKC right of way.
- (f) Any required detour signage at adjacent crossings to facilitate sidewalk or active transportation pathway closures.

- D18.3 The Accessibility Plan may also include figures, sketches, or drawings to demonstrate the proposed plan.
- D18.4 The Accessibility Plan shall include written details on how the Contractor intends to review, maintain, and document all items related to the Accessibility Plan on-site during Construction, including, but not limited to:
- (a) Signage
 - (b) Temporary Ramping
 - (c) Transit Stops
 - (d) Detour Signage
- D18.5 At minimum, the Contractor shall review the site conditions on a daily basis to ensure that all features related to the Accessibility Plan are in place. The site review is intended to correct deficiencies as a result of unforeseen events such as wind, traffic, or the general public. Deficiencies that are direct result of the Contractors actions must be corrected immediately.
- D18.6 Any changes to the Accessibility Plan must be approved by the Contract Administrator.
- D18.7 Upon request from the Contract Administrator, the Contractor shall provide records demonstrating that the site has been maintained.
- D18.8 Deficiencies as a direct result of actions by the Contractor that are not immediately corrected and/or failure to produce records that demonstrate that the site was maintained in compliance with the Accessibility Plan may result in a pay adjustment via the monthly Progress Payment. The rate of pay adjustment will be as per the following schedule:
- (a) First Offence – A warning will be issued and documented in the weekly or bi-weekly site meeting.
 - (b) Second Offence – A field instruction to immediately correct the site will be issued by the Contract Administrator.
 - (c) Third and subsequent Offences – A pay reduction will be issued in the amount of \$250.00 per instance and per day.

SCHEDULE OF WORK

D19. COMMENCEMENT

- D19.1 The Contractor shall not commence any Work until they are in receipt of an award letter from the Award Authority authorizing the commencement of the Work.
- D19.2 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 D11;
 - (ii) evidence of the workers compensation coverage specified in C6.15;
 - (iii) the twenty-four (24) hour emergency response phone number specified in D7.2.
 - (iv) the Safe Work Plan specified in D12;
 - (v) evidence of the insurance specified in D13;
 - (vi) the contract security specified in D14;
 - (vii) the subcontractor list specified in D15;
 - (viii) the equipment list specified in D16;
 - (ix) the detailed work schedule specified in D17;
 - (x) the Requirements for Site Accessibility Plan specified in D18;
 - (xi) the direct deposit application form specified in D33; and

- (xii) detailed methodology for construction operations within CPKC right of way, including but not limited to sidewalk removals, concrete pour operations and fencing installation specified in D17.
 - (xiii) Phasing Plan for lane closures along Keewatin Street as specified in E7.
 - (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.
- D19.3 The Contractor shall commence the Work on the Site within Ten (10) Working Days of receipt of the award letter.
- D19.4 The Contractor shall not commence Structural Work as described in D3.2(a) as well as Form B – prices section E, unless they have received notification from the Contract Administrator that the City has finalized an agreement with CPKC and that the methodology described in D19.2(a)(xii) has been reviewed and approved by the Contract Administrator and CPKC.
- D19.5 The Contractor shall not commence Part 2 of the Work as described in D3 and identified in Form B: Prices, unless prior to May 15 2024, they have received notification from the Contract Administrator that the City has received notice of sufficient funding from the Province.

D20. WORKING DAYS

- D20.1 Further to C1.1(tt);
- D20.1.1 The Contract Administrator will determine daily if a Working Day has elapsed and will record their 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 they agree with the Contract Administrator's determination of the Working Days assessed for the report period.
- D20.1.2 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.
- D20.1.3 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.

D21. RESTRICTED WORK HOURS

- D21.1 Further to 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.

D22. WORK BY OTHERS

- D22.1 Further to C6.25, the Contractor's attention is directed to the fact that other Contractors, the personnel of Utilities and the staff of the City may be working within the project limit, approach roadway, adjacent roadways or right-of-way. The activities of these agencies may coincide with the Contractor's execution of work and it will be the Contractor's responsibility to cooperate to the fullest extent with other personnel working in the area, and such cooperation is an obligation of the Contractor under the terms of Contract.
- D22.2 Work by others on or near the Site will include but not necessarily be limited to:
- (a) CPKC and AECOM acting as Owner's representative – Provision of flag person and monitoring of construction work and adherence to CPKC requirements, project management, reviewing plans, submittals and schedules.
 - (b) BellMTS – Conversion of two above ground pedestals to two flush mount vaults south of Selkirk Ave. Relocation of the two large DSLAM cabinets south of Safeway. This section may have to be blocked out depending on the timing of their work.

- (c) Winnipeg Transit – Removal and reinstallation of shelters, provision of temporary transit stop signage.
- (d) Shaw – Adjustment of handholes.
- (e) Manitoba Hydro Street Lighting – Energizing of streetlights and provision of street lighting materials. Relocation of two timber stabilization poles.

D22.3 Further to D22.1 the Contractor shall cooperate and coordinate all activities with all parties performing required Work by Others. The Contractor must include and accommodate Work by Others identified in D22.2 or additional parties, in their construction schedule as per D17 and accommodate the necessary area on Site required for the Work by Others to complete the Work.

D23. SEQUENCE OF WORK

D23.1 Further to C6.1, the sequence of work shall be as follows:

D23.1.1 The Work shall be divided into 2 Phases. Each Phase shall be subdivided into stages. Stages are further subdivided into major items of work.

D23.1.2 Phase I – Selkirk Avenue to Burrows Avenue

- (a) **Stage I** – Roadway widening between Selkirk Avenue and Burrows Avenue
- (b) **Stage II** – Pathway Construction between Selkirk Avenue and Burrows Avenue

D23.1.3 Phase II – Gallagher Avenue West to Selkirk Avenue

- (a) **Stage 1** – Pathway Construction between Gallagher Avenue West and Selkirk Avenue
- (b) **Stage 2** – Structural Works

D23.1.4 Immediately following the completion of the asphaltic concrete works, the Contractor shall clean up the Site and remove all plant, surplus material, waste and debris, other than that left by the City or other Contractors.

D24. CRITICAL STAGES

D24.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

- (a) Completion of the **Structural Works** within thirty (30) consecutive Working Days.

D25. SUBSTANTIAL PERFORMANCE

D25.1 The Contractor shall achieve Substantial Performance within Seventy Five (75) consecutive Working Days of the commencement of the Work as specified in D19.

D25.2 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.

D25.3 The date on which the Work has been certified by the Contract Administrator as being substantially performed to the requirements of the Contract through the issue of a certificate of Substantial Performance is the date on which Substantial Performance has been achieved.

D26. TOTAL PERFORMANCE

D26.1 The Contractor shall achieve Total Performance within Eighty (80) consecutive Working Days of the commencement of the Work as specified in D19.

D26.2 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.

D26.3 The date on which the Work has been certified by the Contract Administrator as being totally performed to the requirements of the Contract through the issue of a certificate of Total Performance is the date on which Total Performance has been achieved.

D27. LIQUIDATED DAMAGES

D27.1 If the Contractor fails to achieve Critical Stages, Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Working Day for each and every Working Day following the days fixed herein for same during which such failure continues:

- (a) Structural Works – Two Thousand dollars (\$2,000.00);
- (b) Substantial Performance – Four Thousand dollars (\$4,000.00);
- (c) Total Performance – Two Thousand dollars (\$2,000.00).

D27.2 The amounts specified for liquidated damages in D27.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve critical stages, Substantial Performance or Total Performance by the days fixed herein for same.

D27.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D28. SUPPLY CHAIN DISRUPTION SCHEDULE DELAYS

D28.1 The City acknowledges that the schedule for this Contract may be impacted by the Supply Chain Disruption. Commencement and progress of the Work shall be performed by the Contractor with due consideration to the delivery requirements and schedule identified in the Contract, in close consultation with the Contract Administrator.

D28.2 If the Contractor is delayed in the performance of the Work by reason of the Supply Chain Disruption, the Work schedule may be adjusted by a period of time equal to the time lost due to such delay and costs related to such delay will be determined as identified herein.

D28.3 A minimum of seven (7) Calendar Days prior to the commencement of Work, the Contractor shall declare whether a Supply Chain Disruption will affect the start date. The Contractor shall provide sufficient evidence that the delay is directly related to ordering of Material or Goods, production and/or manufacturing schedules or availability of staff as appropriate s.

D28.4 For any delay related to Supply Chain Disruption and identified after Work has commenced, the Contractor shall within seven (7) Calendar Days of becoming aware of the anticipated delay declare the additional delay and shall provide sufficient evidence as indicated in D28.3. Failure to provide this notice will result in no additional time delays being considered by the City.

D28.5 The Work schedule, including the durations identified in D21 to D26 where applicable, will be adjusted to reflect delays accepted by the Contract Administrator. No additional payment will be made for adjustment of schedules except where seasonal work, not previously identified in the Contract, is carried over to the following construction season.

D28.6 Where Work not previously identified is being carried over solely as a result of delays related to Supply Chain Disruption, as confirmed by the Contract Administrator, the cost of temporary works to maintain the Work in a safe manner until Work recommences, will be considered by the Contract Administrator. Where the Work is carried over only partially due to Supply Chain Disruption, a partial consideration of the cost of temporary works will be considered by the Contract Administrator.

D28.7 Any time or cost implications as a result of Supply Chain Disruption and in accordance with the above, as confirmed by the Contract Administrator, shall be documented in accordance with C7.

D29. SCHEDULED MAINTENANCE

D29.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

- (a) Reflective Crack Maintenance as specified in CW 3250;
- (b) Sod Maintenance as specified in CW 3510;

D29.2 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

D30. JOB MEETINGS

D30.1 Regular weekly job meetings will be held at Site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, 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.

D30.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever they deem it necessary.

D31. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D31.1 Further to C6.26, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

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

D32.1 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 their sole discretion and acting reasonably, require updated proof of compliance, as set out in B12.4.

MEASUREMENT AND PAYMENT

D33. PAYMENT

D33.1 Further to C12, the City shall make payments to the Contractor by direct deposit to the Contractor's banking institution, and by no other means. Payments will not be made until the Contractor has made satisfactory direct deposit arrangements with the City. Direct deposit application forms are at https://winnipeg.ca/finance/files/Direct_Deposit_Form.pdf.

D34. FUEL PRICE ADJUSTMENT

D34.1 The Contract is subject to a fuel price adjustment which will be calculated monthly based on eligible Work completed utilizing the following mathematical formulas;

- (a) where the price of fuel has increased - $((CFI/BFI)-1.15) \times Q \times FF$; and
- (b) where the price of fuel has decreased - $((CFI/BFI)-0.85) \times Q \times FF$; where
 - (i) BFI = base fuel index
 - (ii) CFI = current fuel index
 - (iii) FF = fuel factor
 - (iv) Q = monetary value of Work applied in the calculation.

D34.1.1 Eligible Work will be determined in accordance with D34.5.

D34.1.2 The base fuel index (BFI) will be the retail price of fuel identified on the Submission Deadline based on latest published "Monthly average retail prices for gasoline and fuel by geography" for Winnipeg, published by [Statistics Canada, Table 18-10-0001-01](#). The BFI is a blended rate based on 15% regular unleaded gasoline at self-service filling stations and 85% diesel fuel at self-service filling stations.

D34.1.3 The current fuel index (CFI) based on the above blended rate will be determined for each monthly progress estimate and applied on the following progress estimate as a change order once rates are published by Statistics Canada.

D34.1.4 A Fuel Factor (FF) rate of the monetary value of all eligible Work completed that month based on the Contract unit prices will be used to calculate the assumed apportioned cost of fuel.

D34.2 Fuel cost adjustments may result in additional payment to the Contractor or credit to the City within the Contract by way of a monthly change order.

D34.3 The fuel escalation or de-escalation adjustment will not be applied if the CFI is within $\pm 15\%$ of the BFI.

D34.4 Fuel escalation adjustments will not be considered beyond the Substantial Performance/Critical Stages except where those dates/Working Days are adjusted by change order. Fuel de-escalation adjustments will apply for Work that extends beyond the dates/Working Days specified for Substantial Performance/Critical Stages.

D34.5 The Fuel Factor (FF) rates will be set as follows:

- (a) The Fuel Factor rate shall be set at 2.7% of the monetary value of all Work based on unit prices.

WARRANTY

D35. WARRANTY

D35.1 Notwithstanding C13.2, the warranty period shall begin on the date of Total Performance and shall expire two (2) years thereafter unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.

DISPUTE RESOLUTION

D36. DISPUTE RESOLUTION

D36.1 If the Contractor disagrees with any opinion, determination, or decision of the Contract Administrator, the Contractor shall act in accordance with the Contract Administrator's opinion, determination, or decision unless and until same is modified by the process followed by the parties pursuant to D36.

D36.2 The entire text of C21.4 is deleted, and amended to read: "Intentionally Deleted"

D36.3 The entire text of C21.5 is deleted, and amended to read:

- (a) If Legal Services has determined that the Disputed Matter may proceed in the Appeal Process, the Contractor must, within ten (10) Business Days of the date of the Legal Services Response Letter, submit their written Appeal Form, in the manner and format set out on the City's Purchasing Website, to the Chief Administrative Officer, and to the Contract Administrator. The Contractor may not raise any other disputes other than the Disputed Matter in their Appeal Form.
- D36.4 Further to C21, prior to the Contract Administrator's issuance of a Final Determination, the following informal dispute resolution process shall be followed where the Contractor disagrees with any opinion, determination, or decision of the Contract Administrator ("Dispute"):
- (a) In the event of a Dispute, attempts shall be made by the Contract Administrator and the Contractor's equivalent representative to resolve Disputes within the normal course of project dealings between the Contract Administrator and the Contractor's equivalent representative.
- (b) Disputes which in the reasonable opinion of the Contract Administrator or the Contractor's equivalent representative cannot be resolved within the normal course of project dealings as described above shall be referred to a without prejudice escalating negotiation process consisting of, at a minimum, the position levels as shown below and the equivalent Contractor representative levels:
- (i) The Contract Administrator;
 - (ii) Supervisory level between the Contract Administrator and applicable Department Head;
 - (iii) Department Head.
- D36.4.1 Names and positions of Contractor representatives equivalent to the above City position levels shall be determined by the Contractor and communicated to the City at the pre-commencement or kick off meeting.
- D36.4.2 As these negotiations are not an adjudicative hearing, neither party may have legal counsel present during the negotiations.
- D36.4.3 Both the City and the Contractor agree to make all reasonable efforts to conduct the above escalating negotiation process within twenty (20) Business Days, unless both parties agree, in writing, to extend that period of time.
- D36.4.4 If the Dispute is not resolved to the City and Contractor's mutual satisfaction after discussions have occurred at the final escalated level as described above, or the time period set out in D36.4.3, as extended if applicable, has elapsed, the Contract Administrator will issue a Final Determination as defined in C1.1(v), at which point the parties will be governed by the Dispute Resolution process set out in C21.

INDEMNITY

D37. INDEMNITY

- D37.1 Indemnity shall be as stated in C17.
- D37.2 Notwithstanding C17.1, the Contractor shall save harmless and indemnify the City in the amount of twice the Contract Price or five million dollars (\$5,000,000), whichever is greater, against all costs, damages or expenses arising from actions, claims, demands and proceedings, by whomsoever brought, made or taken as a result of negligent acts or negligent omissions of the Contractor, their Subcontractors, employees or agents in the performance or purported performance of the Work, and more particularly from:
- (a) accidental injury to or death of any person whether retained by or in the employ of the contractor or not, arising directly or indirectly by reason of the performance of the Work, or by reason of any trespass on or damage to property;

- (b) damage to any property owned in whole or in part by the City, or which the City by duty or custom is obliged, directly or indirectly, in any way or to any degree, to construct, repair or maintain;
- (c) damage to, or trespass or encroachment upon, property owned by persons other than the City;
- (d) any claim for lien or trust claim served upon the City pursuant to The Builders' Liens Act;
- (e) failure to pay a Workers Compensation assessment, or Federal or Provincial taxes;
- (f) unauthorized use of any design, device, material or process covered by letters patent, copyright, trademark or trade name in connection with the Work;
- (g) inaccuracies in any information provided to the City by the Contractor.

D37.3 Further to C17, The City shall save harmless and indemnify the Contractor in the amount of twice the Contract Price or five million dollars (\$5,000,000), whichever is greater, against all costs, damages or expenses arising from actions, claims, demands and proceedings, by whomsoever brought, made or taken as a result of negligent acts or negligent omissions of the City, their employees or agents in the performance of its obligation under the Contract.

THIRD PARTY AGREEMENTS

D38. FUNDING AND/OR CONTRIBUTION AGREEMENT OBLIGATIONS

D38.1 Funding for the Work of the Contract is being provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada and accordingly, as required by the applicable funding agreements, the following terms and conditions shall apply.

D38.2 For the purposes of D38:

- (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.

D38.3 Indemnification By Contractor

D38.3.1 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.

D38.3.2 The Contractor agrees that in no event will Canada or Manitoba, their respective officers, servants, employees or agents be held liable for any damages in contract, tort (including negligence) or otherwise, for:

- (a) any injury to any person, including, but not limited to, death, economic loss or infringement of rights;
- (b) any damage to or loss or destruction of property of any person; or
- (c) any obligation of any person, including, but not limited to, any obligation arising from a loan, capital lease or other long term obligation;

in relation to this Contract or the Work.

D38.4 Records Retention and Audits

- D38.4.1 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.
- D38.4.2 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 D38.4.1 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.
- D38.5 Other Obligations
- D38.5.1 The Contractor consents to the City providing a copy of the Contract Documents to the Government of Manitoba and/or the Government of Canada upon request from either entity.
- D38.5.2 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.
- D38.5.3 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.
- D38.5.4 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.
- D38.5.5 The Contractor represents and warrants that no current or former public servant or public office holder, to whom the Value and Ethics Code for the Public Sector, the Policy on Conflict of Interest and Post Employment, or the Conflict of Interest Act applies, shall derive direct benefit from this Contract, including any employment, payments, or gifts, unless the provision or receipt of such benefits is in compliance with such codes and the legislation.
- D38.5.6 The Contractor represents and warrants that no member of the House of Commons or of the Senate of Canada or of the Legislative Assembly of Manitoba is a shareholder, director or officer of the Contractor or of a Subcontractor, and that no such member is entitled to any benefits arising from this Contract or from a contract with the Contractor or a Subcontractor concerning the Work.

FORM H1: PERFORMANCE BOND
(See D13.1)

KNOW EVERYONE BY THESE PRESENTS THAT

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

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

_____ dollars (\$_____)

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

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

TENDER NO. 376-2023

KEEWATIN STREET PATHWAY FROM GALLAGHER AVENUE WEST TO BURROWS AVENUE
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 D13.1)

KNOW EVERYONE BY THESE PRESENTS THAT

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

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

_____ dollars (\$_____)

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

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

TENDER NO. 376-2023

KEEWATIN STREET PATHWAY FROM GALLAGHER AVENUE WEST TO BURROWS AVENUE

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

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

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

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

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

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

_____ day of _____, 20____.

SIGNED AND SEALED
in the presence of:

(Witness as to Principal if no seal)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

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

FORM K: EQUIPMENT
(See D16)

KEEWATIN STREET PATHWAY FROM GALLAGHER AVENUE WEST TO BURROWS AVENUE

<p>1. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>2. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>3. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>

FORM K: EQUIPMENT
(See D16)

KEEWATIN STREET PATHWAY FROM GALLAGHER AVENUE WEST TO BURROWS AVENUE

<p>4. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>5. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>
<p>6. Category/type:</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p> <p>Make/Model/Year: _____ Serial No.: _____</p> <p>Registered owner: _____</p>

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

- E1.1 These Specifications shall apply to the Work.
- E1.2 *The City of Winnipeg Standard Construction Specifications* in their entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Purchasing Division website at <http://www.winnipeg.ca/matmgt/Spec/Default.stm>
- E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.2.3 Further to C2.4(d), Specifications included in the Tender shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.3 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with 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>
	Cover Sheet	
P-3571-01	New Pathway STA 0+27.28 to STA 1+55	A1
P-3571-02	New Pathway STA 0+1+55 to STA 2+95	A1
P-3571-03	New Pathway STA 2+95 to STA 4+45	A1
P-3571-04	New Pathway STA 4+45 to STA 5+75	A1
P-3571-05	New Pathway STA 5+75 to STA 6+85	A1
P-3571-06	New Pathway STA 6+85 to STA 8+15	A1
P-3571-07	New Pathway STA 8+15 to STA 9+45	A1
P-3571-08	New Pathway STA 9+45 to STA 10+70	A1
P-3571-09	New Pathway STA 10+70 to STA 11+75	A1
P-3571-10	New Pathway STA 11+75 to STA 13+00	A1
P-3571-11	New Pathway STA 13+00 to STA 14+60	A1
P-3571-12	New Pathway STA 14+60 to STA 15+90	A1
P-3571-13	New Pathway STA 15+90 to STA 17+10	A1
P-3571-14	New Pathway STA 17+10 to STA 18+61	A1
P-3571-15	New Pathway Tyndall Avenue	
P-3571-16	Structural Works – Design Data and General Notes	A1
P-3571-17	Structural Works – Profile Elevation and Plan View (Sheet 1 of 2)	A1
P-3571-18	Structural Works – Profile Elevation and Plan View (Sheet 2 of 2)	A1
P-3571-19	Structural Works – Concrete Details (Sheet 1 of 2)	A1
P-3571-20	Structural Works – Concrete Details (Sheet 2 of 2)	A1
S-1142	Keewatin St and Burrows Ave Traffic Signals	A1
S-1498	Keewatin St and Manitoba Ave Half Signal	A1
S-1497	Keewatin St and Selkirk Ave Traffic Signals	A1
S-2192	Keewatin St and Tyndall Ave Half Signal	A1
1-04707-DE- 50000-0635 0001	Manitoba Hydro – Keewatin Street Streetlighting Sheet 1 of 3	A1
1-04707-DE- 50000-0635 0002	Manitoba Hydro – Keewatin Street Streetlighting Sheet 2 of 3	A1

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
1-04707-DE- 50000-0635 0003	Manitoba Hydro – Keewatin Street Streetlighting Sheet 3 of 3	A1

E2. MOBILIZATION AND DEMOBILIZATION PAYMENT

DESCRIPTION

- E2.1 This Specification shall cover all operations relating to the mobilization and demobilization of the Contractor to the project location(s).
- E2.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Works as hereinafter specified.
- E2.3 The inclusion of a payment item for the Work under this Specification shall not release or reduce the responsibilities of the Contractor under any other specification in this Contract.

SCOPE OF WORK

- E2.4 Further to C12 of the General Conditions, where Mobilization and Demobilization is included as a bid item, it shall consist of the following, as applicable:
- (a) Mobilization shall include, but not be limited to:
 - (i) All activities and associated costs for transportation of the Contractor's personnel, equipment, and operating supplies to the site, and/or sites, and/or between sites;
 - (ii) Establishment of offices, buildings, other necessary general facilities and equipment parking/staging areas for the Contractor's operations at the site or sites;
 - (iii) Premiums paid for performance and payment bonds including coinsurance and reinsurance agreements as applicable;
 - (iv) General cleanup and housekeeping needed maintain a neat and orderly project site(s);
 - (v) Other job related items.
 - (b) Demobilization shall include, but not be limited to:
 - (i) All activities and costs for transportation of personnel, equipment, and supplies not used in the project from the site, and/or sites, and/or between sites;
 - (ii) Disassembly, removal, and site cleanup and restoration of offices, buildings, and other facilities assembled on the site and/or sites;
 - (iii) Repair of access roads, temporary haul roads, and equipment parking areas leaving the project site in the same or better condition than at the start of the project;
 - (iv) General cleanup and housekeeping needed to restore a neat and orderly project site.
- E2.5 Access to the site, equipment parking, and staging areas are limited to that shown on the drawings or as approved by the Contract Administrator.

MEASUREMENT AND PAYMENT

- E2.6 The lump-sum price for the Mobilization and Demobilization bid item shall not exceed five percent (5.00%) of the total bid price for the Contract.
- E2.6.1 Further to B9, B17, C12 and E2.6, should the lump sum price exceed 5% of the Total Bid Price the lump sum price will be reduced to 5% of the Total Bid Price, the Total Bid Price will be determined using the reduced lump sum price and payment will be based on the reduced lump sum price.

- E2.7 Payment for Mobilization:
- (a) 60% of the lump-sum price will be paid to the contractor for Mobilization on the first Progress Estimate for the Contract.
- E2.8 Payment for Demobilization:
- (a) The remaining 40% of the lump-sum price will be paid upon:
 - (i) Restoration of the site and/or sites to the satisfaction of the Contract Administrator;
 - (ii) Distribution of the Declaration of Total Performance.
- E2.9 Pay Reduction for Accessibility Plan
- (a) The Demobilization payment will be reduced by the number of pay adjustments incurred in accordance with D18 and as determined by the Contract Administrator.
- E2.10 Mobilization and Demobilization will be paid only once (to a maximum of 100%), regardless of the number of times the Contractor mobilizes to the site and/or sites.

E3. GEOTECHNICAL REPORT

- E3.1 Further to C3.1, the geotechnical report is provided to aid the Contractor's evaluation of the existing soil conditions near CPKC Right-of-Way. The geotechnical report is contained in Appendix 'A'.

E4. OFFICE FACILITIES

- E4.1 The Contractor shall supply office facilities meeting the following requirements:
- (a) The field office shall be for the exclusive use of the Contract Administrator.
 - (b) The building shall be conveniently located near the site of the Work at a location agreed to by the Contract Administrator.
 - (c) The building shall have a minimum floor area of 20 square metres, 2.4m with a window and a door entrance with a suitable lock.
 - (d) The building shall be suitable for all weather use. It shall be equipped with an electric heater and air conditioner so that the room temperature can be maintained between either 16-18°C or 24-25°C.
 - (e) The building shall be powered by a generator provided and maintained by the Contractor. Alternative power sources are to be approved by the Contract Administrator.
 - (f) The building shall include a microwave and a small fridge.
 - (g) The building shall be adequately lighted with fluorescent fixtures and have a minimum of three wall outlets.
 - (h) The building shall be furnished with one desk, one table 3mx1.2m, and a minimum of 10 chairs.[(one, two) desk, one drafting table, table 3m X 1.2m, one stool, one four drawer legal size filing cabinet, and a minimum of (5,6,8,12,15) chairs]
 - (i) A portable toilet shall be located near the field office building. The toilet shall have a locking door and be for the exclusive use of the Contract Administrator and other personnel from the City.
 - (j) The field office building and the portable toilet shall be cleaned on a weekly basis immediately prior to each site meeting. The Contract Administrator may request additional cleaning when they deem it necessary.
- E4.2 The Contractor shall be responsible for all installation and removal costs, all operating costs, and the general maintenance of the office facilities.
- E4.3 The office facilities will be provided from the date of the commencement of the Work to the date of Total Performance.

E4.4 On a one time basis, where directed by the Contract Administrator, the Contractor shall relocate the office facilities to a location more convenient for the remaining Work.

E5. PROTECTION OF EXISTING TREES

E5.1 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.

E5.2 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 their designate.

E5.3 No separate measurement or payment will be made for the protection of trees.

E5.4 Except as required in E5.1(c) and E5.1(e), Elm trees shall not be pruned at any time between April 1 and July 31.

E6. TRAFFIC CONTROL

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

- (a) Where directed by the Contract Administrator, the Contractor shall construct and maintain temporary asphalt ramps to alleviate vertical pavement obstructions such as manholes and planing drop-offs to the satisfaction of the Contract Administrator. Payment shall be in accordance with CW3410.
- (b) In accordance with the Manual of Temporary Traffic Control on City Streets (MTTC), the Contractor ("Construction Agency" in the Manual) shall be responsible for placing, maintaining and removing the appropriate temporary traffic control devices as specified by the MTTC, the Contract Drawings, Staging Plans and Traffic Management Plans or by the Traffic Management Branch of the City of Winnipeg Public Works Department. The Contractor shall bear all costs associated with the placement of temporary traffic control devices by their own forces or Subcontractor.
- (c) In addition, the Contractor shall be responsible for **supplying**, removing, placing and maintaining all regulatory signing including but not limited to:
 - (i) Parking restrictions;
 - (ii) Stopping restrictions;
 - (iii) Turn restrictions;
 - (iv) Diamond lane removal;

- (v) Full or directional closures on a Regional Street;
 - (vi) Traffic routed across a median;
 - (vii) Full or directional closure of a non-regional street where there is a requirement for regulatory signs (turn restrictions, bus stop relocations, etc.) to implement the closure.
- (d) The Contractor shall remove and stockpile any regulatory signage not required during construction such as, but not limited to, parking restrictions, turn restrictions and loading restrictions.
- E6.2 Upon request from the Contract Administrator, the Contractor shall provide records demonstrating that the site has been maintained.
- E6.3 Further to E6.1(c) and E6.1(d) the Contractor shall make arrangements with the Traffic Services Branch of the City of Winnipeg to reinstall the permanent regulatory signs after the Contract Work is complete. The Contractor shall make arrangements to drop off the stockpiled materials to Traffic Services at 495 Archibald Street.
- E6.4 Any changes to the approved Traffic Management Plan must be submitted to the Contract Administrator a minimum of five (5) Working Days prior to the required change for approval.
- E6.5 If the Contract Administrator determines that the Contractor is not performing Traffic Control in accordance with this specification, Traffic Services may be engaged to perform the Traffic Control. In this event the Contractor shall bear costs charged to the project by the Traffic Services Branch of the City of Winnipeg in connection with the required Works.

E7. TRAFFIC MANAGEMENT

- E7.1 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.
- E7.1.1 Maintain one lane in the southbound and northbound direction at all times.
- E7.1.2 No lane closures permitted in the northbound direction during peak times unless approved by the Contract Administrator, in consultation with the Traffic Management Branch.
- E7.1.3 Where left turn lanes exist, an additional lane to accommodate the left turn storage lane shall be maintained at all times.
- E7.1.4 Intersecting local street, median opening and private approach access shall be maintained at all times unless joint/slab repairs or planing/paving operations require temporary closure. Temporary closures are to be staggered such that consecutive intersections are not closed at the same time. Temporary complete closures shall be no longer than 10 minutes during asphalt planing/paving operations and shall be completed during off peak hours.
- E7.1.5 Flag persons may be necessary to maintain the flow of traffic during certain work operations.
- E7.1.6 Should the Contractor be unable to maintain pedestrian or vehicular access to a residence or business, they 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.
- E7.1.7 Pedestrian access must be maintained on the east side at all times. One pedestrian crossing in the east-west direction must be maintained at each of the traffic controlled intersections at all times.

- E7.1.8 Closures of the west sidewalk to pedestrians shall start and stop at logical locations so pedestrians can cross to the other side at a safe location. They shall also take into consideration the location of temporary Transit Stop locations.
- E7.1.9 Lane closures in the southbound direction may be used for pedestrian walking areas if required and must be adequately barricaded and delineated.
- E7.1.10 When no work is being performed on site, non-essential lane closures will not be permitted. Contractor is required to provide a Phasing Plan for Closures along Keewatin Street, minimizing sidewalk and lane closures to active areas of work to be approved by the Contract Administrator.
- E7.1.11 Ambulance/emergency vehicle access must be maintained at all times.

E8. WATER OBTAINED FROM THE CITY

- E8.1 Further to 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.

E9. SURFACE RESTORATIONS

- E9.1 Further to 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.

E10. INFRASTRUCTURE SIGNS

- E10.1 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

E11. MIX DESIGN PROPORTION

E11.1 General

- E11.1.1 Further to CW 3310-R18, this Specification covers the mix proportion for all concrete types related to, the construction of Portland Cement Concrete pavements, curbs, gutters, private approaches, bull-noses, median slabs, medians, safety medians and boulevard splash strips, sidewalks and other related concrete works.

E11.2 Referenced Standard Construction Specifications

- (a) CW 3310 – Portland Cement Concrete Pavement Works

E11.3 Mix Design

- E11.3.1 Further to CW 3310-R18 Table CW 3310.5, the minimum cementitious contents shall be as follows:
- Type 1 - 380 kg/m³
 - Type 2 - 360 kg/m³

- Type 3 - 380 kg/m³
- Type 4 - 380 kg/m³
- Type 5 - 340 kg/m³
- Type 6 - 360 kg/m³

E11.4 Requirements

E11.4.1 The Mix Design Statements for all the concrete shall be submitted to the City of Winnipeg, Research and Standards Engineer for approval.

E11.5 Quality Assurance

E11.5.1 The Contract Administrator shall ensure the frequency and number of quality assurance tests in accordance with CW 3310.

E12. LANDSCAPING CURB

DESCRIPTION

E12.1 This specification shall cover the supply and installation of concrete landscaping curb, as noted on the Drawings or as directed by the Contract Administrator.

MATERIAL & CONSTRUCTION METHOD

E12.2 Supply and install curb in accordance with CW 3310 – Portland Cement Concrete Pavement Works.

E12.3 Construct 200 mm reveal or less concrete landscaping curb as per SD-200A.

MEASUREMENT AND PAYMENT

E12.4 Supply and installation of concrete landscaping curb will be measured on a length basis and paid for at the Contract Unit Price for “Landscaping Curb (<=200 mm reveal ht)”, supplied and installed in accordance with the Specification and accepted and measured by the Contract Administrator.

E13. HYDRO EXCAVATION

DESCRIPTION

E13.1 This specification shall cover the works and locations as directed by the Contract Administrator for the removal of earthen material immediately adjacent to underground utilities infrastructure by means of high pressure water spray, and the recovery of excavated material by vacuum type means or equivalent method as approved by the Contract Administrator.

EQUIPMENT

E13.2 Hydro-Excavation equipment shall be capable of maintaining a minimum working pressure of 10,000 psi, at a rate of flow of 10 to 12 gallons per minute. The unit should be adjustable, so as to provide adequate pressure to remove earthen material identified by the Contract Administrator.

E13.3 Spray head shall be equipped with a rotating type nozzle in order to provide a wider path of cut.

CONSTRUCTION METHODS

E13.4 Hydro-Removal of Earthen Material

E13.4.1 Earthen material adjacent to utility entity shall be sprayed with high pressure water so as to remove all such material identified by the Contract Administrator.

E13.5 Recovery of Excavated Material

- E13.5.1 The recovery of excavated material shall be done using a vacuum type method, or other type method as approved by the Contract Administrator.
- E13.5.2 The recovery of material shall follow immediately behind the excavation, to avoid excavated areas from filling with excavated material.
- E13.5.3 The use of mechanical sweepers will not be allowed.
- E13.5.4 Dispose of material in accordance with Section 3.4 of CW 1130-R2.

MEASUREMENT AND PAYMENT

E13.6 Hydro-Excavation

- E13.6.1 Hydro-Excavation of earthen material and its recovery and disposal will be paid for at the Contract Unit Price per hour for "Hydro Excavation", which price shall be payment in full for completing all operations herein described and all other items incidental to the work included in this Specification.

E14. STRUCTURAL EXCAVATION

E14.1 Description

- (a) This Specification shall cover all operations related to excavation for reinforced concrete sidewalk at the Keewatin Street CPR Underpass in accordance with Specification CW 2030, except as amended as specified herein.
- (b) The work to be done by the Contractor under this Specification shall include the furnishings of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.

E14.2 Materials

E14.2.1 General

- (a) The Contractor shall be responsible for the excavation, stockpiling and removal of all materials as set forth in this Specification. Materials to be stockpiled shall be handled in careful and workmanlike manner, to the satisfaction of the Contract Administrator.
- (b) The Contractor shall be responsible for design, construction and removal of any temporary shoring deemed necessary by the Contractor to ensure the safety of the workers and to preserve in original conditions any existing structures that may be affected by the excavations.
- (c) The shoring design shall be sealed by a Professional Engineer licensed to practice in the Province of Manitoba.
- (d) The shoring shall be removed to a minimum of 500mm below the final grade.
- (e) The Contractor shall also be responsible for all utility locates and required permits required to complete this work.

E14.3 Equipment

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

E14.4 Construction Methods

- (a) Excavation: The excavation of material to complete the reinforced concrete sidewalk works.
- (b) The Contractor shall determine the required limits of excavation and the requirements for temporary shoring or temporary sloping.

- (c) The Contractor shall review the Site and the Drawings to determine the limits of the excavations and proximity of existing buildings, utilities and property limits to determine if temporary retaining walls or shoring are required in order to complete the work. The Contractor shall account for slope stability at the site, limited access areas, utilities, etc. Other hidden conditions may present themselves during construction also could result in additional temporary shoring. All shoring shall be designed installed, maintained and paid for by the Contractor if required.
- (d) Stockpiling will not be permitted.

E14.5 Survey Monuments

- (a) The Contractor shall avoid damaging survey monument and shall take all necessary precautions to protect the same. The Contract Administrator at the sole expense of the Contractor will rectify any damage to the survey monuments.

E14.6 Measurement and Payment

E14.6.1 Structural excavation will not be measured and will be considered incidental to the “Reinforced Concrete 3.0m Pathway”, which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E14.6.2 Temporary shoring will not be measured and will be considered incidental to the “Reinforced Concrete 3.0m Pathway”, which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E15. STRUCTURAL BACKFILL

E15.1 Description

- (a) This Specification shall cover all operations related to backfill work as herein specified and in the latest version of the City of Winnipeg Standard Construction Specifications CW 2030, CW 3110, CW 3130, CW 3170 and as shown on the Drawings.
- (b) The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E15.2 References

- (a) All related Specifications and reference Standards are in accordance with the most current issue or latest revision:
 - (i) CW 2030 – Excavation Bedding and Backfill
 - (ii) CW 3110 – Subgrade, Sub-Base, and Base Course Construction
 - (iii) CW 3130 – Supply and Installation of Geotextile Fabrics
 - (iv) CW 3170 – Earthwork and Grading.

E15.3 Scope of Work

- (a) The Work under this Specification shall involve:
 - (i) Supply and placing granular base course under the pathway for the reinforced concrete sidewalk.
 - (ii) Supply and placing back behind the concrete retaining wall along the pathway.

E15.4 Submittals

- (a) The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the commencement of any scheduled Work on the site, a proposed schedule, including methods and sequence of operations.

- (b) The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the commencement of any scheduled Work on the Site, the proposed material(s) to undertake the Work. Data submitted shall summarize the physical, mechanical, and chemical characteristics of the material, including evidence that the specified gradation has been met for granular material and Standard Proctor Density (SPD) and Optimum Moisture Content (OMC) for cohesive (common fill) materials to establish a baseline for field compaction of materials.

E15.5 Equipment

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

E15.6 Materials

(a) Backfill Material

- (i) All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes.
- (ii) All materials shall be approved by the Contract Administrator at least fourteen (14) Days before any construction is undertaken. If, in the opinion of the Contract Administrator, such materials in whole or in part, at the time of supply to site and placement, do not conform to the Specification detailed herein, or are found to be defective in manufacture, or have become damaged in transit, storage, or handling operations, then such material shall be rejected by the Contract Administrator and replaced by the Contractor at his own expense.
- (iii) Backfill materials shall be free of frozen lumps and shall be placed and compacted in an unfrozen state. Backfill shall not be placed on frozen subsoil. Heating of the backfill materials and/or subgrade shall be undertaken as required, to maintain the temperature of the material above freezing.
- (iv) All granular backfill, including granular base course and drainage fill shall be clean and free from organic material, meeting the gradation requirements of Table CW 2030.1 in Specification CW 2030 and Table 2160.1 in Specification CW 2160.

(b) Geotextile Fabric

- (i) Geotextile fabric placed along the limits or within structural backfill shall be "Separation Geotextile Fabric" supplied in accordance with CW 3130.
- (ii) Supply of geotextile fabric for structural backfill shall be considered incidental to Structural Backfill and no separate measurement or payment will be made.

(c) Perforated Drain and Geotextile Filter Sock

- (i) The drainage fill shall contain HDPE perforated drains complete with filter socks.

E15.7 Construction Methods

(a) Backfill Material

- (i) The Contract Administrator shall be notified at least one (1) working day in advance of any backfilling operations. No backfill shall be placed against any concrete until accepted by the Contract Administrator.
- (ii) All backfill material shall be placed and compacted in lifts of 300 mm (maximum) to the minimum percent of Standard Proctor Dry Density specified on the Drawings and/or City Standards.
- (iii) The Contractor shall be required to provide necessary water or equipment during compaction of backfill material to achieve the required densities.
- (iv) The Standard Proctor Density for granular shall be determined at the optimum moisture content in accordance with ASTM Standard D698 (latest revision).

- (v) The field density of the compacted layers shall be verified by Field Density Tests in accordance with ASTM Standard, Test for Density of Soil in Place by the Sand-Cone Method, or equivalent as accepted by the Contract Administrator.
- (vi) The frequency and number of tests to be made shall be as determined by the Contract Administrator.
- (b) Installing Geotextile Fabric
 - (i) Geotextile fabric shall be installed in accordance with CW 3130, and as shown on the Drawings.
 - (ii) Installation of geotextile fabric for structural backfill shall be considered incidental to Structural Backfill and no separate measurement or payment will be made.

E15.8 Quality Control

- (i) All workmanship and materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the specified Work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or acceptance that may have previously been given. The Contract Administrator reserves the right to reject any materials or Works which are not in accordance with the requirements of this Specification.
- (ii) The Contract Administrator shall be afforded full access for the inspection and control testing of constituent materials both at the Site of the Work and at any plant used for production of the materials to determine whether the material is being supplied and placed in accordance with this Specification.
- (iii) Any backfill material that does not meet the gradation and/or compaction requirements of this Specification shall be removed and replaced by the Contractor at his own expense, to the satisfaction of the Contract Administrator.

E15.9 Measurement and Payment

- (a) The backfilling required underneath the sidewalk pathway shown on the Drawings will not be measured and will be considered incidental to the "Reinforced Concrete 3.0m Pathway" listed here below, which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.
- (b) The HDPE perforated drains and geotextile filter socks shall be considered incidental to Structural Backfill.
- (c) Items of Work:
 - (i) Drainage Fill & HDPE Perforated Drain
 - (ii) Connect sub-drain to existing Catch Basin

E16. RANDOM STONE RIPRAP AND GEOTEXTILE

E16.1 Description

E16.1.1 Riprap shall be random stone riprap and supplied and installed in accordance with Specification CW 3615, except as specified herein.

E16.2 Materials

E16.2.1 Rock

- (a) The Contractor shall supply quarried rock, or quarried limestone which is dense, durable, sound, resistant to the action of water and frost, and suitable in all respects for the purpose intended. Stone riprap shall be free from sod, roots, organic material and debris prior to placement. Individual pieces of stone shall be free of defects such as seams or cracks that would cause rapid or excessive deterioration or degradation. The Contract Administrator shall approve the rock for riprap prior to placing.

- (b) Quarried limestone shall have a maximum Los Angeles Abrasion Loss of 32% (ASTM C535) and a maximum Magnesium Sulphate Soundness Loss of 13% (ASTM C88).
- (c) The stone riprap shall be well graded having a full range and even distribution of sizes and shall conform to the following gradation:

Size (mm)	Class 250	Class 350
350		100%
250	100%	
200		15-50%
150	15-50%	
100		0-15%
50	0-15%	

E16.2.2 Geotextile Fabric

- (a) Geotextile fabric shall be non-woven and conform to the requirements of CW 3130 Clause 2.5.

E16.3 Construction Methods

E16.3.1 Place a layer of the geotextile fabric under the riprap and place rip rap. Place grout on the riprap to secure in place.

E16.3.2 Place the rock riprap carefully on the geotextile fabric so that it does not tear.

E16.4 Measurement and Payment

E16.4.1 Supply and placement of riprap and geotextile fabric will be measured on an area basis and will be paid for at the Contract Unit Price per square metre for “Class 350 – Grouted Random Stone Riprap and Geotextile”, which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

- (a) Supply and placement of class 350 riprap and geotextile fabric measurement will be calculated by surface area of riprap placed and accepted by the Contract Administrator.

E17. REINFORCING STEEL

E17.1 Description

- (a) This Specification shall cover all operations relating to the supply, fabrication, and placement of black reinforcing steel, and associated bar accessories, as specified herein and as shown on the Drawings.
- (b) The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified

E17.2 Referenced Specifications and Drawings

- (a) The latest edition and subsequent revisions of the following:
 - (i) ASTM A955M – Standard Specification for Deformed and Plain Stainless-Steel Bars for Concrete Reinforcement;
 - (ii) ASTM A615M – Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement;

- (iii) ASTM C881 – Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete;
- (iv) CAN/CSA A23.1/A23.2 – Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete;
- (v) CAN/CSA G30.18 – Billet-Steel Bars for Concrete Reinforcement;
- (vi) Reinforcing Steel Institute of Canada – Reinforcement Steel Manual of Standard Practice.

E17.3 Scope of Work

- (a) The Work under this Specification shall involve supplying and placing all black and stainless steel reinforcing (including dowels), as shown on the Drawings for the following Works:
 - (i) Reinforced concrete sidewalk with varying height retaining walls
 - (ii) Restoration and modification to existing slope paving.

E17.4 Submittals

- (a) The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the commencement of any scheduled Work on the Site, a proposed schedule, including methods and sequence of operations.
- (b) Contractor shall submit all original mill certificates to the Contract Administrator prior to placement of reinforcing on site.
- (c) Contractor to submit Quality Control Testing Program to the Contract Administrator in accordance with E17.9, "Quality Assurance".
- (d) Shop Drawings shall be submitted in accordance with the latest edition of the Reinforcement Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada (RSIC).

E17.5 Materials

E17.5.1 General

- (a) All materials supplied under this Specification shall be of a type approved by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.
- (b) The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

E17.5.2 Handling and Storage of Materials

- (a) All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with the latest edition and all subsequent revisions of CAN/CSA-A23.1, "Storage of Materials", except as otherwise specified herein.
- (b) Bundles of reinforcing steel shall be identified by tags containing bar marks.
- (c) The Contractor shall handle and store the reinforcing steel in a manner that ensures it is not damaged or contaminated with dirt or other materials.
- (d) The reinforcing steel shall not be placed directly on the ground. Timber pallets shall be placed under the reinforcing steel to keep them free from dirt and mud and to provide easy handling.

E17.5.3 Reinforcing Steel

- (a) Reinforcing steel shall be deemed to include all reinforcing bars, tie-bars, and dowels.
- (b) Black steel as shown on the Drawings and shall conform to the requirements of CAN/CSA G30.18, Grade 400W.

- (c) If, in the opinion of the Contract Administrator, any reinforcing steel provided for the concrete Works exhibit flaws in manufacture or fabrication, such material shall be immediately removed from the site and replaced with acceptable reinforcing steel.
- (d) All reinforcing steel shall be straight and free from paint, oil, millscale, and injurious defects. Rust, surface seams, or surface irregularities will not be cause for rejection, provided that the minimum dimensions, cross sectional area, and tensile properties of a hand-wire-brushed specimen are not less than the requirements of ASTM A955M.

E17.5.4 Bar Accessories

- (a) Bar accessories shall be of types suitable for each type of reinforcing and acceptable to the Contract Administrator. They shall be made from a non-rusting material, and they shall not stain, blemish, or spall the concrete surface for the life of the concrete.
- (b) Bar chairs, bolsters, and bar supports shall be made from cementitious material. No plastic or PVC, or galvanized bar supports shall be used.
- (c) The use of pebbles, pieces of broken stone or brick, plastic, metal pipe, and wooden blocks, will not be permitted.
- (d) Placing of bar supports shall be done to meet the required construction loads.
- (e) Tie wire shall be the following:
 - (i) Black, soft-annealed 1.6 mm diameter wire for black steel reinforcing;
 - (ii) Nylon-, epoxy-, or plastic-coated wire for black steel reinforcing; and
 - (iii) Stainless steel, fully annealed 1.6 mm diameter wire, Type 316 or 316L for stainless steel reinforcing.
- (f) Bar accessories shall include bar chairs, spacers, clips, wire ties, wire (18 gauge minimum), or other similar devices that may be approved by the Contract Administrator. The supplying and installation of bar accessories shall be deemed to be incidental to the supplying and placing of reinforcing steel.

E17.5.5 Mechanical Splices

- (a) Mechanical splices shall be stainless steel, meeting the requirements of ASTM A955M, Type 316L, Type 2005, or Type XM-28.

E17.5.6 Bonding Agent/Grout

- (a) Epoxy resin shall conform to the requirements of ASTM C881. Type I or Type IV, Grade 3 epoxy shall be used for bonding reinforcing steel into hardened concrete. An approved product is Hilti RE500 or equal, as approved by the Contract Administrator in accordance with B6 "Substitutes".
- (b) An aggregate filler may be used in accordance with manufacturer's directions when the drilled hole is sized for the head of a stud rather than a shaft only.
- (c) Bonding agents for bonding reinforcing steel into holes in hardened concrete other than epoxy resin may be permitted provided that they develop a minimum pullout resistance of 50 kN within 48 hours after installation.

E17.6 Equipment

E17.6.1 General

- (a) All equipment shall be of a type acceptable to the Contract Administrator and shall be kept in good working order.
- (b) All tools used for stainless steel reinforcing shall be stainless steel and shall not be contaminated with iron or non-stainless steel.

E17.7 Construction Methods

E17.7.1 Fabrication of Reinforcing Steel

- (a) All reinforcing steel shall be fabricated in accordance with the latest edition of the Reinforcement Steel Manual of Standard Practice by the RSIC, to the lengths and shapes as shown on the Drawings.

E17.7.2 Placing and Fastening of Reinforcing Steel

- (a) General
 - (i) Reinforcing steel shall be placed accurately in the positions shown on the Drawings and shall be retained in such positions by means of a sufficient number of bar accessories so that the bars shall not be moved out of alignment during or after the depositing of concrete. The Contract Administrator's decision in this matter shall be final.
 - (ii) Reinforcing steel shall be free of all foreign material in order to ensure a positive bond between the concrete and steel. The Contractor shall also remove any dry concrete which has been deposited on the steel from previous pouring operations before additional concrete may be placed. Intersecting bars shall be tied positively at each intersection.
 - (iii) Splices in reinforcing steel shall be made only where indicated on the Drawings. Prior acceptance by the Contract Administrator shall be obtained where other splices must be made. Welded splices shall not be permitted.
 - (iv) Reinforcing steel shall be placed to provide a clear space between the reinforcing bars as shown on the Drawings to accurately place preformed holes where necessary.
 - (v) Reinforcing steel shall not be straightened or re-bent in a manner that will injure the metal. Bars with bends not shown on the Drawings shall not be used.
 - (vi) Heating of reinforcing steel shall not be permitted without prior acceptance by the Contract Administrator.
 - (vii) Reinforcing steel shall be placed within the tolerances specified in CAN/CSA A23.1.
 - (viii) The Contractor shall supply and place all necessary support accessories to ensure proper placement of reinforcing steel. All reinforcement shall be accurately placed in the positions shown on the Drawings, and firmly tied and chaired before placing the concrete.
 - (ix) Distances from the forms shall be maintained by means of stays, spacers, or other approved supports. Spacers and supports for holding reinforcing steel at the required location and ensuring the specified concrete cover over the reinforcing steel shall be as specified in E17.5.4, "Bar Accessories".
 - (x) Welding or tack welding is not permitted.
 - (xi) Unless otherwise shown on the Drawings, the minimum distance between bars shall be 40 mm.

E17.7.3 Splicing

- (a) General
 - (i) Splices shall only be provided as shown on the Drawings. Splices other than as shown on the Drawings will not be permitted without the written approval of the Contract Administrator.
 - (ii) For lapped splices, the bars shall be placed in contact and wired together in such a manner as to maintain a clearance of not less than the required minimum clear distance to other bars, and the required minimum distance to the surface of the concrete. In general, suitable lap lengths shall be supplied as detailed on the Drawings. If this information is not detailed on the Drawings, a minimum of thirty-five (35) bar diameters lap length shall be provided.

E17.8 Quality Control

E17.8.1 Inspection

- (a) All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the specified Work.
- (b) The Contractor shall be wholly responsible for the control of all operations incidental thereto, notwithstanding any inspection or acceptance that may have been previously given. The Contract Administrator reserves the right to reject any materials or Works, which are not in accordance with the requirements of this Specification.
- (c) A minimum of two (2) Business Days advance notice shall be given to the Contract Administrator prior to the pouring of any concrete to allow for inspection of the reinforcing steel.
- (d) After all reinforcing steel has been placed, a final inspection shall be made prior to the placement of concrete to locate any damage or deficiencies. All visible damage or any deficiencies shall be repaired to the satisfaction of the Contract Administrator before concrete is placed.

E17.8.2 Access

- (a) The Contract Administrator shall be afforded full access for the inspection and control testing of reinforcing steel, both at the Site of Work and at any plant used for the fabrication of the reinforcing steel, to determine whether the reinforcing steel is being supplied in accordance with this Specification.

E17.9 Quality Assurance

E17.9.1 Testing

- (a) Quality Assurance testing shall be used to determine the acceptability of the reinforcing steel supplied by the Contractor.
- (b) The Contractor shall provide, without charge, the samples of reinforcing steel required for Quality Assurance Tests and provide such assistance and use of tools and construction equipment as is required.

E17.10 Measurement and Payment

- E17.10.1 Supplying and placing reinforcing steel will be not be measured and will be considered incidental to the "Reinforced Concrete 3.0m Pathway", which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

Items of Work:

Supplying and placing reinforcing steel:

- (a) Supply Black Reinforcing Steel
- (b) Place Black Reinforcing Steel

E18. STRUCTURAL CONCRETE

E18.1 Description

- (a) This Specification shall cover all operations relating to the preparation of Portland Cement structural concrete for, and all concreting operations related to, the construction of structural concrete works in accordance with Specification CW 2160 and CSA A23.1, except as amended as specified herein or as shown on the Drawings.
- (b) The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.

E18.2 Referenced Specifications and Drawings

- (a) The latest edition and subsequent revisions of the following:
- (i) ACI 309 – Guide for Consolidation of Concrete;
 - (ii) ACI 347 – Guide to Formwork for Concrete;
 - (iii) American Concrete Publication SP4 – Formwork for Concrete;
 - (iv) ASTM A780 – Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings;
 - (v) ASTM C131 – Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine;
 - (vi) ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete;
 - (vii) ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete;
 - (viii) ASTM C457 – Standard Test Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete;
 - (ix) ASTM C494 – Standard Specification for Chemical Admixtures for Concrete;
 - (x) ASTM C1017 – Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete;
 - (xi) ASTM C1202 – Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration;
 - (xii) ASTM C1399 – Standard Test Method for Obtaining Average Residual-Strength of Fibre-Reinforced Concrete;
 - (xiii) ASTM C1609 – Standard Test Method for Flexural Performance of Fibre-Reinforced Concrete (Using Beam with Third Point Loading);
 - (xiv) ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types);
 - (xv) CAN/CSA A23.1/A23.2 – Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete;
 - (xvi) CAN/CSA A3001 – Cementitious Materials for Use in Concrete;
 - (xvii) CAN/CSA G40.21 – General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel;
 - (xviii) CAN/CSA G164-M92 – Hot Dip Galvanizing of Irregularly Shaped Articles;
 - (xix) CAN/CSA O121 – Douglas Fir Plywood;
 - (xx) CAN/CSA-S6 – Canadian Highway Bridge Design Code;
 - (xxi) CAN/CSA S269.1 – False Work for Construction Purposes;
 - (xxii) CAN/CSA S269.3 – Concrete Formwork;
 - (xxiii) ICRI Guideline No. 03732 – Selecting and Specifying Concrete Surface Preparation for Coatings, Sealers, and Polymer Overlays;
 - (xxiv) Ministry of Transportation Ontario MTO Lab Test Method LS 609 – Petrographic Analysis of Coarse Aggregate; and
 - (xxv) Ontario Provincial Standard Specification OPSS 1010 – Material Specification for Aggregates – Base, Sub-base, Select Subgrade, and Backfill Material.

E18.3 Scope of Work

- (a) The Work under this Specification shall involve the following structural concrete Works:
- (i) Reinforced Concrete Sidewalk with varying height retaining walls
 - (ii) Restoration and modification of slope paving

E18.4 Submittals

E18.4.1 General

- (a) The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the commencement of any scheduled Work on the Site, a proposed schedule, including methods and sequence of operations.
- (b) The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the commencement of any Work on Site, the proposed materials to be used including the name of the proposed qualified Ready Mix Concrete Supplier, Concrete Mix Design sealed, signed and dated by a Professional Engineer registered or licenced to practice in Manitoba that meets the minimum performance requirements shown on the Drawings, test data by an independent laboratory certified in accordance with CSA A283 showing that concrete and all constituent materials meets the necessary requirements of specified concrete and appropriate material specifications, Fly Ash Mill Certificate including physical and chemical properties with source and supplier, weigh scale certification for the current calendar year acceptable test results.

E18.4.2 Temporary False Work, Formwork and Shoring Works

- (a) The Contractor shall submit to the Contract Administrator for review and approval, at least ten (10) Business Days prior to the scheduled commencement of concrete placement, detailed design calculations and Shop Drawings for any temporary Works, including false work, formwork, and shoring.
- (b) Design Requirements
 - (i) All forms shall be of wood, metal or other materials as approved by the Contract Administrator.
 - (ii) The false work, formwork, and shoring for these Works shall be designed by a Professional Engineer registered in the Province of Manitoba. False work shall be designed according to the requirements of the requirements of the CAN/CSA S269.1. The Shop Drawings shall bear the Professional Engineer's seal. Shop Drawings submitted without the seal of a Professional Engineer will be rejected. The submission of such Shop Drawings to the Contract Administrator shall in no way relieve the Contractor of full responsibility for the safety and structural integrity of the formwork and shoring.
 - (iii) The false work, formwork, and shoring for these Works shall be designed to safely support all vertical and lateral loads until such loads can be supported by the concrete all in accordance with the requirements of CAN/CSA S269.3. All proposed fastening methods to the existing deck superstructure must be submitted to the Contract Administrator for review and approval. Drilling into the precast concrete girders will not be accepted.
 - (iv) The loads and lateral pressures outlined in Part 3, Section 102 of ACI 347 and wind loads as specified by the Manitoba Building Code shall be used for design. Additional design considerations concerning factors of safety for formwork elements and allowable settlements outlined in Section 103 of the above reference shall apply.
 - (v) As a minimum, the following spacings shall apply, for studding and waling:
 - (vi) 20-mm plywood: studding 400 mm centre to centre (max.),
 - (vii) Walers 760 mm centre to centre (max.)
 - (viii) Forms shall be designed and constructed so that the completed Work will be within minus 3 mm or plus 6 mm of the dimensions shown on the Drawings.
 - (ix) Formwork shall be designed to provide camber, where applicable, to maintain the specified tolerance to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete, due to construction loads.

- (x) Slots, recesses, chases, sleeves, inserts, bolts, hangers, and other items shall be accommodated in the design, in coordination and cooperation with the trade concerned. No openings in structural members are to be shown on the Shop Drawings without the prior written approval of the Contract Administrator.
 - (xi) Shores shall be designed with positive means of adjustment (jacks or wedges). All movements shall be taken up before or during concreting as required.
 - (xii) Mud sills shall not be used.
 - (xiii) The Contractor shall design supports for shores that are attached to the abutments or supported by piles. The design of the supports for the shores installed on the abutments shall be designed by the Contractor to ensure the abutments can withstand the shoring loads as noted in section E27.4.5(b)(iii) and meet the requirements of the shoring and false work as noted in this section. All items that shall remain permanently within the abutments shall be hot dip galvanized. All ferrule inserts or similar shall have bolts permanently installed. The supports shall be designed by a Professional Engineer registered in the Province of Manitoba and sealed drawings shall be prepared and provided to the Contract Administrator for review 10 days prior to installation.
 - (xiv) The supports for the shores can be founded on piles. The pile shall be designed by a Professional Engineer registered in the Province of Manitoba. The pile shall be designed for all loads to be supported during construction, any movements that may occur such as settlements and shall be removed to a minimum of 1m below the finished grade. If a portion of the pile remains it must be designed to resist all up-lift forces, after the piles have been cut to their final length below grade. sealed drawings shall be prepared and provided to the Contract Administrator for review 10 days prior to installation.
 - (xv) Shores must be designed to accommodate construction of the shore in frozen conditions and then allow for a change to unfrozen conditions and saturated soils prior to, during or after concrete placement without any effect on the shoring system or the resulting finished concrete adherence to the shapes, lines, and dimensions of the members shown on the Drawings.
 - (xvi) Shores shall be designed and braced as necessary so that they can safely withstand all dead and moving loads to which they will be subjected.
 - (xvii) All exposed edges shall be chamfered 20 mm unless otherwise noted on the Drawings.
 - (xviii) Formwork shall be designed to have sufficient strength and rigidity so that the resultant finished concrete conforms to the shapes, lines, and dimensions of the members shown on the Drawings.
 - (xix) Forms shall be designed to be sufficiently tight to prevent leakage of grout or cement paste.
- (c) Shop Drawings shall show design loads, type, and number of equipment to be used for placing the concrete, method of construction, method of removal, type and grade of materials, and any further information that may be required by the Contract Administrator. The Contractor shall not proceed with any Work on site until the Shop Drawings have been reviewed and approved in writing by the Contract Administrator. False work must be designed to carry all loads associated with construction of overhangs including deflection due to dead loads, placement of concrete, hoarding, construction live loads, and any other loads that may occur.

E18.5 Materials

E18.5.1 General

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

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

E18.5.2 Handling and Storage of Materials

- (a) All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with the latest edition and all subsequent revisions of CAN/CSA-A23.1.

E18.5.3 Concrete

- (a) Concrete materials susceptible to frost damage shall be protected from freezing.
- (b) Concrete shall have nominal compressive strengths (f'_c) and meet the requirements for hardened concrete as specified in the following Table E18.1.

TABLE E18.1 REQUIREMENTS FOR HARDENED CONCRETE							
Type of Concrete	Location	Nominal Compressive Strength MPa	Class of Exposure	Air Content Category	Max Aggregate Size	Special Requirements	Minimum Post Residual Cracking Index
Type 2	Reinforced Concrete Retaining Wall and Slope Paving	35 @ 28 Days	C-1	1	20 mm	-	-

E18.5.4 Aggregates

(a) General

- (i) All aggregates shall be handled to prevent segregation and inclusion of any foreign substances, and to obtain uniformity of materials. The two sizes of coarse and fine aggregates, and aggregates secured from different sources, shall be piled in separate stockpiles. The site of the stockpiles shall be cleaned of all foreign materials and shall be reasonably level and firm or on a built-up platform. If the aggregates are placed directly on the ground, material shall not be removed from the stockpile within 150 mm of the ground level. This material shall remain undisturbed to avoid contaminating the aggregate being used with the ground material.
- (ii) The potential for deleterious alkali-aggregate reactivity shall be assessed in accordance with CSA Standard Test Method A23.2-27A. Current (less than 18 months old) test data evaluating the potential alkali-silica reactivity of aggregates tested in accordance with CSA Standard Test Method A23.2-1 4A or CSA A23.2-25A is required.
- (iii) Petrographic analysis when performed shall be in accordance with MTO (Ministry of Transportation Ontario) Lab Test Method LS 609. The (weighted) petrographic number shall not exceed 130.

(b) Fine Aggregate

- (i) Fine aggregate shall meet the grading requirements of CAN/CSA A23.1, Table 10, FA1, be graded uniformly and not more than 3% shall pass a 75 um sieve. Fine aggregate shall consist of sand, stone, screenings, other inert materials with similar characteristics or a combination thereof, having clean, hard, strong, durable, uncoated grains free from injurious amounts of dust, lumps, shale, alkali, organic matter, loam or other deleterious substances.
- (ii) Tests of the fine aggregate shall not exceed the limits for standard requirements prescribed in CAN/CSA A23.1, Table 12.

(c) Coarse Aggregate - Standard

- (i) The maximum nominal size of coarse aggregate shall be 20 mm and meet the grading requirements of CAN/CSA A23.1, Table 11, Group I. Coarse aggregate shall be uniformly graded and not more than 2% shall pass a 75 um sieve. Coarse aggregate shall consist of crushed stone or gravel or a combination thereof, having hard, strong, durable particles free from elongation, dust, shale, earth, vegetable matter or other injurious substances. Coarse aggregate shall be clean and free from alkali, organic or other deleterious matter; shall have a minimum of two fractured faces; and shall have an absorption not exceeding 3%.
- (ii) The aggregate retained on the 5 mm sieve shall consist of clean, hard, tough, durable, angular particles with a rough surface texture, and shall be free from organic material, adherent coatings of clay, clay balls, an excess of thin particles or any other extraneous material.
- (iii) Course aggregate when tested for abrasion in accordance with the requirements of the ASTM C131 shall not have a loss greater than 30%.
- (iv) Tests of the coarse aggregate shall not exceed the limits for standard requirements prescribed in CAN/CSA A23.1, Table 12, for concrete exposed to freezing and thawing.

E18.5.5 Admixtures

- (a) Air-entraining admixtures shall conform to the requirements of ASTM C260.
- (b) Chemical admixtures shall conform to the requirements of ASTM C494 or C1017 for flowing concrete.
- (c) All admixtures shall be compatible with all other constituents. The addition of calcium chloride, accelerators and air-reducing agents, will not be permitted, unless otherwise approved by the Contract Administrator.

E18.5.6 Cementitious Materials

- (a) Cementitious materials shall conform to the requirements of CAN/CSA A3001 and shall be free from lumps.
- (b) Should the Contractor choose to include a silica fume admixture in the concrete mix design, the substitution of silica fume shall not exceed 8% by mass of cement.
- (c) Should the Contractor choose to include fly ash in the concrete mix design, the fly ash shall be Class CI or F and the substitution shall not exceed 30% by mass of cement.
- (d) Cementitious materials shall be stored in a suitable weather-tight building that shall protect these materials from dampness and other destructive agents. Cementitious materials that have been stored for a length of time resulting in the hardening, or the formation of lumps, shall not be used in the Work.

E18.5.7 Water

- (a) Water to be used for all operations in the Specification, including mixing and curing of concrete or grout, surface texturing operations, and saturating the substrate shall conform to the requirements of CAN/CSA A23.1 and shall be free of oil, alkali, acidic, organic materials or deleterious substances. The Contractor shall not use water from shallow, stagnant or marshy sources.

E18.5.8 Corrosion Inhibitor

- (a) Corrosion inhibitor shall be MCI 2005 NS at a dosage of 1 L/m³, or equal as accepted by the Contract Administrator, in accordance with B6.

E18.5.9 Formwork

- (a) Formwork materials shall conform to CAN/CSA A23.1, and American Concrete Publication SP4, "Formwork for Concrete."
- (b) Form sheeting plywood to be covered with form liner or to be directly in contact with soil shall be exterior Douglas Fir, concrete form grade, conforming to CSA Standard O121-M1978, a minimum of 20 mm thick.

- (c) Where form liner is not being used, form sheeting shall be Douglas Fir, overlay form liner type conforming to CAN/CSA "O121". Approved Manufacturers are "Evans" and "C-Z."
- (d) Boards used for formwork shall be fully seasoned and free from defects such as knots, warps, cracks, etc., which may mark the concrete surface.
- (e) No formwork accessories will be allowed to be left in place within 50 mm of the surface following form removal. Items to be left in place must be made from a nonrusting material or galvanized steel; and they shall not stain, blemish, or spall the concrete surface for the life of the concrete.
- (f) Forms for exposed surfaces that do not require a form liner may be either new plywood or steel as authorized by the Contract Administrator.
- (g) Studding shall be spruce or pine and shall have such dimensions and spacing that they shall withstand without distortion all the forces to which the forms shall be subjected.
- (h) Walers shall be spruce or pine, with minimum dimensions of 100 mm x 150 mm. Studding shall be spruce or pine, with minimum dimensions of 50 x 150.
- (i) Stay-in-place formwork or false work is not acceptable and shall not be used by the Contractor unless specifically shown on the Drawings.

E18.5.10 Form Coating

- (a) Form coating shall be "Sternson C.R.A." by Sternson, "SCP Strip Ease" by Specialty Construction Products, or equal as accepted by the Contract Administrator, in accordance with B6.

E18.5.11 Permeable Formwork Liner

- (a) Formwork liner shall be Texel Drainform, Hydroform, or equal as accepted by the Contract Administrator, in accordance with B6. This formwork liner shall be used on all exposed substructure and superstructure formed surfaces, except soffit surfaces, or where a normal form finish is specified.
- (b) Paper-lined forms shall be used on all soffit surfaces, such as structural deck overhangs. The Contractor shall provide conclusive evidence that the paper-lined form proposed for use will not stain or otherwise blemish the hardened concrete surface.

E18.5.12 Curing Compound

- (a) Curing compound shall conform to the requirements of ASTM C309, either Type D with fugitive dye or Type 2.
- (b) Type 2 shall only be used on surfaces that will not be exposed to view.

E18.5.13 Bonding Agents

- (a) Latex Bonding Agent
 - (i) Latex bonding agent shall be Acryl-Stix, SikaCem 810, or equal as accepted by the Contract Administrator, in accordance with B6. Polyvinyl acetate-based latexes will not be permitted. Planicrete AC by MAPEI is approved for use as a latex bonding agent on concrete greater than 28 days in age.
- (b) Bonding Grout
 - (i) The grout for bonding the structural deck concrete to the precast concrete girders shall be mixed in an agitating hopper slurry pump and shall consist of the following constituents, by weight:
 - (i) 1 part water;
 - (ii) 1 part latex bonding agent; and
 - (iii) 1 1/2 parts Type GUSF Portland cement.
 - (ii) The consistency of the bonding grout shall be such that it can be brushed on the existing concrete surface in a thin, even coating that will not run or puddle in low spots.

E18.5.14 Epoxy Adhesive

- (a) Epoxy adhesive for bonding concrete to steel shall be one of the following approved products: Sternson ST432 or ST433, Dural Duralbond, Capper Capbond E, Sikadur 32 Hi-bond, Concsive 1001 LPL, Meadows Rezi-Weld 1000, or equal as accepted by the Contract Administrator, in accordance with B6.

E18.5.15 Epoxy Grout

- (a) Epoxy grout shall be one of the following approved products: Sternson Talygrout 100, Sika Sikadur 42, CPD Epoxy Grout by Specialty Construction Products, Meadows Rezi-Weld EG-96, or equal as accepted by the Contract Administrator, in accordance with B6.

E18.5.16 Cementitious Grout

- (a) Cementitious grout shall be nonshrink and non-metallic. Approved products are Sternson M-bed Standard, Specialty Construction Products CPD Non-Shrink Grout, Sika 212 Non-Shrink Grout, or equal as accepted by the Contract Administrator, in accordance with B6. The minimum compressive strength of the grout at 28 days shall be 40 MPa.

E18.5.17 Patching Mortar

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

E18.5.18 Flexible Joint Sealant

- (a) Flexible joint sealant for all horizontal, vertical, and sloping joints shall be guaranteed non-staining, grey polyurethane, accepted by the Contract Administrator and applied in strict accordance with the details shown on the Drawings and the Manufacturer's instructions including appropriate primers if recommended. Approved products are Vulkem 116 by Mameco, Sonolastic NP1 by Sonneborn, Sikaflex-1a by Sika, Bostik 915 by Bostik, or equal as accepted by the Contract Administrator, in accordance with B6.

E18.5.19 Fibre Joint Filler

- (a) Fibre joint filler shall be rot-proof and of the preformed, nonextruding, resilient type made with a bituminous fibre such as Flexcell and shall conform to the requirements of ASTM D1751 or equal as accepted by the Contract Administrator, in accordance with B6.

E18.5.20 Precompressed Foam Joint Filler

- (a) Precompressed foam joint filler shall be "Emseal BEJS System" where shown on the drawings, satisfying the requirements of ASTM C711 and G155, or equal as accepted by the Contract Administrator, in accordance with B6.
- (b) Precompressed foam joint filler shall be used around roadway approach slabs and approach sidewalks, and shall be used also between barrier joints.
- (c) The sealant system shall be comprised of three components:
 - (i) Cellular polyurethane foam impregnated with hydrophobic 100% acrylic, waterbased emulsion, factory coated and highway-grade, fuel resistant silicone;
 - (ii) Field applied epoxy adhesive primer; and
 - (iii) Field injected silicone sealant bands.
- (d) Impregnation agent shall have proven non-migratory characteristics. Silicone coating shall be highway-grade, low modulus, fuel resistant silicone applied to the impregnated foam sealant at a width greater than maximum allowable joint extension and which when cured and compressed will form a bellows. The depth of seal shall be as recommended by the Manufacturer.

- (e) Material shall be capable, as a dual seal, of movement of +50% to -50% (100% total) of nominal material size. Changes in plan and direction shall be executed using factory fabricated transition assemblies. Transitions shall be watertight at the inside and outside corners through the full movement capabilities of the product.
- (f) All substitute candidates shall be free in composition of any waxes or asphalts, wax compounds or asphalt compounds. All substitute candidates shall be:
 - (i) Capable of withstanding 65°C for three hours while compressed down to the minimum movement capability (-50% nominal material size) without evidence of any bleeding of impregnation medium from the materials; and
 - (ii) Capable of self-expanding to the maximum movement capacity (+50% nominal material size) within twenty-four (24) hours at 20°C.

E18.5.21 Ethafoam Joint Filler

- (a) Ethafoam joint filler shall be non-staining, polyethylene, closed-cell product for expansion and contraction and/or isolation joint application.

E18.5.22 Low Density Styrofoam

- (a) Low density Styrofoam shall be the type accepted by the Contract Administrator, in accordance with B6.

E18.5.23 Backup Rod

- (a) Backup rod shall be pre-formed compressible polyethylene, urethane, neoprene, or vinyl foam backer rod, extruded into a closed cell form and oversized 30 to 50%.

E18.5.24 Void Form

- (a) Void form shall be supplied by Void form International, or equal as accepted by the Contract Administrator, in accordance with B6.

E18.5.25 Screed Bases and Chairs

- (a) Screed bases shall be Hilti HAS 304 stainless steel threaded rods, or equal as accepted by the Contract Administrator, in accordance B6.
- (b) Screed chairs shall be Mega Screed as supplied by Brock White Canada Company, or equal as accepted by the Contract Administrator, in accordance with B6.

E18.5.26 Dampproofing

- (a) Dampproofing materials shall be applied to all buried concrete surfaces in contact with the soil to within 300 mm of Finished Ground Elevation, with the exception of those surfaces cast directly against the soil or in contact with prefabricated drainage composite. Dampproofing materials shall be mineral colloid emulsified asphalt complying with Canadian General Standards Board Specification No. 37.16-M89. Acceptable product is Bakelite/Flintguard 710-11 Foundation Coating as manufactured by BAKOR, Elsro Fibrated Foundation Coating, Insulmastic 7103 Fibered Waterproofing, or equal as accepted by the Contract Administrator, in accordance with B6.
- (b) All damaged concrete, including tie holes to be filled with non-shrink grout prior to application of dampproofing.
- (c) Primer for dampproofing shall be asphalt primer, penetrating type conforming to CGSB 37-GP-9Ma. Acceptable products are BAKOR Penetrating 910-01 Asphalt Primer as manufactured by BAKOR Inc., Elsro Asphalt Primer No. 510, Insulmastic 7501 C/B Roof & Foundation Primer, or equal as accepted by the Contract Administrator, in accordance with B6.

E18.6 Equipment

E18.6.1 General

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

E18.6.2 Vibrators

- (a) The Contractor shall have sufficient numbers of internal concrete vibrators and experienced operators on site to properly consolidate all concrete in accordance with ACI 309. The type and size of vibrators shall be appropriate for the particular application, the size of the pour, and the amount of reinforcing and shall conform to standard construction procedures.
- (b) The Contractor shall use rubber coated vibrators for consolidating concrete containing epoxy-coated reinforcing, such as in locations that the existing deck reinforcing is exposed.
- (c) The Contractor shall have standby vibrators available at all times during the pour.

E18.7 Construction Methods

E18.7.1 General

- (a) It is intended that this Section cover all construction Work associated with Structural Concreting operations.

E18.7.2 Temporary False Work, Formwork, and Shoring

- (a) Construction Requirements
 - (i) Temporary false work, formwork, and shoring shall satisfy all requirements of the Navigable Waters Protection Program.
 - (ii) The Contractor shall construct false work, formwork and shoring for the new structural deck concrete overhangs strictly in accordance with the accepted sealed Shop Drawings.
 - (iii) All forms shall be of wood, metal or other materials as approved by the Contract Administrator. No formwork shall extend beneath the underside of the girders.
 - (iv) The false work, formwork, and shoring for these Works shall be erected, and braced, as designed, and maintained to safely support all vertical and lateral loads until such loads can be supported by the concrete. All proposed fastening shall be as shown on the accepted sealed Shop Drawings.
 - (v) Forms shall be constructed and maintained so that the completed Work is within minus 3 mm or plus 6 mm of the dimensions shown on the Drawings.
 - (vi) Formwork shall be cambered, where necessary to maintain the specified tolerance to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete, due to construction loads.
 - (vii) Slots, recesses, chases, sleeves, inserts, bolts, hangers, and other items shall be formed or set in coordination and cooperation with the trade concerned. No openings shall be made in structural members that are not shown on the Shop Drawings without the prior written approval of the Contract Administrator.
 - (viii) Shores shall be provided with positive means of adjustment (jacks or wedges). All settlement shall be taken up before or during concreting as required.
 - (ix) Mud sills shall not be used
 - (x) Shores shall be braced horizontally in two directions and diagonally in the same two vertical planes so that they can safely withstand all dead and moving loads to which they will be subjected.
 - (xi) All exposed edges shall be chamfered 20 mm unless otherwise noted on the Drawings.
 - (xii) Formwork shall have sufficient strength and rigidity so that the resultant finished concrete conforms to the shapes, lines, and dimensions of the members shown on the Drawings.
 - (xiii) Forms shall be constructed so as to be sufficiently tight to prevent leakage of grout or cement paste.

- (b) Form panels shall be constructed so that the contact edges are kept flush and aligned.
- (c) Forms for the concrete barriers shall be accordingly aligned to each other and to the geometry shown on the Drawings so as to provide a smooth, continuous barrier. Any misalignments in the barrier shall be cause for rejection and removal of same. No snap ties within the barriers shall be placed below 250 mm above the top of the upper lift elevation.
- (d) Forms shall be clean before use. Plywood and other wood surfaces shall be sealed against absorption of moisture from the concrete by a field applied form coating or a factory applied liner as accepted by the Contract Administrator.
- (e) Where prefabricated panels are used, care shall be taken to ensure that adjacent panels remain flush. Where metal forms are used, all bolts and rivets shall be counter sunk and well ground to provide a smooth, plane surface.
- (f) Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be commercially manufactured types. The portion remaining within the concrete shall leave no metal within 50 mm of the surface when the concrete is exposed to view. Spreader cones on ties shall not exceed 30 mm in diameter. All fittings for metal ties shall be of such design that, upon their removal, the cavities which are left will be of the smallest possible size. Torch cutting of steel hangers and ties will not be permitted. Formwork hangers for exterior surfaces of decks and curbs shall be an acceptable break-back type with surface cone, or removable threaded type. Cavities shall be filled with cement mortar and the surface left sound, smooth, even and uniform in colour.
- (g) Formwork shall be constructed to permit easy dismantling and stripping and such that removal will not damage the concrete. Provision shall be made in the formwork for shores to remain undisturbed during stripping where required.
- (h) It shall be permissible to use the forms over again where possible to a maximum of three uses, provided they are thoroughly cleaned and in good condition after being removed from the former portions of the Work. The Contract Administrator shall be the sole judge of their condition and their decision shall be final regarding the use of them again.
- (i) Where required by the Contract Administrator, the Contractor shall cast test panels not using less than two panels of representative samples of the forms he proposes for reuse and shall strip them after forty-eight (48) hours for the Contract Administrator to judge the type of surface produced.
- (j) All form lumber, studding, etc., becomes the property of the Contractor when the Work is finished, and it shall be removed from the concrete and the site by the Contractor after the concrete is set, incidental to the Work of this Specification, and the entire site shall be left in a neat and clean condition.

E18.7.3 Concrete Construction Joints

- (a) Concrete construction joints shall be located only where shown on the Drawings or as otherwise directed in writing by the Contract Administrator. Concrete construction joints shall be formed at right angles to the direction of the main reinforcing steel. All reinforcing steel shall be continuous across the joints.
- (b) Forms shall be re-tightened and all reinforcing steel shall be thoroughly cleaned at the joint prior to concreting.
- (c) After the forms are stripped off the construction joint, the entire face of the joint, including the reinforcing steel, shall be thoroughly cleaned down to sound concrete and the surface roughened.
- (d) Refer to, E18.7.6, "Preparation for Concreting Against Hardened Concrete", for the requirements to prepare the hardened concrete at a construction joint for receiving new concrete.

E18.7.4 Permeable Formwork Liner

- (a) Permeable formwork liner shall be used on all exposed vertical surfaces, unless otherwise noted on the Drawings.

- (b) The permeable formwork liner shall be used for only one (1) application.
- (c) The supply, setup, application, and removal of permeable formwork liner shall be considered incidental to the placement of structural concrete, and no separate measurement or payment shall be made for this Work.

E18.7.5 Supply of Structural Concrete

- (a) All structural concrete shall be supplied from a plant certified by the Concrete Manitoba. The Contractor, upon request from the Contract Administrator, shall furnish proof of this certification.
- (b) All mixing of concrete must meet the provisions of CAN/CSA A23.1, Clause 5.2, Production of Concrete.
- (c) Time of Hauling
 - (i) The maximum time allowed for all types of concrete to be delivered to the Site of the Work, including the time required to discharge, shall not exceed 120 minutes after batching. Batching of all types of concrete is considered to occur when any of the mix ingredients are introduced into the mixer, regardless of whether or not the mixer is revolving. For concrete that includes silica fume and fly ash, this requirement is reduced to 90 minutes.
 - (ii) Each batch of concrete delivered to the Site shall be accompanied by a time slip issued at the batching plant, bearing the time of batching. In hot or cold weather, or under conditions contributing to quick stiffening of the concrete, a time less than 120 and/or 90 minutes may be specified by the Contract Administrator. The Contractor will be informed of this requirement 24 hours prior to the scheduled placing of concrete.
 - (iii) To avoid the reduction of delivery and discharge time in hot weather, the Contractor will be allowed to substitute crushed ice for a portion of the mixing water provided the specified water/cementitious ratio is maintained. All of the ice shall be melted completely before discharging any of the concrete at the delivery point.
 - (iv) Unless otherwise noted in Table E18.1, "Requirements for Hardened Concrete", no retarders shall be used.
 - (v) The concrete, when discharged from truck mixers or truck agitators, shall be of the consistency and workability required for the job without the use of additional mixing water. If the slump of the concrete is less than that designated by the mix design statement, then water can be added on site provided the additional water meets the requirements of CAN/CSA A23.1 5.2.4.3.2. If additional water is to be added on site, it must be done under the guidance of the Suppliers' designated quality control person. The Supplier shall certify that the addition of water on site does not change the Mix Design for the concrete supplied. Any other water added to the concrete without such control will be grounds for rejection of the concrete by the Contract Administrator.
 - (vi) A record of the actual proportions used for each concrete placement shall be kept by the Supplier and a copy of this record shall be submitted to the City upon request.
- (d) Delivery of Concrete
 - (i) The Contractor shall satisfy himself that the Concrete Supplier has sufficient plant capacity and satisfactory transporting equipment to ensure continuous delivery at the rate required. The rate of delivery of concrete during concreting operations shall be such that the development of cold joints will not occur. The methods of delivering and handling the concrete shall facilitate placing with a minimum of re-handling, and without damage to the structure or the concrete.
- (e) Concrete Placement Schedule
 - (i) The Contractor shall submit to the Contract Administrator the proposed concrete placement schedule for all concrete placements for review and

approval. If, in the opinion of the Contract Administrator, the volume of the placement is deemed larger than can be placed with the facilities provided, the Contractor shall either:

- (i) Limit the amount to be placed at any time (using adequate construction joints);
 - (ii) Augment his facilities and Plant in order to complete the proposed placement;
 - (iii) In the case of continuous placing, provide additional crews and have adequate lighting to provide for proper placing, finishing, curing and inspecting; and
- (ii) The Contractor shall adhere strictly to the concrete placement schedule, as approved by the Contract Administrator.

E18.7.6 Preparation for Concreting Against Hardened Concrete

- (a) All hardened concrete against which new concrete is to be placed shall be prepared in the following manner:
- (i) Concrete shall be removed to sound concrete or to the limits as shown on the Drawings, whichever is greater. The resulting surface shall be roughened to remove latent cement and miscellaneous debris.
 - (ii) All existing surfaces and exposed reinforcing steel are to be sandblasted to reveal a clean substrate and kept clean until concrete placement. Sandblasting shall be followed by a high pressure water wash to remove all residues.
 - (iii) Immediately prior to placing new concrete, bonding grout shall be thoroughly brushed onto the entire surface of the existing hardened concrete in a thin and even coating that will not run or puddle.
 - (iv) For the Bridge traffic and median barriers, during concreting of the structural deck, the top surface of the concrete shall be roughened using a small rake running longitudinally between barrier dowels.

E18.7.7 Placing Structural Concrete

- (a) General
- (i) The Contractor shall notify the Contract Administrator at least one (1) Working day prior to concrete placement so that an adequate inspection may be made of formwork, shoring, reinforcement, deck joints, mechanical screed setup, movable hoarding, and related Works. No concrete pour shall be scheduled without the prior written approval of the Contract Administrator.
 - (ii) The Contractor shall conduct a dry run of the screed machine in the presence of the Contract Administrator to verify that the screed supporting rails are properly set to ensure compliance with the specified longitudinal and transverse deck grades. Sufficient screed supporting guide rails to provide the required coverage for the entire pour, as approved by the Contract Administrator, shall be set out and adjusted for height at least one (1) Working Day prior to the proposed pour. The Contract Administrator will verify that the screed machine and screed rails have been adjusted so that the height of the screed above the existing concrete at each point meets the requirements. To confirm the Contractor's adjustments of the machine and screed rails, the screed machine shall be "dry run", and screed clearance measurements taken at each support point by the Contractor. Resetting of the machine and/or screed rails shall be done by the Contractor as required by the Contract Administrator.
- (b) Placing Structural Concrete
- (i) The nomograph, Figure D1, Appendix D of CAN/CSA A23.1 shall be used to estimate surface moisture evaporation rates.

- (ii) Equipment for mixing or conveying concrete shall be thoroughly flushed with clean water before and after each pour. Water used for this purpose shall be discharged outside the forms. All equipment and processes are subject to acceptance by the Contract Administrator.
- (iii) Concrete shall be conveyed from the mixer to the place of final deposit by methods which will prevent segregation and a marked change in consistency.
- (iv) Runways for concrete buggies and all pumping equipment shall be supported directly by the formwork and not on reinforcement.
- (v) Before depositing any concrete, all debris shall be removed from the space to be occupied by the concrete, and any mortar splashed upon the reinforcement or forms shall be removed.
- (vi) Placing of concrete, once started, shall be continuous. No concrete shall be placed on concrete which has sufficiently hardened to cause the formation of seams or "cold joints" within the section. If placing must be interrupted, construction joints shall be located where shown on the Drawings or as accepted by the Contract Administrator.
- (vii) When the Contractor chooses to pump the concrete, the operation of the pump shall produce a continuous flow of concrete without air pockets. The equipment shall be arranged such that vibration is not transmitted to freshly placed concrete that may damage the concrete. When pumping is completed, the concrete remaining in the pipeline, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients.
- (viii) Concrete shall be placed as nearly as possible in its final position. Rakes or mechanical vibrators shall not be used to transport concrete.
- (ix) The maximum free drop of concrete into the forms shall not be greater than 1.5 m, otherwise rubber tubes or pouring ports spaced not more than 1.5 m vertically and 2.5 m horizontally shall be used. The Contractor shall obtain the Contract Administrator's acceptance, prior to pouring concrete, of all placing operations.
- (x) All concrete, during and immediately after depositing, shall be consolidated by mechanical vibrators so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into the corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. Mechanical vibrators shall have a minimum frequency of 7000 revolutions per minute immersed.
- (xi) Vibrators shall be inserted systematically into the concrete at intervals such that the zones of influence of the vibrator overlap (generally 300 to 900 mm). Apply the vibrator at any point until the concrete is sufficiently compacted (5 to 15 seconds), but not long enough for segregation to occur. The vibrators shall be inserted vertically and withdrawn out of the concrete slowly. Spare vibrators in good working condition shall be kept on the job site during all placing operations.
- (xii) Concrete shall not be placed during rain or snow unless adequate protection is provided for formwork and concrete surfaces, to the satisfaction of the Contract Administrator.
- (xiii) Before any concrete is placed for the approach slabs the Bridge structural deck or the sidewalk slab, the Contractor shall demonstrate to the satisfaction of the Contract Administrator before each pour that all necessary adjustments have been made to provide the required camber, crown, slab thickness, and concrete cover. This demonstration may be carried out by means of an attachment securely fastened to the finisher's strike-off machine and moving the machine and the strike-off across the deck over the reinforcing steel with a minimum 3 mm clearance between the steel and attachment.

- (a) Finishing Operations for Unformed Surfaces
 - (i) The Contractor shall ensure that sufficient personnel are provided for the finishing of the slab surfaces. In the event that the depositing, vibrating, and screeding operations progress faster than the concrete finishing, the Contractor shall reduce the rate of concrete placement or cease the depositing of concrete until the exposed area of unfinished concrete has been satisfactorily minimized. The Contract Administrator's judgement in this matter shall be final and binding on the Contractor. All loads of concrete that exceed the 120 minute discharge time limit during the delay, while the finishing operations catch up, shall be rejected.
- (b) Type 1 Finish –Formed Surfaces
 - (i) A permeable formwork liner finish shall be applied to all exposed formed surfaces including all exposed concrete surfaces not included in Type 2, Type 3, Type 4 finishes, but excluding soffit surfaces.
 - (ii) All surfaces to receive a formwork liner finish shall be formed using an approved permeable formwork liner.
 - (iii) The surfaces shall be patched as specified in this Specification with surfaces below 300 mm below finished grade except underside of footings shall be patched in accordance with the requirements of Sections E18.5.17 “Patching Mortar”, E18.5.13 “Bonding Agents”, and E18.7.12 “Patching of Formed Surfaces” of this Specification.
 - (iv) All surfaces below 300 mm below finish grade shall receive dampproofing in accordance with E18.5.26, “Dampproofing” of this Specification.
- (c) Type 4 Finish – Sidewalk
 - (i) Transverse broomed finish using a coarse broom to produce regular corrugations to a maximum depth of 3 mm.
 - (ii) An edging tool shall be used at all edges, as accepted by the Contract Administrator.
 - (iii) Edges of sidewalk surfaces shall be given a smooth float surface using a magnesium float.

E18.7.9 Surface Defects and Tolerances

- (a) The surface shall be free from open texturing, plucked aggregate and local projections.
- (b) Except across the crown, the surface shall be such that when tested with a 3 metre long straight edge placed anywhere in any direction on the surface, there shall not be a gap greater than 3 mm between the bottom of the straight edge and the surface of the deck anywhere below the straight edge.
- (c) The surface shall be checked by the Contractor, as described above, immediately after final bull floating and before texturing.
- (d) After checking and correcting of screeded surfaces has been completed, the marks in the screeded surfaces caused by the use of the straight edge shall be removed.
- (e) The surface shall again be checked by the Contractor at the end of the curing period in the same manner and to the same tolerance. Areas that do not meet the required surface accuracy shall be clearly marked out and the Contractor shall repair the concrete surface by one of the following methods, at his own expense:
 - (i) Grind down any areas higher than 3 mm but not higher than 10 mm above the correct surface,
 - (ii) Correct any areas lower than 3 mm but not lower than 10 mm below the correct surface, by grinding down the adjacent high areas, or
 - (iii) When the deviation exceeds 10 mm from the correct surface, the deck slab shall be replaced for a length, width and depth that will allow the formation of a new slab, of the required quality, in no way inferior to the adjacent undisturbed slab.

- (f) Grinding shall be carried out by an approved machine, of a type and capacity suitable for the total area of grinding involved, until the surface meets the specified requirements.
- (g) All corrective work will require the Contractor to submit a proposal to the Contract Administrator for review, prior to commencement of any work.
- (h) If the surface is damaged in any way by construction operations, or if the deck concrete shows signs of distress or scaling prior to the final acceptance, it shall be repaired or replaced by the Contractor at his own expense.

E18.7.10 General Curing Requirements

- (a) Refer to E18.7.13, "Cold Weather Concreting" for cold weather curing requirements and E18.7.14, "Hot Weather Concreting" of this Specification for hot weather curing requirements.
- (b) Concrete shall be protected from the harmful effects of sunshine, drying winds, surface dripping, running water, vibration, and mechanical shock. No machinery shall travel in the vicinity of freshly placed concrete for a period of 24 hours. Concrete shall be protected from freezing until at least 24 hours after the end of the curing period.
- (c) Changes in temperature of the concrete shall be uniform and gradual and shall not exceed 3°C in one hour or 20°C in 24 hours.
- (d) Freshly finished concrete shall be moist cured by immediately applying wet curing blankets to the exposed concrete surface immediately following finishing operations for at least seven (7) consecutive days thereafter. Construction joints shall be cured by means of wet curing blankets only. Water shall be applied as necessary to keep the concrete and curing blankets saturated. The Contractor must ensure the concrete and curing blankets are kept saturated with water for the entire seven (7) days.
- (e) Immediately following finishing of the structural deck, approach and transition slab concrete, apply fog misting until the concrete has enough strength to support the placement of the pre-dampened curing blankets. The misting device shall not be used to apply water to the concrete's surface for finishing purposes. The misting device shall not be directed towards the concrete surface. Only a fine coating or sheen should be applied by the misting device. There should be no standing water. Failure to apply wet curing blankets within 40 minutes after the structural deck concrete has been deposited shall be cause for rejecting the Works so affected. Concrete in the rejected area shall be removed and replaced at no additional cost to the City.
- (f) Care shall be exercised to ensure that the polyester curing blanket is well drained and that it is placed as soon as the surface will support it without deformation. The Contractor shall ensure that water from the polyester curing blankets does not run into areas where concrete placement and finishing operations are underway. If this occurs, concrete placement shall stop until the problem is corrected satisfactory to the Contract Administrator. Formed surfaces shall receive, immediately after stripping and patching, the same curing as finished surfaces, with the exception of the Bridge deck overhang surfaces.
- (g) For curing of barriers, formwork shall remain in place for seven (7) consecutive days in accordance with E18.7.11, "Form Removal". The top surface of the concrete surface shall be moist cured during this timeframe in accordance with E26.7.15(e).

E18.7.11 Form Removal

- (a) The Contractor shall notify the Contract Administrator at least one (1) Working Day prior to form removal. The Contractor shall not commence any form removal operations without the prior written acceptance of the Contract Administrator.
- (b) All forms shall remain in place and the concrete shall not be loaded for a minimum of seven (7) days after initial concrete placement, unless otherwise authorized by the Contract Administrator in writing.
- (c) Notwithstanding the above, the minimum strength of in-place concrete prior to removal of vertical forms shall be 70% percent of the 28 day strength, with the added provision that

the member shall be of sufficient strength to safely carry its own weight, together with super-imposed construction loads..

- (d) Field-cured test specimens representative of the cast-in-place concrete being stripped shall be tested as specified in this Specification to verify the concrete strength.

E18.7.12 Patching of Formed Surfaces

- (a) The Contractor shall notify the Contract Administrator at least one (1) Working Day prior to removal of forms. Immediately after forms have been removed and before the Contractor commences any surface finishing or concrete patching operations, all newly exposed concrete surfaces shall be inspected by the Contract Administrator.
- (b) Any repair or surface finishing started before this inspection may be rejected and required to be removed.
- (c) Patching of formed surfaces shall take place within 24 hours of formwork removal.
- (d) All formed concrete surfaces shall have bolts, ties, struts, and all other timber or metal parts not specifically required for construction purposes cut back 75 mm from the surface before patching.
- (e) Minor surface defects caused by honeycomb, air pockets greater than 5 mm in diameter, voids left by strutting, and tie holes shall be repaired by removing the defective concrete to sound concrete, dampening the area to be patched, then applying bonding grout followed by patching mortar. Bonding grout shall be well brushed onto the area immediately prior to patching. When the bonding grout begins to lose the water sheen, the patching mortar shall be thoroughly trowelled into the repair area to fill all voids. It shall be struck off slightly higher than the adjacent concrete surface and left for one hour before final finishing to facilitate initial shrinkage of the patching mortar. It shall be touched up until it is satisfactory to the Contract Administrator. The patch shall be cured as specified in this Specification. The final colour shall match the surrounding concrete.
- (f) Concrete shall be cast against forms which will produce plane surfaces with no bulges, indentations, or protuberances other than those shown on the Drawings. All objectionable fins, projections, offsets, streaks, or other surface imperfections on the concrete surface shall be removed by means acceptable to the Contract Administrator. Cement washes of any kind shall not be used.
- (g) The arrangement of panel joints shall be kept to a minimum. Panels containing worn edges, patches, or other defects which will impair the texture of concrete surfaces shall not be used.

E18.7.13 Cold Weather Concreting

- (a) All concreting operations during cold weather shall be completed in accordance with CAN/CSA-A23.1 "Cold Weather Concreting".
- (b) Heating and hoarding is to remain in place a minimum of 7 days after the moist curing is removed.

E18.7.14 Hot Weather Concreting

- (a) General
 - (i) The requirements of this section shall be applied during hot weather, i.e., air temperatures forecast to go higher than 27°C during placing.
 - (ii) Concrete at discharge shall be at as low a temperature as possible, preferably as low as 15°C, but not above 25°C. Concrete containing silica fume shall be between 10°C minimum and 18°C maximum at discharge. Aggregate stockpiles should be cooled by water sprays and sun shades.
 - (iii) The Contractor shall use cold water and/or ice in the mix to keep the temperature of the fresh concrete down, if required. Ice may be substituted for a portion of the mixing water; provided it has melted by the time mixing is completed.

- (iv) Form and conveying equipment shall be kept as cool as possible before concreting by shading them from the sun, painting their surfaces white and/or the use of water sprays.
 - (v) Sun shades and wind breaks shall be used as required during placing and finishing.
 - (vi) Work shall be planned so that concrete can be placed as quickly as possible to avoid "cold joints".
 - (vii) The Contract Administrator's acceptance is necessary before the Contractor may use admixtures such as retardants to delay setting, or water reducing agents to maintain Workability and strength, and these must appear in the Mix Design Statement submitted to the Contract Administrator.
 - (viii) Hot weather curing shall follow immediately after the finishing operation.
- (b) Hot-Weather Curing
- (i) When the air temperature is at or above 25°C, curing shall be accomplished by fog misting and by using saturated absorptive fabric, in order to achieve cooling by evaporation. Note that fog misting is mandatory for all structural deck and median slab pours at all temperatures.
 - (ii) Mass concrete shall be water cured for the basic curing period when the air temperature is at or above 20°C, in order to minimize the temperature rise of the concrete.
- (c) Job Preparation
- (i) When the air temperature is forecast to rise to 25°C or higher during the placing period, provisions shall be made by the Contractor for protection of the concrete in place from the effects of hot and/or drying weather conditions. Under severe drying conditions, the formwork, reinforcement, and concreting equipment shall be protected from the direct rays of the sun or cooled by mist fogging and evaporation, to the satisfaction of the Contract Administrator.
- (d) Concrete Temperature
- (i) The temperature of the concrete as placed shall be as low as practicable and in no case greater than the following temperatures, as shown in Table E18.2, "Acceptable Concrete Temperatures", for the indicated size of the concrete section.

TABLE E18.2: ACCEPTABLE CONCRETE TEMPERATURES		
THICKNESS OF SECTION	TEMPERATURES °C	
	MINIMUM	MAXIMUM
Less than:		
1.0 m	10	27
1.2 m	5	25

E18.7.15 Cleanup

- (a) The Contractor shall cleanup equipment and construction debris on at least a daily basis to the satisfaction of the Contract Administrator.

E18.8 Concrete Quality

E18.8.1 Inspection

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

- (c) Quality Assurance testing shall be undertaken by the Contract Administrator. Quality Control testing shall be undertaken by the Contractor.

E18.8.2 Access

- (a) The Contractor shall allow the Contract Administrator free access to all parts of the Work at all times. The Contractor shall supply samples to the Contract Administrator or their inspector for testing purposes as required. There will be no charge to the City for samples taken.

E18.8.3 Materials

- (a) All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the Quality Assurance Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City of Winnipeg for any materials taken by the Contract Administrator for testing purposes.
- (b) All materials shall conform to the latest edition and all subsequent revisions of CAN/CSA A23.1.
- (c) All testing of materials shall conform to the latest edition and all subsequent revisions of CAN/CSA A23.2.
- (d) All materials shall be submitted to the Contract Administrator for acceptance at least twenty (20) Business Days prior to its scheduled incorporation into any construction. If, in the opinion of the Contract Administrator, such materials, in whole or in part, do not conform to the Specifications detailed herein or are found to be defective in manufacture or have become damaged in transit, storage, or handling operations, then such material shall be rejected by the Contract Administrator and replaced by the Contractor at their own expense.

E18.8.4 Quality Assurance and Quality Control

- (a) The Contract Administrator shall be afforded full access for the inspection and control and assurance testing of concrete and constituent materials, both at the site of Work and at any plant used for the production of concrete, to determine whether the concrete is being supplied in accordance with this Specification.
- (b) The Contract Administrator reserves the right to reject concrete in the field that does not meet the Specifications.
- (c) The Contractor shall provide, without charge, the samples of concrete and the constituent materials required for Quality Assurance tests and provide such assistance and use of tools and construction equipment as is required.
- (d) Quality Assurance and Control tests will be used to determine the acceptability of the concrete supplied by the Contractor.
- (e) The Contractor will be required to undertake Quality Control tests, of all concrete supplied. All test results are to be copied to the Contract Administrator immediately after the tests have been performed.
- (f) The frequency and number of concrete Quality Control tests shall be in accordance with the requirements of CAN/CSA A23.1. An outline of the quality tests is indicated below.
- (g) Contract Administrator shall undertake cover metre survey of top of bridge deck and inside face of barriers at sidewalk. Concrete areas with cover not within specified tolerances will be rejected.

E18.8.5 Concrete Testing

- (a) Slump tests shall be made in accordance with CSA Standard Test Method A23.2-5C, "Slump of Concrete". If the measured slump falls outside the limits of this Specification, a second test shall be made. In the event of a second failure, the Contract Administrator reserves the right to refuse the use of the batch of concrete represented.
- (b) Air content determinations shall be made in accordance with CSA Standard Test Method A23.2-4C, "Air Content of Plastic Concrete by the Pressure Method". If the measured air content falls outside the limits of this Specification, a second test shall be made at any

time within the specified discharge time limit for the mix. In the event of a second failure, the Contract Administrator reserves the right to reject the batch of concrete represented.

- (c) The air-void system shall be proven satisfactory by data from tests performed in accordance with the latest edition and all subsequent revisions of ASTM Standard Test Method C457. The spacing factor, as determined on concrete cylinders moulded in accordance with CSA Standard Test Method A23.2-3C, shall be determined prior to the start of construction on cylinders of concrete made with the same materials, mix proportions, and mixing procedures as intended for the project. If deemed necessary by the Contract Administrator to further check the air-void system during construction, testing of cylinders may be from concrete as delivered to the job Site and will be carried out by the Contract Administrator. The concrete will be considered to have a satisfactory air-void system when the average of all tests shows a spacing factor not exceeding 230 microns with no single test greater than 260 microns.
- (d) Rapid chloride permeability testing shall be performed in accordance with ASTM C1202 or CAN/CSA A23.2-23C, with testing performed at 56 days for all types of concrete.
- (e) Testing for the post-cracking residual strength index (Ri) of FRC shall be conducted as follows:
- One (1) set of a minimum of five (5) concrete beam specimens, 100 mm by 100 mm by 350 mm long, shall be tested at 7 days in accordance with the latest edition of ASTM C1609.
 - The initial cracking load of the concrete (Pp) and the post cracking residual strength (Pcr), which shall be taken as the average of loads corresponding to deflection values of 0.5 mm, 0.75 mm, 1.0 mm, and 1.25 mm, shall be tabulated for each of the specimens. The Ri for each specimen, which shall be taken as the ratio of Pcr over Pp, shall be tabulated.
 - Tests conducted in accordance to ASTM C1609 will be considered invalid if the initial crack in the specimen has occurred after 0.2 mm deflection.
 - The Ri shall be taken as the average of the Ri's from a minimum of five valid (5) specimens.
 - The Contractor shall submit a report as specified in ASTM C1609, including a summary of the results of all post-cracking residual strength index tests and all load deflection curves.
- (f) Samples of concrete for test specimens shall be taken in accordance with CSA Standard Test Method CSA-A23.2-1C-04, "Sampling Plastic Concrete".
- (g) Test specimens shall be made and cured in accordance with CSA Standard Test Method A23.2-3C, "Making and Curing Concrete Compression and Flexure Test Specimens".
- (h) Compressive strength tests at twenty-eight (28) days shall be the basis for acceptance of all concrete supplied by the Contractor. For each twenty-eight (28) day strength test, the strength of two companion standard-cured test specimens shall be determined in accordance with CSA Standard Test Method A23.2-9C, "Compressive Strength of Cylindrical Concrete Specimens", and the test result shall be the average of the strengths of the two specimens. A compressive strength test at seven (7) days shall be taken, the strength of which will be used only as a preliminary indication of the concrete strength, a strength test being the strength of a single standard cured specimen.
- (i) Compressive strength tests on specimens cured under the same conditions as the concrete Works shall be made to check the strength of the in-place concrete so as to determine if the concrete has reached the minimum allowable working compressive strength as specified in Table E18.1 of this Specification and also to check the adequacy of curing and/or cold weather protection. At least two (2) field-cured test specimens shall be taken to verify strength of the in-place concrete. For each field cured strength test, the strength of field-cured test specimens shall be determined in accordance with CSA Standard Test Method A23.2-9C, "Compressive Strength of Cylindrical Concrete Specimens", and the test result shall be the strength of the specimen.

E18.8.6 Corrective Action

- (a) If the results of the tests indicate that the concrete is not of the specified quality, the Contract Administrator shall have the right to implement additional testing, as required, to further evaluate the concrete, at the Contractor's expense. The Contractor shall, at their own expense, correct such Work or replace such materials found to be defective under this Specification in an acceptable manner to the satisfaction of the Contract Administrator.

E18.9 Measurement and Payment

E18.9.1 Structural concrete will not be measured and will be paid for at the Contract Unit Price for the "Items of Work" listed here below, which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E18.9.2 Items of Work:

- (a) Modification of existing slope paving per square metre.
- (b) Reinforced Concrete 3.0m Pathway with 300-400mm Retaining Curb per lineal metre.
- (c) Reinforced Concrete 3.0m Pathway with 750-850mm Retaining Curb per lineal metre.
- (d) Reinforced Concrete 3.0m Pathway with varying height from 850mm transitioning to 200mm Retaining Curb per lineal metre.

E19. NATURALIZED LANDSCAPING

E19.1 This specification shall cover sub-grade preparation and the supply and placement of seed at locations designated for naturalized area seeding.

E19.2 References

E19.2.1 City of Winnipeg Standard Construction Specifications:

- (a) CW 3520 – Seeding
- (b) CW 3540 – Topsoil and Finish Grading for Establishment of Turf Areas

E19.3 Submittals

E19.3.1 Submit product data for:

- (a) For each type of seed mix provide the following:
 - (i) % of pure seed by weight.
 - (ii) % of germination or % of pure live seed.
 - (iii) Year of seed production
 - (iv) Seed Tags Stating:
 - ◆ Date when tagged,
 - ◆ Location,
 - ◆ Weight,
 - ◆ Name and address of distributor, and
- (b) Fertilizer.

E19.4 Materials

E19.4.1 Topsoil: refer to planting Medium & Finished Grading Specification.

E19.4.2 Naturalized Seed Mix:

Medium Height Mix

Common name	Scientific name	Percentage by weight
slender wheatgrass	<i>Elymus trachycaulus</i>	15.00%
western wheat grass	<i>Pascoyrum smithii</i>	10.00%
green needle grass	<i>Stipa viridula</i>	15.00%
side oats gramma	<i>Bouteloua curtipendula</i>	25.00%
Blue gramma	<i>Bouteloua gracilis</i>	5.00%
little bluestem	<i>Schizachyrium scoparium</i>	20.00%
purple prairie clover	<i>Dalea purpureum</i>	5.00%
white prairie clover	<i>Dalea candida</i>	5.00%

E19.5 Equipment

E19.5.1 Scarification equipment shall be suitable for the area being scarified, shall be capable of scarifying the sub-grade to the specified depth and shall be accepted by the Contract Administrator. For confined areas a toothed bucket may be acceptable. For larger areas tilling equipment may be required.

E19.6 Construction Method

E19.6.1 Preparation of Existing Grade

- (a) Prior to placing topsoil, in areas to be seeded greater in width than 600mm, prepare the existing sub-grade by scarifying to a minimum depth of 75mm and to a maximum depth of 100mm to the satisfaction of the Contract Administrator.
- (b) Scarification shall consist of breaking up and loosening the sub-grade. No scarification shall occur within the edge of a tree canopy (or drip line).

E19.6.2 Placement of Planting Medium

- (a) Depth and placement of planting medium in accordance with Planting Medium Specification.

E19.7 Maintenance

E19.7.1 Commencement of maintenance period per CW 3520.

E19.7.2 Maintenance of seeded area per CW 3520.

E19.7.3 Spring clean-up per CW 3520.

E19.7.4 Termination of maintenance period per CW 3520.

E19.8 Site Clean-Up

E19.8.1 Per CW 3520.

E19.9 Measurement and Payment

E19.9.1 Supply, placement and maintenance of Naturalized Seed Mixes will be paid for at the Contract Unit Price per square metre for the Items of Work listed below, measured as specified herein, which price shall be payment in full for supplying all materials and for completing all operations herein described and all other items incidental to the work included in this Specification and accepted and measured by the Contract Administrator.

E19.9.2 Items of Work:

- (a) Naturalized Landscaping

E19.9.3 Payment for Naturalized Landscaping shall be in accordance with the following:

- (a) Sixty five percent (65%) of quantity following supply and placement.

- (b) Remaining thirty five percent (35%) of quantity following termination of maintenance period.

E20. TRAFFIC SIGNAL INSTALL MATERIALS

E20.1 In addition to CW 3620 3.11.12, Joining of conduit will not be allowed except:

- (a) Where joining of conduit is required for Convenience of Road Construction Sequencing with a maximum of one (1) joint per conduit.

E20.2 In place of CW 3620 3.11.13, Joining of conduit shall use an approved oversize coupler to connect nominal size 1.5" or 2" LDPE pipe, IPEX Series 75, installation to follow manufacture's recommendations.

(a) Approved Products:

- (i) Plasson Universal Slip Repair Coupler 60-64, Product Code: 176100060064 for use with nominal 2" LDPE.
- (ii) Plasson Universal Slip Repair Coupler 48-51, Product Code: 176100048051 for use with nominal 1.5" LDPE.

(b) Substitutes will not be allowed except:

- (i) Where application has been made to and approval has been provided by Traffic Signals. The Contractor shall provide sufficient information and details to enable the Traffic Signals to determine acceptability.

E20.3 As per CW 3620 4.11.5, No measurement or payment shall be made for Joining of Conduit.

E20.4 Removal of CW 3620 2.10.1 (b) Conduit coupling pipe and gear clamps.

E21. TRAFFIC SIGNALS SERVICE BOX PRE-CAST

E21.1 Description

- (a) This specification covers the use and installation of a service box pre-cast 17" x 30" x 18" and 13" x 24" x 18".

E21.2 Materials

- (a) Materials shall be as per section 2 of CW 3620.

E21.3 Construction Method

- (a) Install Pre-Cast Service Box in grass boulevards/medians, and hard surfaced medians or as shown on the Drawings or as directed by the Contract Administrator.
- (b) Fill bottom of excavation with compacted limestone base course material to set precast service box to grade.
- (c) Install Pre-Cast Service Box on top of the compacted granular fill material to pavement, sidewalk or boulevard finish grade.
- (d) All conduits must be bundled into a group in the centre of the Pre-Cast Service Box. Install plastic plugs prior to back fill.

- (e) Backfill around Pre-Cast Service Box exterior. Back fill shall conform to requirements of SD-342.
- (f) Pre-Cast Service box shall meet the grade of the sidewalk or boulevard given provided by Contract Administrator.

E22. INSTALLATION OF EARLY OPEN TRAFFIC SIGNALS CONCRETE BASES

E22.1 Description

- (a) This specification shall cover the installation of Early Open Concrete Bases.

E22.2 Materials

- (a) Supply concrete for bases in accordance with CW 2160, Table CW 2160.1 Design Requirements for Concrete Used for Underground Structures, for Type A Structures (monolithic sewers and reinforced structures).
- (b) Further to E22.2(a), the supplied concrete shall achieve a minimum compressive strength of 22 MPa at 48 hours.

E22.3 Construction Methods

- (a) Construction Methods for the installation of Early Open Concrete Bases shall be as per Section 3.7 of CW 3620.

E23. INSTALLATION OF PRE-CAST TYPE PM TRAFFIC SIGNALS BASES

E23.1 Pre-cast Type PM concrete bases shall be supplied by The Contractor including anchor bolts.

E23.2 Fabrication and installation shall be in accordance with SD-315.A.

E24. ANCHOR BOLT PROJECTIONS FOR TRAFFIC SIGNALS CONCRETE BASES

E24.1 Further to Section 3.7 of CW 3620 Concrete Bases Type A, Type G, Type OD and Type J Bases shall have an anchor bolt projection as specified below:

- (a) The following bolt projections shall override what has been specified on SD-310, SD-313 and SD-314.

Concrete Base Type	Anchor Bolt Projection (mm)	Tolerance (mm)
Type A	76.0	(71.0 – 76.0)
Type G	89.0	(84.0 – 89.0)
Type OD	50.8	(45.8 – 50.8)
Type J	150.0	(145.0 – 150.0)

E25. INSTALLATION OF STREET LIGHTING AND ASSOCIATED WORKS

E25.1 DEFINITIONS

- E25.1.1 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.
- E25.1.2 MANITOBA HYDRO CENTRAL STORES means Manitoba Hydro's Waverley Service and Reclaim Centre - 1840 Chevrier Blvd - Winnipeg, Manitoba
- E25.1.3 OVERHEAD FEED means an electrical supply via an overhead conductor connected between streetlight standards. Typically strung between standards on a temporary basis.
- E25.1.4 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.)
- E25.1.5 RECLAIM material means existing material that has been removed from Manitoba Hydro's system and to be returned to Manitoba Hydro.
- E25.1.6 SCRAP material means existing material that has been removed from Manitoba Hydro's system and to be recycled/disposed of by the Contractor.
- E25.1.7 SURPLUS material means new material that has been requisitioned by the Contractor and not incorporated into the work at the end of the Contract.
- E25.1.8 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).

E25.2 DESCRIPTION

- E25.2.1 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.

E25.3 WORK LOCATIONS

- E25.3.1 The proposed street light installation and removals are shown on construction drawings and are as follows:

(a) Keewatin Street – Gallagher Avenue West to Burrows Avenue

E25.4 COORDINATION OF WORK

- E25.4.1 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.
- E25.4.2 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.
- E25.4.3 Manitoba Hydro's CSC will provide the Limits of Approach applicable to the Contractor on the Work Clearance form.

E25.5 ORIENTATION

- E25.5.1 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.

E25.6 PRE-CONSTRUCTION MEETING

E25.6.1 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.

E25.6.2 The Contractor's cost to attend this pre-construction meeting shall be incorporated into the unit prices for the work.

E25.7 QUALIFICATIONS AND CERTIFICATION

E25.7.1 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.

E25.7.2 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.

E25.7.3 Office of the Fire Commissioner Bulletin OFC 18 – 002 dated May 23, 2018 regarding Electrician Licenses discusses the requirements for a "Limited Specialized Trade Licence – 'M-P' Licence – Power Line".

For more information contact:
Office of the Fire Commissioner
500-401 York Avenue
Winnipeg, Manitoba R3C 0P8
Tel. 204-945-3373
Fax 204-948-2089
Toll Free: 1-800-282-8069
firecomm@gov.mb.ca

E25.7.4 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.

E25.7.5 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.

E25.8 REFERENCED STANDARD CONSTRUCTION SPECIFICATIONS

E25.8.1 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")

E25.8.2 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.

E25.8.3 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.

E25.9 TOOLS, EQUIPMENT AND MATERIALS

E25.9.1 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.

E25.9.2 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

E25.9.3 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.

E25.9.4 Alternative equipment manufacturers may be considered upon request by the Contractor and shall be approved for use by Manitoba Hydro prior to use.

E25.9.5 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.

E25.10 MATERIAL SUPPLIED BY MANITOBA HYDRO

E25.10.1 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:

E25.10.2 Manitoba Hydro Central Stores (contact personnel will be provided to the successful contractor).

E25.10.3 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.

E25.10.4 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.

E25.10.5 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.

E25.11 MATERIAL SUPPLIED BY CONTRACTOR

E25.11.1 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.

E25.12 SURPLUS, RECLAIM AND SCRAP MATERIAL

E25.12.1 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.

E25.12.2 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.

E25.12.3 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.

E25.13 DE-ENERGIZATION AND LOCKOUT

E25.13.1 **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.

E25.13.2 **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.

E25.13.3 The Contractor shall complete a job planning form on a daily basis before any work commences and provide Manitoba Hydro with copies of the job plans if requested.

E25.14 TEMPORARY OVERHEAD FEEDS

E25.14.1 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.

E25.14.2 When using the existing poles for temporary lighting, Manitoba Hydro shall remove an Overhead Source in accordance with DE-ENERGIZATION AND LOCKOUT section 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.

E25.14.3 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.

E25.14.4 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.

E25.15 SAFE EXCAVATION

E25.15.1 The work shall be performed in accordance with the requirements of Manitoba Hydro's Safe Excavation and Safety Watch Guidelines (latest revision) included as Appendix B and Manitoba Workplace Safety and Health Regulation 217 latest revision.

E25.16 SAFE HANDLING

E25.16.1 The Contractor shall apply handling techniques in accordance with Manitoba Workplace Health and Safety Regulation 217 (latest revision).

E25.17 ELECTRIC CABLES AND CONDUITS

- (a) 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.
- (b) 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.

- (c) 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.
- (d) The Contractor shall provide Manitoba Hydro's inspector sufficient opportunity, in the sole discretion of Manitoba Hydro, to inspect the work.

E25.18 PRECAST CONCRETE BASES

E25.18.1 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.

E25.18.2 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.

E25.19 STREET LIGHT POLES AND ARMS

E25.19.1 The Contractor shall handle, store, transport, and provide proper load securement for the poles and arms in a manner to prevent damage.

E25.20 LUMINAIRES

E25.20.1 The Contractor shall handle, store, transport and unload the luminaires in their original packaging and in a manner to prevent damage.

E25.21 SMALL MATERIAL

E25.21.1 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.

E25.22 CARE OF MATERIALS

E25.22.1 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.

E25.23 WIRE AND CABLE REEL STORAGE

E25.23.1 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.

E25.23.2 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.

E25.24 REEL HANDLING

E25.24.1 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.

E25.24.2 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.

E25.24.3 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.

E25.24.4 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.

E25.25 PRESSURIZED WATER/VACUUM EXCAVATION

E25.25.1 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.

E25.25.2 The work shall be performed in accordance with the requirements of Manitoba Hydro's Safe Excavation and Safety Watch Guidelines (latest revision) included as Appendix B.

E25.26 REMOVAL STREET LIGHT POLE FROM EXISTING BASE

E25.26.1 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.

E25.26.2 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.

E25.26.3 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.

E25.27 REMOVAL OF BASE AND DIRECT BURIED STREET LIGHT POLE

E25.27.1 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.

E25.27.2 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.

E25.27.3 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.

E25.28 INSTALLATION OF FOUNDATION - CONCRETE BASE

E25.28.1 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.

E25.28.2 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.

- E25.28.3 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.
- E25.28.4 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.
- E25.28.5 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.
- E25.28.6 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.
- E25.29 BASE MOUNTED STREET LIGHT POLES**
- E25.29.1 This shall include all work required to install the street light pole on the concrete base as set forth in this Specification.
- E25.29.2 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.
- E25.29.3 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.
- E25.29.4 The Contractor shall level the street light pole in all 4 directions. Leveling shims may be used.
- E25.29.5 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.
- E25.29.6 Unless otherwise specified, excess underground cable and 2C-12 wire shall be left inside the hand hole with the hand hole cover loosely installed.
- E25.29.7 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.
- E25.30 LUMINAIRES AND ASSOCIATED WIRING**
- E25.30.1 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.
- E25.30.2 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.

E25.30.3 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.

E25.31 BREAK AWAY BASES

E25.31.1 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.

E25.31.2 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.

E25.32 SPLICING/CONNECTING CABLES

E25.32.1 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.

E25.32.2 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).

E25.33 EXCAVATION

E25.33.1 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.

E25.33.2 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.

E25.34 LAYING CABLES

E25.34.1 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.

E25.34.2 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.

E25.34.3 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.

E25.34.4 During installation, under no circumstance is the cable to be subjected to a bending radius tighter than that detailed in the Standards.

E25.34.5 Where specified in the Standards or on the construction drawings, the Contractor shall install the street light cable in a conduit.

E25.35 INSTALLING CONDUIT AND CABLE BY BORING (HORIZONTAL DIRECTIONAL DRILLING)

E25.35.1 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 kellum grip in a manner so as to guard against damage.

E25.35.2 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 (latest revision) included as Appendix B. Maximum pulling tensions on any streetlight cable shall be limited to 2.9 kN/0.65 kips.

E25.35.3 Drilling fluids and associated waste materials shall be disposed of in a manner that minimizes environmental effects.

E25.35.4 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.

E25.36 BURIED UTILITY CROSSINGS

E25.36.1 All buried obstructions are not necessarily shown on the reference drawings and the locations of those indicated are approximate only.

E25.36.2 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 (latest revision) included as Appendix B shall be followed when crossing natural gas pipelines and electrical cables by the directional boring method.

E25.36.3 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.

E25.36.4 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.

E25.37 BENDING CABLES/CONDUITS AND INSTALLATION INTO STANDARDS

- E25.37.1 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.
- E25.37.2 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 exits the conduit. The conduit shall only be installed into the concrete base if conduit sizes make it practicable.
- E25.37.3 Unless otherwise directed, excess underground cable and 2C-12 wire shall be left inside the hand hole with the hand hole cover loosely installed.

E25.38 BACKFILL

- E25.38.1 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.
- E25.38.2 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.
- E25.38.3 Excavations remaining where poles have been removed shall be backfilled with spoil, pit run gravel or ¾" 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.
- E25.38.4 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.
- E25.38.5 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.

E25.39 DEFECTIVE WORK & WARRANTY

- E25.39.1 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.

E25.39.2 At the completion of the work for each location, Manitoba Hydro shall prepare and issue a Network Commissioning Report, to the Contractor. The Network Commissioning Report shall be dated indicating the commencement of the Warranty period for the work performed at the location.

E25.40 AS-BUILT DRAWING

E25.40.1 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.

E25.41 MEASUREMENT AND PAYMENT

E25.41.1 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.

E25.41.2 Removal of 45' 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 45' 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.

E25.41.3 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.

E25.41.4 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.
- E25.41.5 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.
- E25.41.6 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.
- E25.41.7 Installation of 45' 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 45' 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.
- E25.41.8 Installation of One (1) 10' Ground Rod at Every Third Street Light, at the End of a Street Light Circuit or Anywhere Else as Shown on the Design Drawings. 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 every third street light, at the end of a street light circuit or anywhere else as shown on the design drawings. 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.

- E25.41.9 Installation of 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.
- E25.41.10 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.
- E25.41.11 Termination of 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.
- E25.41.12 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.
- E25.41.13 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.
- E25.41.14 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.
- E25.41.15 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.
- E25.41.16 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.
- E25.41.17 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.

E26. WORK WITHIN CPKC RAIL RIGHT-OF-WAY

DESCRIPTION

- E26.1 This specification shall cover the requirements for work within CPKC Right-of-Way.

REQUIREMENTS

- E26.2 The Contractor shall be responsible to meet and adhere to all CPKC constraints, requirements, submittals, and safety measures.
- E26.3 The Contractor is expected to schedule work to minimize the need for flagging and CPKC inspection.

E26.4 The Contractor is required to install and maintain a 3.05m Height Chain Link Fence in coordination with CPKC and the Contract Administrator to provide right-of-way access control during work within CPKC right-of-way. Location and exact fencing requirements to be confirmed with CPKC as part of commencement submittals outlined in D19.

E26.5 Requirements for work on CPKC property is contained in Appendix 'B'.

MEASUREMENT AND PAYMENT

E26.6 There will be no measurement or payment associated with additional or modified work requirements for work associated with this specification with exception of the installation, maintenance and removal of the Chain Link Fence which will not be measured and will be paid for at the Contract Unit Price for "Install and Remove 3.05m Height Chain Link Fence along CPKC Right-of-Way". Payment shall be in accordance with the following:

E26.6.1 Fifty percent (50%) of Unit Price following supply and placement.

E26.6.2 Remaining fifty percent (50%) following the removal of all materials and restoration of the site as directed by the Contract Administrator.