



**THE CITY OF WINNIPEG**

# **TENDER**

**TENDER NO. 8-2019**

**2019/2020 REGIONAL STREET RENEWAL PROGRAM- FERMOR AVENUE FROM  
LAGIMODIERE BOULEVARD TO PLESSIS ROAD (CITY BOUNDARY), ASPHALT  
RECONSTRUCTION**

## TABLE OF CONTENTS

### PART A - BID SUBMISSION

Form A: Bid	1
Form B: Prices	4
Form G1: Bid Bond and Agreement to Bond	34

### PART B - BIDDING PROCEDURES

B1. Contract Title	1
B2. Submission Deadline	1
B3. Enquiries	1
B4. Confidentiality	1
B5. Addenda	1
B6. Substitutes	2
B7. Bid Components	3
B8. Bid	3
B9. Prices	4
B10. Disclosure	5
B11. Conflict of Interest and Good Faith	5
B12. Qualification	6
B13. Bid Security	7
B14. Opening of Bids and Release of Information	7
B15. Irrevocable Bid	8
B16. Withdrawal of Bids	8
B17. Evaluation of Bids	9
B18. Award of Contract	9

### PART C - GENERAL CONDITIONS

C0. General Conditions	1
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### PART D - SUPPLEMENTAL CONDITIONS

#### General

D1. General Conditions	1
D2. Scope of Work	1
D3. Contract Administrator	3
D4. Contractor's Supervisor	3
D5. Ownership of Information, Confidentiality and Non Disclosure	3
D6. Notices	4
D7. Furnishing of Documents	4

#### Submissions

D8. Authority to Carry on Business	4
D9. Safe Work Plan	5
D10. Insurance	5
D11. Contract Security	6
D12. Subcontractor List	6
D13. Equipment List	6
D14. Detailed Work Schedule	7

#### Schedule of Work

D15. Commencement	7
D16. Working Days	8
D17. Restricted Work Hours	8
D18. Work By Others	8
D19. Sequence of Work	8
D20. Critical Stages	9
D21. Substantial Performance	9
D22. Total Performance	9

D23. Liquidated Damages	10
D24. Scheduled Maintenance	10
<b>Control of Work</b>	
D25. Job Meetings	10
D26. Prime Contractor – The Workplace Safety and Health Act (Manitoba)	10
D27. The Workplace Safety and Health Act (Manitoba) – Qualifications	10
<b>Measurement and Payment</b>	
D28. Payment	11
<b>Warranty</b>	
D29. Warranty	11
<b>Third Party Agreements</b>	
D30. Funding and/or Contribution Agreement Obligations	11
Form H1: Performance Bond	13
Form H2: Labour and Material Payment Bond	15
Form J: Subcontractor List	17
Form K: Equipment	19

## **PART E - SPECIFICATIONS**

<b>General</b>	
E1. Applicable Specifications and Drawings	1
E2. Geotechnical Report	4
E3. Office Facilities	4
E4. Protection Of Existing Trees	5
E5. Traffic Control	5
E6. Traffic Management	6
E7. Water Obtained From the City	7
E8. Surface Restorations	7
E9. Infrastructure Signs	7
E10. Miscellaneous Removals	7
E11. Imported Fill Material	8
E12. Sub-Grade, Sub-Base and Base Course Construction, Supply and Installation of Geotextile Fabrics and Geogrid	9
E13. Hydro-Excavation	9
E14. Installation of Interlocking Paving Stones	10
E15. French Drains	11
E16. Concrete Median Barrier	12
E17. Concrete Curbs, Curb and Gutter, and Splash Strips	13
E18. Temporary Asphalt Curb	14
E19. Ditch Inlet Grate	14
E20. Installation of Culverts	15
E21. Land Drainage Sewers	17
E22. Installation of Straw Wattles	18
E23. Tree Removal	19
E24. Salt Tolerant Grass Seeding	20
E25. Cast-in-Place Concrete Pile Foundations for Steel Overhead Sign Support Structures	21
E26. Supply and Installation of New Steel Overhead Sign Support Structures	30
E27. Traffic Management For Overhead Sign Support Structures Installation	38
E28. Supply of Reflective Guide Sign Panels	39
E29. Temporary East End Crossovers	46
E30. Crash Attenuation Barriers	47
E31. Operating Constraints For Work In Close Proximity To The Branch 1 Branch 2 Interconnection Pipe	49
E32. Installation of Street Lighting and Associated Works	51

- APPENDIX 'A' – Geotechnical Report**
- APPENDIX 'B' – Manitoba Hydro Gas Requirements**
- APPENDIX 'C' – Crash Attenuation Barriers**
- APPENDIX 'D' – OHSS Clip and Bolt Details**
- APPENDIX 'E' – Revised Standard Construction Specifications**
- APPENDIX 'F' – Manitoba Hydro Street Lighting Standards**
- APPENDIX 'G' – Safe Excavation & Safety Watch Guidelines**
- APPENDIX 'H' – Gelcap**
- APPENDIX 'I' – Electric and/ or Natural Gas Facilities Locate**
- APPENDIX 'J' – Manitoba Hydro Job Plan**

## **PART B - BIDDING PROCEDURES**

### **B1. CONTRACT TITLE**

- B1.1 2019/2020 Regional Street Renewal Program- Fermor Avenue From Lagimodiere Boulevard to Plessis Road (City Boundary), Asphalt Reconstruction

### **B2. SUBMISSION DEADLINE**

- B2.1 The Submission Deadline is 12:00 noon Winnipeg time, April 26, 2019.
- B2.2 Bids determined by the Manager of Materials to have been received later than the Submission Deadline will not be accepted and will be returned upon request.
- B2.3 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

### **B3. ENQUIRIES**

- B3.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.
- B3.2 If the Bidder finds errors, discrepancies or omissions in the Tender, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.
- B3.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Tender will be provided by the Contract Administrator to all Bidders by issuing an addendum.
- B3.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Tender will be provided by the Contract Administrator only to the Bidder who made the enquiry.
- B3.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B3 unless that response or interpretation is provided by the Contract Administrator in writing.

### **B4. CONFIDENTIALITY**

- B4.1 Information provided to a Bidder by the City or acquired by a Bidder by way of further enquiries or through investigation is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator. The use and disclosure of the confidential information shall not apply to information which:
- (a) was known to the Bidder before receipt hereof; or
  - (b) becomes publicly known other than through the Bidder; or
  - (c) is disclosed pursuant to the requirements of a governmental authority or judicial order.
- B4.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Tender to the media or any member of the public without the prior written authorization of the Contract Administrator.

### **B5. ADDENDA**

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

- B5.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.
- B5.3 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/bidopp.asp>
- B5.4 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B5.5 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.
- B5.6 Notwithstanding B3, enquiries related to an Addendum may be directed to the Contract Administrator indicated in D3.

**B6. SUBSTITUTES**

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

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

## **B7. BID COMPONENTS**

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

## **B8. BID**

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

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

## **B9. PRICES**

- B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.
- B9.1.1 Prices stated on Form B: Prices shall not include any costs which may be incurred by the Contractor with respect to any applicable funding agreement obligations as outlined in D30. Any such costs shall be determined in accordance with D30.
- B9.1.2 For the convenience of Bidders, and pursuant to B7.4.2 and B17.4.2, an electronic spreadsheet Form B: Prices in Microsoft Excel (.xls) format is available along with the Adobe PDF documents for this Tender on the Bid Opportunities page at the Materials Management Division website at <http://www.winnipeg.ca/matmgt/>
- B9.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.
- B9.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.
- B9.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).



B9.5 Form B: Prices is organized into Parts: Part 1 of the Work and Part 2 of the Work. Bidders shall provide a total price for each Part and, on the summary sheet, a Total Bid Price consisting of the sum of prices for Part 1 and Part 2.

## **B10. DISCLOSURE**

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

B10.2 The Persons are:

- (a) The following Contractors were consulted during Preliminary Design regarding potential material pricing for budgetary use: Maple Leaf Construction Ltd., Bayview Construction Ltd., Bituminex Paving Ltd., Borland Construction Inc., and Nelson River Construction Inc.

## **B11. CONFLICT OF INTEREST AND GOOD FAITH**

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

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

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

that could or would be seen to:

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

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

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

B11.4 Without limiting B11.3, the City may, in its sole discretion, waive any and all perceived, potential or actual Conflicts of Interest. The City's waiver may be based upon such terms and conditions

as the City, in its sole discretion, requires to satisfy itself that the Conflict of Interest has been appropriately avoided or mitigated, including requiring the Bidder to put into place such policies, procedures, measures and other safeguards as may be required by and be acceptable to the City, in its sole discretion, to avoid or mitigate the impact of such Conflict of Interest.

- B11.5 Without limiting B11.3, and in addition to all contractual or other rights or rights at law or in equity or legislation that may be available to the City, the City may, in its sole discretion:
- (a) disqualify a Bidder that fails to disclose a perceived, potential or actual Conflict of Interest of the Bidder or any of its employees proposed for the Work;
  - (b) require the removal or replacement of any employees proposed for the Work that has a perceived, actual or potential Conflict of Interest that the City, in its sole discretion, determines cannot be avoided or mitigated;
  - (c) disqualify a Bidder or employees proposed for the Work that fails to comply with any requirements prescribed by the City pursuant to B11.4 to avoid or mitigate a Conflict of Interest; and
  - (d) disqualify a Bidder if the Bidder, or one of its employees proposed for the Work, has a perceived, potential or actual Conflict of Interest that, in the City's sole discretion, cannot be avoided or mitigated, or otherwise resolved.
- B11.6 The final determination of whether a perceived, potential or actual Conflict of Interest exists shall be made by the City, in its sole discretion.

## **B12. QUALIFICATION**

- B12.1 The Bidder shall:
- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba; and
  - (b) be financially capable of carrying out the terms of the Contract; and
  - (c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.
- B12.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:
- (a) be responsible and not be suspended, debarred or in default of any obligations to the City. A list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/debar.stm>
- B12.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:
- (a) have successfully carried out work similar in nature, scope and value to the Work; and
  - (b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and
  - (c) have a written workplace safety and health program if required pursuant to The Workplace Safety and Health Act (Manitoba);
- B12.4 Further to B12.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:
- (a) Written confirmation of a safety and health certification meeting SAFE Work Manitoba's SAFE Work Certified Standard (e.g., COR™ and SECOR™) in the form of:

- (i) a copy of their valid Manitoba COR certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Certificate of Recognition (COR) Program administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or
  - (ii) a copy of their valid Manitoba SECOR™ certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Small Employer Certificate of Recognition Program (SECOR™) administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or
- (b) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>).

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

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

### **B13. BID SECURITY**

B13.1 The Bidder shall provide bid security in the form of a bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in the form included in the Bid Submission (Form G1: Bid Bond and Agreement to Bond).

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

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

B13.1.3 The Bidder shall sign the Bid Bond.

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

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

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

### **B14. OPENING OF BIDS AND RELEASE OF INFORMATION**

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

B14.1.1 Bidders or their representatives may attend.

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

B14.2 Following the submission deadline, the names of the Bidders and their Total Bid Prices (unevaluated, and pending review and verification of conformance with requirements) will be

available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>

- B14.3 After award of Contract, the name(s) of the successful Bidder(s), their address(es) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>
- B14.4 The Bidder is advised that any information contained in any Bid may be released if required by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law or by City policy or procedures (which may include access by members of City Council).
- B14.4.1 To the extent permitted, the City shall treat as confidential information, those aspects of a Bid Submission identified by the Bidder as such in accordance with and by reference to Part 2, Section 17 or Section 18 or Section 26 of The Freedom of Information and Protection of Privacy Act (Manitoba), as amended.

**B15. IRREVOCABLE BID**

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

**B16. WITHDRAWAL OF BIDS**

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

## **B17. EVALUATION OF BIDS**

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

- (a) compliance by the Bidder with the requirements of the Tender, or acceptable deviation therefrom (pass/fail);
- (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B12 (pass/fail);
- (c) Total Bid Price;
- (d) economic analysis of any approved alternative pursuant to B6.

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

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

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

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

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

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

## **B18. AWARD OF CONTRACT**

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

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

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

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

B18.3 The Work of this Contract is contingent upon Council approval of sufficient funding in the 2019 Capital Budget. If the Capital Budget approved by Council does not include sufficient funding for the Work, the City will have no obligation to award a Contract.

- B18.4 If funding for the Work is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, Bidders are advised that the terms of D30 shall immediately take effect upon confirmation of such funding, regardless of when funding is confirmed.
- B18.5 Where an award of Contract is made by the City, the award shall be made to the qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B17.
- B18.5.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his/her Bid upon written request to the Contract Administrator.
- B18.5.2 As noted in D2 and identified in Form B: Prices, the Work of Part 2 will be contingent upon Manitoba Hydro approving funding for the Work. If sufficient funding for Part 2 Work is not approved by Manitoba Hydro the City shall have the right to eliminate all or any portion of Part 2 Work in accordance with D2.

## **PART C - GENERAL CONDITIONS**

### **C0. GENERAL CONDITIONS**

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

## **PART D - SUPPLEMENTAL CONDITIONS**

### **GENERAL**

#### **D1. GENERAL CONDITIONS**

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

#### **D2. SCOPE OF WORK**

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

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

##### **Part 1 – City Funded Work**

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

- (a) Asphalt Reconstruction
  - (i) Fermor Avenue Eastbound from Lagimodiere Boulevard to Plessis Road (City Boundary) in 2019;
  - (ii) Fermor Avenue Westbound from Plessis Road (City Boundary) to Lagimodiere Boulevard in 2020.
- (b) Asphalt Widening and Rehabilitation
  - (i) Fermor Avenue Eastbound from west of Lagimodiere Boulevard to Lagimodiere Boulevard in 2019.
- (c) Concrete Construction
  - (i) Royal Mint Drive from Dawson Road South to Fermor Avenue.
- (d) Asphalt Path Construction
  - (i) South of Fermor Avenue from Lagimodiere Boulevard to Royal Mint Drive.

##### **Part 2 – Manitoba Hydro Funded Work**

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

- (a) Streetlighting Preparation Work
  - (i) Fermor Avenue Eastbound from Lagimodiere Boulevard to Plessis Road (City Boundary) in 2019;
  - (ii) Fermor Avenue Westbound from Plessis Road (City Boundary) to Lagimodiere Boulevard in 2020.

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

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

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

D2.4.3 If all or any portion of Part 2 is eliminated pursuant to D2.4.1, the time periods stipulated in D21 for Substantial Performance of the Work and in D22 for Total Performance of the Work will be reduced proportionally by the Contract Administrator acting reasonably.



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

- (a) Asphalt Reconstruction
  - (i) Removal of Existing Pavement;
  - (ii) Excavation;
  - (iii) Installation of culverts, land drainage sewer, catch basins and sewer service pipe;
  - (iv) Placement and compaction of imported fill;
  - (v) Compaction of sub-grade;
  - (vi) Placement of geotextile fabric and geogrid;
  - (vii) Placement of sub-base and base course materials;
  - (viii) Adjustment of existing manholes and appurtenances;
  - (ix) Construct French drains;
  - (x) Construct concrete median barrier and crash attenuation barrier;
  - (xi) Construction of 120 mm mountable curb and gutter with splash strip;
  - (xii) Placement of Asphalt Pavement (Type 1A thickness 60 mm (1 lift), Type III thickness 140 mm (2 lifts));
  - (xiii) Supply and installation of overhead sign structure, sign panels and crash attenuation barriers;
  - (xiv) Boulevard restoration.
- (b) Asphalt Widening and Rehabilitation
  - (i) Excavation and placement of suitable site fill;
  - (ii) Planing of existing asphalt overlay;
  - (iii) Installation of catch basins and sewer service pipe;
  - (iv) Compaction of sub-grade;
  - (v) Placement of geotextile fabric and geogrid;
  - (vi) Placement of sub-base and base course materials;
  - (vii) Adjustment of existing manholes and appurtenances;
  - (viii) Construct French drains;
  - (ix) Construction of 150 mm ht monolithic concrete splash strip;
  - (x) Construction of 150 mm ht barrier curb and curb and gutter;
  - (xi) Construction of concrete median slab;
  - (xii) Placement of Asphalt Pavement (Type 1A thickness 60 mm (1 lift), Type III thickness 140 mm (2 lifts));
  - (xiii) Placement of Asphalt Overlay (Type 1A thickness 50 mm (1 lift));
  - (xiv) Supply and installation of overhead sign structure, sign panels and crash attenuation barriers;
  - (xv) Regrade existing ditch;
  - (xvi) Boulevard restoration.
- (c) Concrete Construction
  - (i) Excavation;
  - (ii) Installation of culverts, land drainage sewer, catch basins and sewer service pipe;
  - (iii) Placement and compaction of imported fill;
  - (iv) Compaction of sub-grade;
  - (v) Placement of geotextile fabric and geogrid;
  - (vi) Placement of sub-base and base course materials;
  - (vii) Adjustment of existing manholes and appurtenances;
  - (viii) Construction of 200 mm reinforced concrete pavement (utilizing slip form paving equipment wherever possible);
  - (ix) Construction of safety median;

- (x) Construction of 180 mm integral barrier curb;
  - (xi) Supply and installation of overhead sign structure;
  - (xii) Boulevard restoration.
- (d) Asphalt Path Construction
- (i) Excavation;
  - (ii) Placement of suitable site fill material;
  - (iii) Compaction of sub-grade;
  - (iv) Placement of geotextile fabric;
  - (v) Placement of sub-base and base course materials;
  - (vi) Placement of asphalt pavement (Type 1A thickness 100 mm (2lifts));
  - (vii) Boulevard restoration.
- (e) Streetlighting Preparation Work
- (i) Remove existing streetlight bases;
  - (ii) Install new streetlight bases;
  - (iii) Install streetlight conduit;
  - (iv) Install ground rods.

### **D3. CONTRACT ADMINISTRATOR**

D3.1 The Contract Administrator is Morrison Hershfield Ltd., represented by:

Ron Bruce, P.Eng.  
Senior Project Manager

Telephone No. 204 977-8370

Email Address rbruce@morrisonhershfield.com

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

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

### **D4. CONTRACTOR'S SUPERVISOR**

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

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

### **D5. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE**

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

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

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

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

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

## **D6. NOTICES**

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

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

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

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

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

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

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

## **D7. FURNISHING OF DOCUMENTS**

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

## **SUBMISSIONS**

### **D8. AUTHORITY TO CARRY ON BUSINESS**

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

## **D9. SAFE WORK PLAN**

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

## **D10. INSURANCE**

- D10.1 The City shall provide and maintain the following owner controlled project insurance coverage to remain in place at all times during the performance of the Work and throughout the warranty period unless otherwise stated below:
- Wrap-up liability insurance in an amount of no less than five million dollars (\$5,000,000) inclusive per occurrence and five millions dollars (\$5,000,000) general aggregate, covering bodily injury, personal injury, damage to the existing structure, sudden and accidental pollution liability with 120 hours reporting for the accidental escape of pollutants, property damage and products and completed operations consistent with industry standard insurance policy wordings. Wrap up liability insurance to also include evidence of contractual liability and cross liability clauses.
- (i) The Contractor shall be responsible for deductibles up to \$50,000 maximum of any one loss.
  - (ii) The City will carry such insurance to cover the City, Contractor, sub-contractor, consultants and sub-consultants as insured's. Provision of this insurance by the City is not intended in any way to relieve the Contractor from his obligations under the terms of the Contract. Specifically, losses relating to deductibles for insurance, as well as losses in excess of limits of coverage and any risk of loss that is not covered under the terms of the insurance provided by the City remains with the Contractor.
  - (iii) BellMTS, Manitoba Hydro, Shaw, Telus, Manitoba and its Ministers, officers, employees and agents and A&S Homes shall be shown as additional insured, as required by contract.
  - (iv) Wrap-up liability insurance shall be maintained from the date of the commencement of the Work until the date of Total Performance of the work and shall include an additional 24 months completed operations coverage which will take affect after Total Performance.
- D10.2 The Contractor shall provide and maintain the following insurance coverage to remain in place at all times during the performance of the Work and throughout the warranty period:
- (a) commercial general liability insurance, in the amount of at least five million dollars (\$5,000,000.00) inclusive, with the City, Manitoba and its Ministers, officers, employees and agents to be added as an additional insured, with a cross-liability clause, contractual liability, unlicensed motor vehicle liability, sudden and accidental pollution liability with 120 hours reporting for the accidental escape of pollutants, non-owned automobile liability, broad form property damage cover and products and completed operations;
  - (b) Automobile Liability Insurance covering all motor vehicles, owned and operated and used or to be used by the Contractor directly or indirectly in the performance of the Work. The Limit of Liability shall not be less than \$2,000,000 inclusive for loss or damage including personal injuries and death resulting from any one accident or occurrence;
  - (c) All risks installation floater adequate to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of the Project;
  - (d) Property insurance for equipment, tools, field office and portable toilets used by the Contractor directly or indirectly in the performance of the Work on the project that may be owned, rented, leased or borrowed.

- D10.3 Deductibles shall be borne by the Contractor.
- D10.4 The Contractor will be required to cooperate with the City and to provide their project experience and project claims history and any other information necessary to obtain the owner controlled project insurance as outlined in D10.1 within three (3) business days after notice of award.
- D10.5 The Contractor shall provide the City Solicitor and Manitoba with 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 and annually thereafter, as required.
- D10.6 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.
- D10.7 All policies shall be taken out with insurers duly licensed to carry on business in the Province of Manitoba.

#### **D11. CONTRACT SECURITY**

- D11.1 The Contractor shall provide and maintain the performance bond and the labour and material payment bond until the expiration of the warranty period in the form of:
- (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; and
  - (b) a labour and material payment bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H2: Labour and Material Payment Bond), in an amount equal to fifty percent (50%) of the Contract Price.
- D11.2 The Contractor shall provide the City Solicitor with the required performance and labour and material payment bonds within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.
- D11.3 The Contractor shall, as soon as practicable after entering into a contract with a Subcontractor:
- (a) give the Subcontractor written notice of the existence of the labour and material payment bond in D11.1(b); and
  - (b) post a notice of the bond and/or a copy of that bond in a conspicuous location at the Site of the Work.

#### **D12. SUBCONTRACTOR LIST**

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

#### **D13. EQUIPMENT LIST**

- D13.1 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 two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the C4.1 for the return of the executed Contract.

#### **D14. DETAILED WORK SCHEDULE**

- D14.1 The Contractor shall provide the Contract Administrator with a detailed work schedule at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the General Conditions for the return of the executed Contract.
- D14.2 If, prior to submitting the Detailed Work Schedule, the Contractor does not receive notification pursuant to D15.5 that all or some portion of Part 2 of the Work may be commenced, he/she shall complete the Detailed Work Schedule for only Part 1 of the Work assuming that, if all of Part 2 is eliminated, the time periods stipulated in D21 for Substantial Performance of the Work and in D22 for Total Performance of the Work will be reduced by five (5) Working Days
- D14.3 If, after submitting the Detailed Work Schedule, the Contractor receives notification that all or any portion of Part 2 of the Work may be commenced, he/she shall submit a revised Detailed Work Schedule no later than two (2) Business Days from receipt of the notification.
- D14.4 The detailed work schedule shall consist of the following:  
(a) a Gantt chart for the Work acceptable to the Contract Administrator.
- D14.5 Further to D14.4(a), the Gantt chart shall show the time on a weekly basis, required to carry out the Work of each trade, or specification division. The time shall be on the horizontal axis, and the type of trade shall be on the vertical axis.

#### **SCHEDULE OF WORK**

##### **D15. COMMENCEMENT**

- D15.1 The Contractor shall not commence any Work until he/she is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.
- D15.2 The Contractor shall not commence any Work on the Site until:  
(a) the Contract Administrator has confirmed receipt and approval of:  
(i) evidence of authority to carry on business specified in D8;  
(ii) evidence of the workers compensation coverage specified in C6.15;  
(iii) the twenty-four (24) hour emergency response phone number specified in D4.2.  
(iv) the Safe Work Plan specified in D9;  
(v) evidence of the insurance specified in D10;  
(vi) the contract security specified in D10.1;  
(vii) the subcontractor list specified in D12; and  
(viii) the detailed work schedule specified in D13.  
(b) the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.
- D15.3 The Contractor shall not commence the Work on the Site before June 10, 2019, and shall commence the Work on Site no later than June 14, 2019, as directed by the Contract Administrator and weather permitting.
- D15.4 The Contractor shall not commence the Work associated with westbound Fermor Avenue (D2.2(a)(ii)) before May 19, 2020, and shall commence the work no later than May 25, 2020, as directed by the Contract Administrator and weather permitting.
- D15.5 The Contractor shall not commence Part 2 of the Work as described in D2 and identified in Form B: Prices, unless he/she has received notification from the Contract Administrator that the City has received notice of sufficient funding from Manitoba Hydro.

D15.6 The City intends to award this Contract by June 3, 2019.

D15.6.1 If the actual date of award is later than the intended date, the dates specified for Critical Stages, Substantial Performance, and Total Performance will be adjusted by the difference between the aforementioned intended and actual dates.

## **D16. WORKING DAYS**

D16.1 Further to C1.1(II);

D16.1.1 The definition of Working Day is amended to include Saturdays.

D16.1.2 The Contract Administrator will determine daily if a Working Day has elapsed and will record his/her assessment. On a weekly basis the Contract Administrator will provide the Contractor with a record of the Working Days assessed for the preceding week. The Contractor shall sign each report signifying that he/she agrees with the Contract Administrator's determination of the Working Days assessed for the report period.

D16.1.3 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.

D16.1.4 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.

## **D17. RESTRICTED WORK HOURS**

D17.1 Further to clause 3.10 of CW 1130, the Contractor shall require written permission forty-eight (48) hours in advance from the Contract Administrator for any work to be performed between 2000 hours and 0700 hours, or on Sundays, Statutory Holidays and or Civic Holidays.

## **D18. WORK BY OTHERS**

D18.1 Work by others on or near the Site will include but not necessarily be limited to:

- (a) Rivergrove Developments and/or their subcontractors may be working in their development on the south side of Fermor Avenue (Precinct J) in 2020;
- (b) Manitoba Hydro – removal and installation of new street lighting;
- (c) Manitoba Hydro Telecom – installation of fibre optic lines;
- (d) Traffic Signals- Removal, modification, and installation of new traffic signals plant;
- (e) Manitoba Hydro, Gas Division – lowering and/ or rock wrapping of underground main and services as required;
- (f) MTS and Shaw – relocations, protection and adjustments as required;
- (g) City of Winnipeg Traffic Services - Erection and maintenance of temporary traffic control (see E5), removal and installation of new traffic signage and line painting.
- (h) City of Winnipeg Geomatics Branch – various work on survey.

## **D19. SEQUENCE OF WORK**

D19.1 Further to C6.1, the sequence of work shall be as follows:

D19.1.1 A recommended traffic staging plan has been included in E1.3.

D19.1.2 Generally, the Contractor will construct the eastbound lanes of Fermor Avenue and all of Royal Mint Drive in 2019. Westbound Fermor Avenue will be constructed in 2020.

- D19.1.3 Placing the topsoil and finished grading of all boulevard and median areas shall be completed prior to commencing construction of the asphaltic concrete overlay, including the scratch course.

## **D20. CRITICAL STAGES**

- D20.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:
- (a) Fermor Avenue Eastbound from west of Lagimodiere Boulevard to Plessis Road shall be completed prior to October 31, 2019 such that two lanes of traffic in each direction plus turning lanes of Fermor Avenue can be opened to traffic for the winter of 2019/2020.
- D20.2 When the Contractor considers the Work associated with D20.1(a) to be completed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Completion. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.
- D20.3 The date on which the D20.1(a) Work has been accepted by the Contract Administrator as being completed to the requirements of the Contract is the date on which completion of D20.1(a) has been achieved.

## **D21. SUBSTANTIAL PERFORMANCE**

- D21.1 The Contractor shall achieve Substantial Performance within one hundred eighty (180) consecutive Working Days of the commencement of the Work as specified in D15.
- D21.2 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.
- D21.3 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.

## **D22. TOTAL PERFORMANCE**

- D22.1 The Contractor shall achieve Total Performance within one hundred eighty five (185) consecutive Working Days of the commencement of the Work as specified in D15.
- D22.2 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.
- D22.3 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.



## **D23. LIQUIDATED DAMAGES**

- D23.1 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) Critical Stage D20.1(a) – six thousand eight hundred dollars (\$6,800);
  - (b) Substantial Performance – six thousand eight hundred dollars (\$6,800);
  - (c) Total Performance – three thousand dollars (\$3,000).
- D23.2 The amounts specified for liquidated damages in D23.1 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.
- D23.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

## **D24. SCHEDULED MAINTENANCE**

- D24.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:
- (a) Salt tolerant grass seed maintenance as specified in E24;
  - (b) Reflective crack maintenance as specified in CW 3250.
- D24.2 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**

### **D25. JOB MEETINGS**

- D25.1 Regular weekly job meetings will be held at the Site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, one representative of the City and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City and the Contractor respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.
- D25.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

### **D26. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)**

- D26.1 Further to C6.24, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

### **D27. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS**

- D27.1 Further to B12.4, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety and Health Act (Manitoba). At any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require updated proof of compliance, as set out in B12.4.

## MEASUREMENT AND PAYMENT

### D28. PAYMENT

D28.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

## WARRANTY

### D29. WARRANTY

D29.1 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.

D29.2 Notwithstanding C13.2 or D29.1, the Contract Administrator may permit the warranty period for a portion or portions of the Work to begin prior to the date of Total Performance if:

- (a) a portion of the Work cannot be completed because of unseasonable weather or other conditions reasonably beyond the control of the Contractor but that portion does not prevent the balance of the Work from being put to its intended use.

D29.2.1 In such case the date specified by the Contract Administrator for the warranty period to begin shall be substituted for the date specified in C13.2 for the warranty period to begin.

## THIRD PARTY AGREEMENTS

### D30. FUNDING AND/OR CONTRIBUTION AGREEMENT OBLIGATIONS

D30.1 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.

D30.2 For the purposes of D30:

- (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.

D30.3 Indemnification By Contractor

D30.3.1 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.

D30.4 Records Retention and Audits

D30.4.1 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.

D30.4.2 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 D30.4.1 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.

#### D30.5 Other Obligations

D30.5.1 The Contractor consents to the City providing a copy of the Contract to the Government of Manitoba and/or the Government of Canada upon request from either entity.

D30.5.2 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.

D30.5.3 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.

D30.5.4 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.

**FORM H1: PERFORMANCE BOND**  
(See D10.1)

KNOW ALL MEN BY THESE PRESENTS THAT

\_\_\_\_\_ ,  
(hereinafter called the "Principal"), and

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

\_\_\_\_\_ dollars (\$\_\_\_\_\_)

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

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

TENDER NO. 8-2019

2019/2020 Regional Street Renewal Program- Fermor Avenue From Lagimodiere Boulevard to Plessis Road (City Boundary), Asphalt Reconstruction 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 D10.1)

KNOW ALL MEN BY THESE PRESENTS THAT

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

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

\_\_\_\_\_ dollars (\$\_\_\_\_\_)

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

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

TENDER NO. 8-2019

2019/2020 Regional Street Renewal Program- Fermor Avenue From Lagimodiere Boulevard to Plessis Road (City Boundary), Asphalt Reconstruction

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

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

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

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

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

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

\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

SIGNED AND SEALED  
in the presence of:

\_\_\_\_\_  
(Witness as to Principal if no seal)

\_\_\_\_\_  
(Name of Principal)

Per: \_\_\_\_\_ (Seal)

Per: \_\_\_\_\_

\_\_\_\_\_  
(Name of Surety)

By: \_\_\_\_\_ (Seal)  
(Attorney-in-Fact)







**FORM K: EQUIPMENT**  
(See D13)

2019/2020 Regional Street Renewal Program- Fermor Avenue From Lagimodiere Boulevard to Plessis Road (City Boundary), Asphalt Reconstruction

<p><b>1. Category/type:</b></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><b>2. Category/type:</b></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><b>3. Category/type:</b></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 D13)

2019/2020 Regional Street Renewal Program- Fermor Avenue From Lagimodiere Boulevard to Plessis Road (City Boundary), Asphalt Reconstruction

<p><b>4. Category/type:</b></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><b>5. Category/type:</b></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><b>6. Category/type:</b></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 its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/Spec/Default.stm>
- E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.2.3 Further to C2.4(d), Specifications included in the Tender shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.3 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B6. In every instance where a brand name or design specification is used, the City will also consider approved equals and/or approved alternatives in accordance with B6.
- E1.4 The following are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
P-3501-0	Cover Sheet, Location Plan	A1
P-3501-1	Key Plan, Drawing List & Horizontal and Vertical Control	A1
P-3501-2	Horizontal Geometry, Fermor Avenue Sta 0+350 SM to Sta 0+700 SM	A1
P-3501-3	Horizontal Geometry, Fermor Avenue Sta 0+700 SM to Sta 1+050 SM	A1
P-3501-4	Horizontal Geometry, Fermor Avenue Sta 1+050 SM to Sta 1+400 SM	A1
P-3501-5	Horizontal Geometry, Fermor Avenue Sta 1+400 SM to Sta 1+770 SM	A1
P-3501-6	Horizontal Geometry, Fermor Avenue Sta 1+770 SM to Sta 2+670 SM	A1
P-3501-7	Horizontal Geometry, Royal Mint Drive & Future Dawson Road South	A1
P-3501-8	Paving, Fermor Avenue Sta 0+300 SM to Sta 0+520 SM	A1
P-3501-9	Paving, Fermor Avenue Sta 0+520 SM to Sta 0+740 SM	A1
P-3501-10	Paving, Fermor Avenue Sta 0+740 SM to Sta 1+000 SM	A1
P-3501-11	Paving, Fermor Avenue Sta 1+000 SM to Sta 1+260 SM	A1
P-3501-12	Paving, Fermor Avenue Sta 1+260 SM to Sta 1+520 SM	A1
P-3501-13	Paving, Fermor Avenue Sta 1+520 SM to Sta 1+780 SM	A1

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
P-3501-14	Paving, Fermor Avenue Sta 1+780 SM to Sta 2+040 SM	A1
P-3501-15	Paving, Fermor Avenue Sta 2+040 SM to Sta 2+250 SM	A1
P-3501-16	Paving, Fermor Avenue Sta 2+250 SM to Sta 2+510 SM	A1
P-3501-17	Paving, Fermor Avenue Sta 2+510 SM to Sta 2+760 SM	A1
P-3501-18	Plan and Profiles, Dawson Road South/ Multi-Use Path, Lagimodiere Boulevard to Sta 0+200	A1
P-3501-19	Plan and Profiles, Dawson Road South/ Multi-Use Path, Sta 0+200 to Sta 0+340	A1
P-3501-20	Plan and Profiles, Dawson Road South/ Multi-Use Path, Sta 0+340 to Royal Mint Drive	A1
P-3501-21	Plan and Profiles, Royal Mint Drive, Dawson Road South to Sta 0+200	A1
P-3501-22	Plan and Profiles, Royal Mint Drive, Sta 0+200 to Fermor Avenue	A1
P-3501-23	Paving and Grading, Rivergrove Development Approach to Dawson's Trail	A1
P-3501-24	Grading, Fermor Avenue Sta 0+300 SM to Sta 0+520 SM	A1
P-3501-25	Grading, Fermor Avenue Sta 0+520 SM to Sta 0+740 SM	A1
P-3501-26	Grading, Fermor Avenue Sta 0+740 SM to Sta 1+000 SM	A1
P-3501-27	Grading, Fermor Avenue Sta 1+000 SM to Sta 1+260 SM	A1
P-3501-28	Grading, Fermor Avenue Sta 1+260 SM to Sta 1+520 SM	A1
P-3501-29	Grading, Fermor Avenue Sta 1+520 SM to Sta 1+780 SM	A1
P-3501-30	Grading, Fermor Avenue Sta 1+780 SM to Sta 2+040 SM	A1
P-3501-31	Grading, Fermor Avenue Sta 2+040 SM to Sta 2+250 SM	A1
P-3501-32	Grading, Fermor Avenue Sta 2+250 SM to Sta 2+510 SM	A1
P-3501-33	Grading, Fermor Avenue Sta 2+510 SM to Sta 2+760 SM	A1
P-3501-34	Profiles, Fermor Avenue - Eastbound Lanes Sta 0+300 SM to Sta 0+520 SM	A1
P-3501-35	Profiles, Fermor Avenue - Eastbound Lanes Sta 0+520 SM to Sta 0+740 SM	A1
P-3501-36	Profiles, Fermor Avenue Sta 0+740 SM/NM to Sta 1+000 SM/NM	A1
P-3501-37	Profiles, Fermor Avenue Sta 1+000 SM/NM to Sta 1+260 SM/NM	A1
P-3501-38	Profiles, Fermor Avenue Sta 1+260 SM/NM to Sta 1+520 SM/NM	A1
P-3501-39	Profiles, Fermor Avenue Sta 1+520 SM/NM to Sta 1+780 SM/NM	A1

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
P-3501-40	Profiles, Fermor Avenue Sta 1+780 SM/NM to Sta 2+040 SM/NM	A1
P-3501-41	Profiles, Fermor Avenue Sta 2+040 SM/NM to Sta 2+250 SM/NM	A1
P-3501-42	Profiles, Fermor Avenue Sta 2+250 SM/NM to Sta 2+510 SM/NM	A1
P-3501-43	Profiles, Fermor Avenue - Eastbound Lanes Sta 2+510 SM to Sta 2+760 SM	A1
P-3501-44	Profiles, Fermor Avenue - Westbound Lanes Sta 2+510 SM to Sta 2+760 SM	A1
P-3501-45	Cross Sections A & B	A1
P-3501-46	Cross Sections C & D	A1
P-3501-47	Cross Sections E & F	A1
P-3501-48	Cross Sections G & H	A1
P-3501-49	Cross Sections I, J & K	A1
P-3501-50	Overhead Sign Structure S792 Fermor Ave. EB, West of Lagimodiere Blvd. General Arrangement	A1
P-3501-51	Overhead Sign Structure S792 Fermor Ave. EB, West of Lagimodiere Blvd. Fabrication Details 1	A1
P-3501-52	Overhead Sign Structure S792 Fermor Ave. EB, West of Lagimodiere Blvd. Fabrication Details 2	A1
P-3501-53	Overhead Sign Structure S793 Fermor Ave. WB, East of Lagimodiere Blvd. General Arrangement	A1
P-3501-54	Overhead Sign Structure S793 Fermor Ave. WB, East of Lagimodiere Blvd. Fabrication Details 1	A1
P-3501-55	Overhead Sign Structure S793 Fermor Ave. WB, East of Lagimodiere Blvd. Fabrication Details 2	A1
P-3501-56	Overhead Sign Structure S794 Dawson Road NB, South of Fermor, General Arrangement & Fabrication Details	A1
P-3501-57	Overhead Sign Structure S794 Dawson Road NB, South of Fermor, Fabrication Details	A1
P-3501-58	Quadguard Layout Plans & Details	A1
P-3501-59	Quadguard Concrete Pad & Details	A1
P-3501-60	REACT 350 Layout Plan, Elevation & Sections	A1
P-3501-61	REACT 350 Concrete Backup and Pad	A1
P-3501-62	Details and Sections, Various	A1
P-3501-63	Details and Sections, Various	A1
Figure ST-01	2019 Staging- Phase 1, 2 & 3	11" x 17"
Figure ST-02	2019 Staging- Phase 1, 2 & 3	11" x 17"
Figure ST-03	2019 Staging- Phase 4	11" x 17"

<u>Drawing No.</u>	<u>Drawing Name/Title</u>	<u>Drawing (Original) Sheet Size</u>
Figure ST-04	2019 Staging- Phase 5	11" x 17"
Figure ST-05	2019 Staging- Phase 6	11" x 17"
Figure ST-06	2019/2020 Winter Traffic	11" x 17"
Figure ST-07	2019/2020 Winter Traffic	11" x 17"
Figure ST-08	2020 Staging- Phase 1, 2 & 3	11" x 17"
Figure ST-09	2020 Staging- Phase 1, 2 & 3	11" x 17"
Figure ST-10	2020 Staging- Phase 4	11" x 17"
Figure ST-11	2020 Staging- Phase 5	11" x 17"
Figure ST-12	2020 Staging- Phase 6	11" x 17"
Figure ST-13	2020 Staging- Phase 7	11" x 17"
Figure ST-14	2020 Staging- Phase 7	11" x 17"
1-04707-DE-50000-0462-0001	Fermor Ave, New Roadway Lighting Between Lagimodiere Blvd and the CNR Tracks	B1
1-04707-DE-50000-0462-0002	Fermor Ave, New Roadway Lighting Between Lagimodiere Blvd and the CNR Tracks	B1

## **E2. GEOTECHNICAL REPORT**

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

## **E3. OFFICE FACILITIES**

E3.1 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.
- (c) The building shall have a minimum floor area of 25 square metres, a height of 2.4 m with two windows for cross ventilation 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 adequately lighted with florescent fixtures and have a minimum of three wall outlets].
- (f) The building shall be furnished with one desk, one drafting table, table 3m X 1.2m, one stool, one four drawer legal size filing cabinet, and a minimum of 12 chairs.

- (g) 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.
- (h) 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 he/she deems it necessary.
- (i) The office shall be equipped with reliable internet access, supplied and paid for by the Contractor, either provided by Ethernet cable (hard line) or wireless internet service. Any wireless internet access shall be secured by an access password and by conventional WPA2 256-bit encryption to prevent unauthorized access. If wireless internet access is not provided, then a minimum of two Ethernet connections shall be provided.

E3.2 The Contractor shall be responsible for all installation and removal costs, all operating costs, and the general maintenance of the office facilities.

E3.3 The office facilities will be provided from the date of the commencement of the Work to the date of Total Performance.

#### **E4. PROTECTION OF EXISTING TREES**

E4.1 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.

E4.2 All damage to existing trees caused by the Contractor's activities shall be repaired to the requirements and satisfaction of the Contract Administrator and the City Forester or his/her designate.

E4.3 No separate measurement or payment will be made for the protection of trees.

E4.4 Except as required in clause E4.1(c) and E4.1(e), Elm trees shall not be pruned at any time between April 1 and July 31.

#### **E5. TRAFFIC CONTROL**

E5.1 Further to clauses 3.6, 3.7 and 3.8 of CW 1130:

- (a) Where directed by the Contract Administrator, the Contractor shall construct and maintain temporary asphalt ramps to alleviate vertical pavement obstructions such as manholes and



planing drop-offs to the satisfaction of the Contract Administrator. Payment shall be in accordance with CW3410.

- (b) In accordance with the Manual of Temporary Traffic Control on City Streets (MTTC), the Contractor ("Construction Agency" in the manual) shall be responsible for placing, maintaining and removing the appropriate temporary traffic control devices as specified by the MTTC or by the Traffic Management Branch of the City of Winnipeg Public Works Department. The Contractor shall bear all costs associated with the placement of temporary traffic control devices by their own forces or subcontractor.

E5.2 Notwithstanding E5.1, in accordance with the MTTC, the Contract Administrator shall make arrangements with the **Traffic Services Branch of the City of Winnipeg** to place, maintain, and remove all **regulatory signs** and traffic control devices authorized and/or required by the Traffic Management Branch in the following situations:

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

E5.2.1 An exception to E5.2 is the 'KEEP RIGHT/KEEP LEFT' sign (RB-25 / RB-25L) which shall be supplied, installed, and maintained by the Contractor at their own expense.

E5.2.2 Further to E5.2, where the Contract Administrator has determined that the services of the Traffic Services Branch are required, the City shall bear the costs associated with the placement of temporary traffic control devices by the Traffic Services Branch of the City of Winnipeg in connection with the works undertaken by the Contractor.

## **E6. TRAFFIC MANAGEMENT**

E6.1 Further to clause 3.7 of CW 1130:

E6.1.1 Maintain a minimum of one lane of traffic in each direction on all streets within the Site at all times during construction;

E6.1.2 Left and right turns shall only be restricted as approved by the Contract Administrator. Wherever possible, additional lanes shall be provided for left and right turning vehicles.

E6.1.3 Access to Precinct J Development to be maintained in 2020.

E6.1.4 Intersecting street and private approach access shall be maintained at all times;

E6.1.5 Should the Contractor be unable to maintain pedestrian or vehicular access to a residence or business, he shall review the planned disruption with the business or residence and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 72 hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access; and

E6.1.6 Pedestrian, bus and ambulance/ emergency vehicle access must be maintained at all times.

- E6.1.7 At the end of each construction season, the Contractor shall ensure that there will be no lane closures during the period when no Work is taking place.
- E6.1.8 The Contractor shall refer to the traffic staging figures provided for more traffic management details.

## **E7. WATER OBTAINED FROM THE CITY**

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

## **E8. SURFACE RESTORATIONS**

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

## **E9. INFRASTRUCTURE SIGNS**

- E9.1 The Contractor shall obtain infrastructure signs from the Traffic Services Sign Shop at 821 Elgin Avenue. The Contractor shall mount each sign securely to a rigid backing material approved by the Contract Administrator. The Contractor shall fasten each sign to a suitable support and erect and maintain one sign at each street as directed by the Contract Administrator. When the Contract Administrator considers the Work on the street complete, the Contractor shall remove and dispose of the signs and supports. No measurement for payment will be made for performing all operations herein described and all other items incidental to the work described.

## **E10. MISCELLANEOUS REMOVALS**

### **E10.1 DESCRIPTION**

- E10.2 This Specification shall cover the miscellaneous removals listed below.

### **CONSTRUCTION METHODS**

### **E10.3 Remove and Salvage Existing Crash Attenuation Unit**

- E10.3.1 The Contractor shall remove the existing crash attenuation unit shown on the Drawings.
- E10.3.2 The crash attenuation unit including all hardware shall be delivered Manitoba Infrastructure's maintenance yard on Wilkes Avenue. The Contractor shall contact the yard prior to arrange for delivery.
- E10.3.3 Any damage to the crash attenuation unit or hardware that has not been identified prior to removal will be repaired or replaced at the Contractor's expense.
- E10.3.4 The concrete pad shall be removed and disposed of in accordance with Section 3.4 of CW 1130.

### **E10.4 Removal of Existing Signs and Barricades**

- E10.4.1 Remove existing signs and barricades where shown on the Drawings or as directed by the Contract Administrator.
- E10.4.2 Dispose of material in accordance with Section 3.4 of CW 1130.

## MEASUREMENT AND PAYMENT

### E10.5 Remove and Salvage Existing Crash Attenuation Unit

E10.5.1 Remove and salvage existing crash attenuation unit will be measured on a unit basis and paid for at the Contract Unit Price for "Remove and Salvage Existing Crash Attenuation Unit". The number to be paid for will be the total number of units removed, salvaged, delivered and unloaded in accordance with this Specification, accepted and measured by the Contract Administrator.

E10.5.2 Removal and disposal of the concrete pad will not be measured and shall be considered incidental to the "Remove and Salvage Existing Crash Attenuation Unit".

### E10.6 Removal of Existing Signs and Barricades

E10.6.1 Removal and disposal of existing signs and barricades will not be measured and will be paid for at the Contract Lump Sum Price for "Removal of Existing Signs and Barricades". Price paid will be payment in full for completing the work of this Specification, accepted and measured by the Contract Administrator.

## E11. IMPORTED FILL MATERIAL

### DESCRIPTION

E11.1 This Specification shall supplement and amend CW 3110-R20 and CW 3170-R3 and covers the supply and installation of imported fill material.

### MATERIALS

#### E11.2 Imported Fill Material

E11.2.1 Imported fill material shall consist of clay material or mixtures of sand and clay, uniform in texture and suitable for compaction. Imported fill material shall have a minimum California Bearing Ratio (CBR) (4 days soaked) of 3.0% as tested in accordance with ASTM D1883 at 95% of Standard Proctor Maximum Dry Density and the appropriate moisture content wet of the optimum moisture content.

E11.2.2 The fill material shall be free of deleterious material such as refuse, wood, steel, organics, concrete rubble or stones larger than 25 millimetres in diameter.

#### E11.3 Quality Control Testing

E11.3.1 The Contractor shall furnish in writing to the Contract Administrator the location of the sources where imported fill will be obtained in order that same may be inspected and tentatively approved by the Contract Administrator. Changes in the source of imported fill supply during the course of the Contract will not be permitted without notification in writing to and the express approval of the Contract Administrator.

E11.3.2 Two (2) weeks prior to the start of importing material, the Contractor shall provide the Contract Administrator with the results of three (3) separate sets of testing to show that the requirements of E11.2.1 will be met from the proposed source. These tests shall include, at a minimum, Standard Proctor and CBR values.

### CONSTRUCTION METHODS

E11.4 Before imported fill is placed the Contractor shall complete "Preparation of Existing Ground" in accordance with CW 3170-R3 or "Subgrade Compaction" in accordance with CW 3110-R20 as directed by the Contract Administrator.

E11.5 Imported fill materials shall be deposited and compacted in accordance with CW 3170-R3.

## MEASUREMENT AND PAYMENT

### E11.6 Imported Fill Material

E11.6.1 Imported fill material will be measured and paid for in accordance with CW 3170-R3.

## **E12. SUB-GRADE, SUB-BASE AND BASE COURSE CONSTRUCTION, SUPPLY AND INSTALLATION OF GEOTEXTILE FABRICS AND GEOGRID**

E12.1 The following Specifications, included in Appendix 'E' will apply to the Work and supersede the existing Standard Construction Specifications:

- (a) CW 3110-R20 Sub-grade, Sub-base and Base Course Construction
- (b) CW 3130-R5 Supply and Installation of Geotextile Fabrics
- (c) CW 3135-R2 Supply and Installation of Geogrid

## **E13. HYDRO-EXCAVATION**

### DESCRIPTION

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

### CONSTRUCTION METHODS

#### E13.2 Hydro-Removal of Earthen Material

E13.2.1 The Contractor shall only be compensated for hydro-excavation undertaken with prior permission of the Contract Administrator.

E13.2.2 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. Expose the buried utility by using a sweeping motion only, perpendicular to the locate markings, until the line is sighted. After sighting, the line shall not be contacted by spray or vacuum to avoid damage.

E13.2.3 Maximum settings when excavating within 1 m of marked utilities will be 38°C (100°F) temperature and 10,342 kPa (1500 psi) pressure.

#### E13.3 Recovery of Excavated Material

E13.3.1 The recovery of excavated material shall be done using a vacuum type method, or other type method as approved by the Contract Administrator.

E13.3.2 The recovery of material shall follow immediately behind the excavation, to avoid excavated areas from filling with excavated material.

E13.3.3 The use of mechanical sweepers will not be allowed.

E13.3.4 Dispose of material in accordance with Section 3.4 or CW 1130-R1.

#### E13.4 Backfill of Hydro Excavated Material

E13.4.1 The Contractor shall be responsible for the backfill of the hydro excavated hole upon acceptance of the Work described herein by the Contract Administrator.

## MEASUREMENT AND PAYMENT

### E13.5 Hydro-Excavation

- E13.6 Hydro-Excavation of earthen material and its recovery and disposal as well as backfilling the hole will be measured on an hourly basis and paid for at the Contract Unit Price per hour for "Hydro-Excavation". The hours to be paid for will be the total number of hours of hydro-excavation completed in accordance with this Specification, accepted and measured by the Contract Administrator.

#### **E14. INSTALLATION OF INTERLOCKING PAVING STONES**

##### DESCRIPTION

- E14.1 General
- E14.1.1 This Specification shall cover the installation of interlocking paving stones on concrete sidewalk and lean concrete base.
- E14.1.2 Referenced Standard Construction Specifications  
(a) CW 3325 – Portland Cement Concrete Sidewalk

##### MATERIALS

- E14.2 Interlocking Paving Stones
- E14.2.1 Paving stones for sidewalk bands shall be Barkman Concrete Holland Stone Pavers (200 x 200). All pavers to be "Charcoal" in colour.
- E14.2.2 Paving stones shall conform to the requirements of CAN3-A231.2, Precast Concrete Pavers.
- E14.2.3 Further to CAN3-A231.2.6.1.1, where concrete pavers are shipped for installation before the pavers are twenty-eight (28) days old, the average compressive strength of these pavers at the time of delivery to the work site shall be not less than 40 MPa.
- E14.3 Other Materials
- E14.3.1 Bedding sand shall be in accordance with CW 3335.
- E14.3.2 Concrete sidewalk base to be in accordance with CW 3325.

##### CONSTRUCTION METHOD

- E14.4 Installation of Paving Stones
- E14.4.1 Sidewalk bands shall be installed on a 100 mm concrete sidewalk base which shall be constructed in accordance with CW 3325.
- E14.4.2 Install paving stones on concrete sidewalk with bedding sand in accordance with the Drawings and CW 3335.

##### MEASUREMENT OF PAYMENT

- E14.5 Supply and Installation of Paving Stones
- E14.5.1 Supply and installation of interlocking paving stones shall be measured on an area basis. The amount to be paid for shall be the total number of square metres of paving stones supplied and installed in accordance with this Specification and the Drawings and accepted by the Contract Administrator. Supply and Installation of Paving Stones shall be paid for at the Contract Unit Price for "Interlocking Paving Stones", which price shall be payment in full for the supply of all materials and for performing all operations required to complete the work as specified.
- E14.5.2 No measurement or payment will be made for bedding sand. Bedding sand shall be included in the price paid for "Interlocking Paving Stones".

E14.6 100 mm Concrete Sidewalk Base

E14.6.1 Supply and installation of 100 mm concrete sidewalk base shall be measured and paid for in accordance with CW 3325.

**E15. FRENCH DRAINS**

DESCRIPTION

E15.1 This Specification covers the construction of french drains adjacent to the road pavement structure as shown on the Drawings.

MATERIALS

E15.2 Drainage Material

E15.2.1 Drainage material will consist of natural gravel, crushed stone or other materials of similar characteristics having clean, hard, strong, durable, uncoated particles free from injurious amounts of soft, friable, thin, elongated or laminated pieces, alkali, organic or other deleterious matter.

E15.2.2 Drainage material will meet the following requirements:

**Drainage Material Grading Requirements**

Canadian Metric Sieve Size	Percent of Total Dry Weight Passing Each Sieve
40 000	100%
25 000	50% - 80%
20 000	5% - 20%
12 500	0% - 5%
80	0% - 3%

- (a) Soundness – Drainage material when subject to five (5) cycles of soundness test will have a weighted loss of not more than thirteen percent (13%) in accordance with ASTM Standard C88, test for soundness of Aggregates by Use of Magnesium Sulphate.
- (b) Abrasion – Drainage material when subject to abrasion test will have a loss of not more than thirty percent (30%) when tested in accordance with grading A of ASTM C131, Test for Resistance to Degradation of Small-Size Aggregate by Abrasion and Impact in the Los Angeles Machine.

E15.3 Drainage Fabric will be non-woven and meet or exceed the requirements of Separation Geotextile Fabric in Clause 2.5 of CW 3130-R5.

CONSTRUCTION METHODS

E15.4 Installation of French Drains

E15.4.1 Installation of the French Drains shall not take place until installation of the sub-base materials is complete and the ditch slopes have been backfilled and compacted and clay capped adjacent to the road structure.

E15.4.2 Excavate a trench to the grade and dimensions shown on the Drawings or as directed by the Contract Administrator. Excavate into the road structure as shown to ensure a physical connection between the sub-grade and the French drain.

E15.4.3 Dispose of trench excavation material in accordance with Section 3.4 of CW 1130 or as directed by the Contract Administrator.

- E15.4.4 Repair any non-conforming trenches as directed by the Contract Administrator.
- E15.4.5 Compact sub-grade in the base of the trench to a minimum standard proctor of ninety five percent (95%).
- E15.4.6 Place separation geotextile fabric such that it overlaps above the geotextile fabric in the road structure a minimum of 300 mm. Ensure adequate geotextile fabric is placed to allow for wrapping the drainage material, including overlap joints above and at the ends of the French Drain.
- E15.4.7 Overlap joints in the geotextile fabric a minimum of 500 mm.
- E15.4.8 Backfill the trench with the drainage material in 300 mm lifts and compact to the satisfaction of the Contract Administrator. Place drainage material to the grade and dimensions shown on the Drawings or as directed by the Contract Administrator.
- E15.4.9 Place drainage material to ensure no damage occurs to the separation geotextile fabric.
- E15.4.10 Backfill above the French Drain with suitable Site material and compact to a standard proctor of ninety five percent (95%) to the grade and dimensions shown on the Drawings or as directed by the Contract Administrator. Ensure this material does not cover the ends as to block the flow of water into the ditch.

#### MEASUREMENT AND PAYMENT

- E15.5 Installation of French Drains
  - E15.5.1 Installation of French Drains will be measured on a unit basis and paid for at the Contract Unit Price for "Installation of French Drain". The number to be paid for shall be the total number of French Drains installed in accordance with this Specification and measured by the Contract Administrator and shall be payment in full for performing all operation herein described and other items incidental to the Work included in this Specification.
  - E15.5.2 The supply and installation of geotextile fabric will be considered incidental to the works, and no separate measurement or payment will be made.

### **E16. CONCRETE MEDIAN BARRIER**

#### DESCRIPTION

- E16.1 This Specification shall supplement and amend CW 3310-R17 – "Portland Cement Concrete Pavement Works".
- E16.2 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 an incidental to the satisfactory performance and completion of all work hereinafter specified.

#### MATERIALS

- E16.3 All materials shall be as specified in CW 3310-R17.

#### E16.4 CONSTRUCTION METHODS

##### E16.5 Median Barrier

- E16.5.1 Concrete pads shall be constructed to the dimensions and at the locations shown on the drawings prior to the construction of median barriers.
- E16.5.2 Median barriers shall be constructed to the dimensions and at the locations shown on the Drawings.

- E16.5.3 Reinforcing steel shall be installed as per the Drawings or as directed by the Contract Administrator.

#### MEASUREMENT AND PAYMENT

#### E16.6 Median Barrier

- E16.6.1 Concrete median barriers will be measured on a length basis and paid for at the Contract Unit Price for the "Items of Work" listed here below. The length to be paid for will be the total number of meters installed in accordance with this Specification, accepted and measured by the Contract Administrator.

##### **Items of Work**

Construction of Concrete Median Barrier

- (a) F-Shaped Barrier
- (b) Transition Barrier

- E16.6.2 Supply and installation of reinforcing steel shall not be measured and shall be considered incidental to "Construction of Concrete Median Barrier".
- E16.6.3 Concrete pads below the concrete median barriers will be measured and paid for in accordance with CW 3310-R17.

#### **E17. CONCRETE CURBS, CURB AND GUTTER, AND SPLASH STRIPS**

##### DESCRIPTION

- E17.1 This Specification shall supplement and amend CW 3310-R17 – "Portland Cement Concrete Pavement Works".
- E17.2 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 an incidental to the satisfactory performance and completion of all work hereinafter specified.

##### MATERIALS

- E17.3 All materials shall be as specified in CW 3310-R17.

#### E17.4 CONSTRUCTION METHODS

#### E17.5 Concrete Curbs, Curb and Gutter, and Splash Strips

- E17.5.1 Concrete curb shapes not included in CW 3310-R17 shall be constructed to the dimensions and locations shown on the Drawings.
- E17.5.2 Reinforcing steel shall be installed as per the Drawings or as directed by the Contract Administrator.

#### E17.6 MEASUREMENT AND PAYMENT

#### E17.7 Concrete Curbs, Curb and Gutter, and Splash Strips

- E17.7.1 Concrete curbs will be measured on a length basis and paid for at the Contract Unit Price for the "Items of Work" listed here below. The length to be paid for will be the total number of meters installed in accordance with this Specification, accepted and measured by the Contract Administrator.

##### **Items of Work**

Concrete Curbs, Curb and Gutter, and Splash Strips



- (a) Construction of Mountable Curb w/ Asphalt Overlay (120 mm ht., Dowelled)
- (b) Construction of Mountable Curb and Gutter (120 mm ht.)
- (c) Splash Curb for Asphaltic Concrete Pavement (\*\* mm ht., Barrier, 750 mm width)  
\*\* specify height

E17.8 Supply and installation of reinforcing steel will not be measured and shall be considered incidental to "Concrete Curbs, Curb and Gutter, and Splash Strips".

## **E18. TEMPORARY ASPHALT CURB**

### DESCRIPTION

E18.1 This Specification covers the construction of temporary asphalt curb and its removal.

### MATERIALS

E18.2 Asphalt

E18.2.1 Asphalt for asphalt curbs shall be Type 1A in accordance with CW 3410.

### CONSTRUCTION METHODS

E18.3 Temporary Asphalt Curb

E18.3.1 Prior to constructing the curb, the Contractor shall clean the pavement and apply tack coat in accordance with CW 3410.

E18.3.2 Asphalt curbs shall be constructed to the dimensions shown on the Drawings.

E18.3.3 Remove the asphalt curb and dispose of the material in accordance with CW 1130.

### MEASUREMENT AND PAYMENT

E18.4 Temporary Asphalt Curb

E18.4.1 Asphalt curbs including removal will be measured on a length basis and paid for at the Contract Unit Price for "Temporary Asphalt Curb". The length to be paid for shall be the total number of linear meters of curb supplied, installed and removed in accordance with this Specification and measured by the Contract Administrator and shall be payment in full for performing all operations herein described and other items incidental to the Work included in this Specification.

E18.4.2 Supply and application of tack coat will be considered incidental to the works, and no separate measurement or payment will be made.

E18.4.3 Removal of the asphalt curb will be considered incidental to the works, and no separate measurement or payment will be made.

## **E19. DITCH INLET GRATE**

### DESCRIPTION

E19.1 This specification covers the supply and installation of ditch inlet grates as shown on catch basins or catchpits.

### MATERIALS

E19.2 Ditch Inlet Grate

- E19.2.1 Ditch inlet grates including all hardware shall be supplied in accordance with the Drawings. All steel shall be hot-dip galvanized and all hardware shall be stainless steel. Ditch inlet grates shall be Shopost Iron Works MK-A1 or approved equal in accordance with B6.

#### CONSTRUCTION METHODS

- E19.3 Ditch Inlet Gate
- E19.3.1 The Contractor shall be required to supply and install ditch inlet grates on catch basins or catchpits shown on the Drawings.
- E19.3.2 The ditch inlet grate shall be understood to replace the City of Winnipeg Approved Product AP-006 and AP-009 as indicated on the Drawings.
- E19.3.3 The ditch inlet grate shall be understood to include the supply and installation of all anchor steel, grate steel, and hardware. All concrete material shall be included in the unit price bid for catch basins or catchpits.
- E19.3.4 The ditch inlet grate shall be securely fastened to the catch basin or catchpit as shown on the Drawings and as approved by the Contract Administrator.
- E19.3.5 Any galvanized surfaces that are damaged shall be coated with a galvanizing compound approved by the Contract Administrator.

#### MEASUREMENT AND PAYMENT

- E19.4 Ditch Inlet Gate
- E19.4.1 The supply and installation of ditch inlet grates will not be measured for payment and shall be included in the payment made for catch basins or catchpits.

### **E20. INSTALLATION OF CULVERTS**

#### DESCRIPTION

- E20.1 General
- E20.1.1 This specification shall amend and supplement City of Winnipeg Standard Construction Specification CW 3610-R3 "Installation of Culverts", and shall cover supply and installation of culverts.
- E20.1.2 Referenced Standard Construction Specifications
- (a) CW 2030 – Excavation Bedding and Backfill
  - (b) CW 3610 – Installation of Culverts
- E20.1.3 Referenced Standard Detail
- (a) SD 002 – Standard Trench and Excavation Backfill Classes.

#### MATERIALS

- E20.2 Bedding and Backfill
- E20.2.1 Bedding and initial backfill material shall consist of 20 mm limestone base course, as specified in CW 2030, placed on a prepared subgrade and compacted to the thickness and density herein specified.
- E20.3 CSP Bar Screens
- E20.3.1 CSP bar screens shall be supplied in accordance with the Drawings.
- E20.4 Concrete Flared End Section

- E20.4.1 Concrete flared end sections shall be supplied from the same manufacturer as the concrete culvert pipe being supplied.

#### CONSTRUCTION METHODS

#### E20.5 Beveled Ends

- E20.5.1 Further to CW 3610, all CSP culvert ends shall be beveled as shown on the Drawings.

#### E20.6 Trenchless Installation

- E20.6.1 Where indicated on the Drawings, trenchless installation methods shall be used in accordance with CW 2130.

#### E20.7 Bedding and Backfill

- E20.7.1 The backfilling for corrugated steel pipe installed under proposed pavements and private approaches shall be Class 2 as shown in Standard Detail SD-002 and specified in CW 2030, except as noted below.

- E20.7.2 The following revisions for bedding and initial backfill apply to Class 2 and Class 4 backfill:

- (a) Limestone base course material shall be used for bedding and initial backfill as opposed to sand.
- (b) A minimum thickness of 225 mm of compacted 20 mm limestone bedding shall be placed on the prepared subgrade. A 75 mm blanket of loose uniform bedding material shall then be placed on the compacted bedding to provide fill for the corrugations in the invert.
- (c) The backfill material shall be placed in layers not exceeding 300 mm. Backfilling shall be carried out in such a manner as to obtain uniform compaction without soft spots. Compaction shall be 95% of the Standard Proctor Density.
- (d) Manual placing and compaction of material shall be used to build up the backfill to encompass the lower part of the pipe. Backfill material shall be placed under the haunches by shovel and compacted firmly by power compaction ("jumping jack") equipment. Valleys of the corrugations and the area immediately next to the pipe must be compacted by hand operated methods. At no time shall heavy compaction equipment be brought closer than 1 m from the CSP.
- (e) Backfill shall be so placed and mechanically compacted that the fill rises equally and simultaneously on both sides, including handwork next to the pipe. Layers shall be placed with equipment running parallel to the structure.
- (f) When the fill on both sides of the pipe approaches the crown of the pipe, the same techniques of spreading shallow layers and compacting thoroughly shall be followed as the backfill covers the pipe. Light tamping equipment shall be used for the initial layers over the pipe.
- (g) No distortion of the structure greater than 2% of the span or rise shall be allowed.
- (h) No traffic of any sort shall be permitted over the structure until cover of a minimum depth of 300 mm is properly compacted in place. If the Contractor requires crossings by heavy construction equipment, a minimum of 1.2 m of compacted cover over a length of at least 7.3 m of the structure shall be provided at no extra cost to the City.
- (i) All compaction equipment used shall be subject to the approval of the Contract Administrator.

#### E20.8 CSP Bar Screens

- E20.8.1 The Contractor shall supply and install bar screens where shown and as indicated on the Drawings.

**E20.9 Concrete Flared End Sections**

E20.9.1 The Contractor shall supply and install concrete flared end sections where shown on the drawings to the manufacturer's installation procedures.

**MEASUREMENT AND PAYMENT**

**E20.10 Installation of Culverts**

E20.10.1 The supply and installation of culverts, including bedding and backfill will be measured and paid for in accordance with CW 3610.

**E20.11 Beveled Ends**

E20.11.1 There shall be no separate measurement or payment for beveled ends. Beveled ends shall be included in the linear meter price paid for the supply and installation of culverts.

**E20.12 CSP Bar Screens**

E20.12.1 There shall be no measurement or payment for CSP Bar Screens. CSP bar screens shall be included in the payment for installation of culverts.

**E20.13 Concrete Flared End Sections**

E20.13.1 There shall be no separate measurement or payment for concrete flared ends. Concrete flared ends shall be included in the linear meter price paid for the supply and installation of culverts.

**E21. LAND DRAINAGE SEWERS**

**DESCRIPTION**

**E21.1 General**

E21.1.1 This specification shall amend and supplement City of Winnipeg Standard Construction Specification CW 2130-R12 "Gravity Sewers", and shall cover the installation of land drainage sewers.

**E21.1.2 Referenced Standard Construction Specifications**

- (a) CW 2030 – Excavation Bedding and Backfill
- (b) CW 2130 – Gravity Sewers

**E21.1.3 Referenced Standard Detail**

- (a) SD 002 – Standard Trench and Excavation Backfill Classes.

**MATERIALS**

**E21.2 Bedding and Backfill**

E21.2.1 Bedding and initial backfill material shall consist of 20 mm limestone base course, as specified in CW 2030, placed on a prepared subgrade and compacted to the thickness and density herein specified.

**CONSTRUCTION METHODS**

**E21.3 Bedding and Backfill**

E21.3.1 The backfilling for land drainage sewers installed under proposed pavements and private approaches shall be Class 3 as shown in Standard Detail SD-002 and specified in CW 2030, except as noted below.

- E21.3.2 The following revisions for bedding and initial backfill apply to Class 3 and Class 5 backfill:
- (a) Limestone base course material shall be used for bedding and initial backfill as opposed to sand.
  - (b) A minimum thickness of 225 mm of compacted 20 mm limestone bedding shall be placed on the prepared subgrade. A 75 mm blanket of loose uniform bedding material shall then be placed on the compacted bedding.
  - (c) The backfill material shall be placed in layers not exceeding 300 mm. Backfilling shall be carried out in such a manner as to obtain uniform compaction without soft spots. Compaction shall be 95% of the Standard Proctor Density.
  - (d) Manual placing and compaction of material shall be used to build up the backfill to encompass the lower part of the pipe. Backfill material shall be placed under the haunches by shovel and compacted firmly by power compaction ("jumping jack") equipment. At no time shall heavy compaction equipment be brought closer than 1 m from the pipe.
  - (e) Backfill shall be so placed and mechanically compacted that the fill rises equally and simultaneously on both sides, including handwork next to the pipe. Layers shall be placed with equipment running parallel to the structure.
  - (f) When the fill on both sides of the pipe approaches the crown of the pipe, the same techniques of spreading shallow layers and compacting thoroughly shall be followed as the backfill covers the pipe. Light tamping equipment shall be used for the initial layers over the pipe.
  - (g) No traffic of any sort shall be permitted over the structure until cover of a minimum depth of 300 mm is properly compacted in place. If the Contractor requires crossings by heavy construction equipment, a minimum of 1.2 m of compacted cover over a length of at least 7.3 m of the structure shall be provided at no extra cost to the City.
  - (h) All compaction equipment used shall be subject to the approval of the Contract Administrator.

#### MEASUREMENT AND PAYMENT

#### E21.4 Land Drainage Sewers

- E21.4.1 No measurement will be made for the work described in this Specification, it shall be included in the payment made for "Land Drainage Sewers".

### **E22. INSTALLATION OF STRAW WATTLES**

#### DESCRIPTION

- E22.1 Straw wattles are required to be installed as erosion control measures to mitigate any deleterious materials from entering the land drainage system or waterways. At a minimum, these locations will include the perimeter of all riprap located at ditch catch basins and culvert ends.

#### MATERIALS

- E22.2 The straw wattles shall be Stenlog or other biodegradable straw wattles.

#### CONSTRUCTION METHODS

- E22.3 Install 300mm straw wattle sediment control material in accordance with the manufacturer's specifications around all riprap areas related to drainage inlets and outlets, and approach/roadway culverts within seeded areas.

- E22.4 Install straw wattles so that no gaps exist between the soil and the bottom of the wattle, and the ends of adjacent wattles are overlapped 150mm minimum to prevent water and sediment passing. Achieve a tight seal between the wattle segments.
- E22.5 Dogleg terminal ends of straw wattle up the slope to prevent channeling of sedimentation.
- E22.6 Use 300mm wooden stakes to fasten straw wattle to the soil. Place stakes on each side of the straw wattle, lying across the natural fibre twine, spaced 1200mm on centre. Leave 30 to 50 mm of wood stake exposed above the wattle.
- E22.7 Avoid damage to wattles. Damaged areas of wattles should be cut and tied off, then treated as terminal ends.
- E22.8 At the direction of the Contract Administrator, the straw wattle shall be removed after seeding has established and before the end of the Warranty Period.

#### MEASUREMENT AND PAYMENT

- E22.9 Installation of straw wattles will be measured on a length basis and paid for at the Contract Unit Price for "Installation of Straw Wattle". The length to be paid for will be the total number of linear metres of straw wattles installed in accordance with this Specification, accepted and measured by the Contract Administrator.

### **E23. TREE REMOVAL**

#### E23.1 Description

- E23.1.1 This Specification shall supplement CW3010 – Clearing and Grubbing and cover the removal of individual trees outside of the designated "Clearing and Grubbing" areas designated for removal by the Contract Administrator. The Work shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work.

#### E23.2 Construction Methods

##### E23.2.1 Tree Removal

- (a) Before commencement of any work, the Contractor shall consult with the Contract Administrator as to which trees and/ or shrubs shall be removed. All other trees and shrubs shall be protected against damage from all construction activity in accordance with E4 Protection of Existing Trees.
- (b) Trees to be removed are to be felled so as to land within the limits of the works. The Contractor shall take all precautions to prevent damage to traffic, structures, pole lines, adjacent property and to trees and shrubs designated to be saved, and he shall be liable for any damages occurring in the performance of this work.
- (c) The Contractor shall cut down all trees and shrubs designated for removal and grub out all stumps and roots. The Contractor shall load and haul all trees, stumps, roots, logs, brush, rubbish and all other surface litter from the site and dispose of these materials at dumps located by the Contractor and approved by the Contract Administrator.

#### E23.3 Measurement and Payment

- E23.3.1 Measurement for payment shall be based on the Diameter at Breast Height (D.B.H.) measured at 145 cm above ground level on trees with single trunks. On trees with double or multiple trunks the following rules shall apply:

- (a) Where a single diameter measurement is possible above ground, the measurement will be made at a point just below the junction of the trunks where the total tree diameter is not influenced by the junction or the basal flare;
- (b) Where a single diameter measurement above ground is not possible, then the total tree diameter will be based on the D.B.H. (measured at 145 cm above ground level) of the largest trunk plus ½ the D.B.H. of each subsequent trunks;
- (c) Situations regarding the measurement of any tree not falling into one of the above categories must be referred to the Contract Administrator immediately for a decision prior to removal

E23.3.2 Removal of Trees will be paid for at the Contract Unit Price for the "Items of Work" listed here below, measured as specified herein, which price shall be payment in full for removing and disposing all tree materials and for completing all operations herein described and all other items incidental to the work included in this Specification.

**Items of Work:**

Tree Removal

- (a) 0 to 10 cm diameter
- (b) 11 to 30 cm diameter
- (c) Over 30 cm diameter

**E24. SALT TOLERANT GRASS SEEDING**

DESCRIPTION

E24.1 Further to CW 3520 and CW3540, this specification shall cover sub-grade preparation and the supply and placement of Salt Tolerant Grass Seed.

MATERIALS

E24.2 Salt Tolerant Grass Seed

- E24.2.1 Salt Tolerant Grass Seed for regional and collector boulevards, medians and interchange areas shall be a mixture composed of:
- (a) Seventy percent (70%) Fults or Nuttals Alkaligrass (*Puccinellia* spp.), twenty percent (20%) Audubon or Aberdeen Creeping Red Fescue and ten percent (10%) Perennial Ryegrass.

EQUIPMENT

E24.3 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.

CONSTRUCTION METHODS

E24.4 Preparation of Existing Grade

- E24.4.1 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 100 mm to the satisfaction of the Contract Administrator.
- E24.4.2 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).

E24.5 Salt Tolerant Grass Seeding

E24.5.1 Salt Tolerant Grass Seed shall be sown at a rate of 2.2 kilograms per 100 square meters.

MEASUREMENT AND PAYMENT

E24.6 Supply, placement and maintenance of Salt Tolerant Grass Seed will be paid for at the Contract Unit Price per square metre for "Salt Tolerant Grass Seeding", 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. Payment for Salt Tolerant Grass Seeding shall be in accordance with the following:

- (a) Sixty five (65%) percent of quantity following supply and placement.
- (b) Remaining thirty five (35%) percent of quantity following termination of the Maintenance Period.

**E25. CAST-IN-PLACE CONCRETE PILE FOUNDATIONS FOR STEEL OVERHEAD SIGN SUPPORT STRUCTURES**

E25.1 Description

E25.1.1 General

- (a) The Work covered under this Item shall include all concreting operations related to construction of cast-in-place concrete pile foundations for new steel overhead sign support structures in accordance with this Specification and as shown on the Drawings.
- (b) The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Works as hereinafter specified.

E25.2 Materials

E25.2.1 General

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

E25.2.2 Handling and Storage of Materials

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

E25.2.3 Testing and Approval

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

E25.2.4 Patching Mortar



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

#### E25.2.5 Cement

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

#### E25.2.6 Concrete

##### (a) General

- (i) Concrete repair material shall be compatible with the concrete substrate.
- (b) The Contractor shall be responsible for the design and performance of all concrete mixes supplied under this Specification. Either ready mix concrete or proprietary repair mortars, where applicable, may be used having the following minimum properties in accordance with the latest CSA A23.1:
  - (i) Class of Exposure: S-1 and F-1;
  - (ii) Compressive Strength @ 56 days = 35 MPa;
  - (iii) Water / Cementing Materials Ratio = 0.4;
  - (iv) Air Content: Category 1 per Table 4 of CSA A23.1-14 (5-8%);
  - (v) Cement – shall be as specified in E18.2.5.
- (c) Mix design for ready mix concrete shall be submitted to Contract Administrator at least two (2) weeks prior to concrete placing operations.
- (d) The workability of each concrete mix shall be consistent with the Contractor's placement operations. Self-compacting concrete may be used for pile foundations
- (e) Any proposed proprietary repair mortar shall be subject to the approval of the Contract Administrator and must meet or exceed the properties of the ready mix concrete.
- (f) The temperature of all types of concrete shall be between fifteen degrees Celsius (15°C) and twenty-five degrees Celsius (25°C) at discharge. Temperature requirements for concrete containing silica fume shall be between ten degrees Celsius (10°C) and eighteen degrees Celsius (18°C) at discharge unless otherwise approved by the Contract Administrator
- (g) Concrete materials susceptible to frost damage shall be protected from freezing.

#### E25.2.7 Aggregate

- (a) The Contractor shall be responsible for testing the fine and coarse aggregates to establish conformance to these specifications, and the results of these tests shall be provided to the Contract Administrator if requested. All aggregates shall comply with the latest CSA A23.1.
- (b) Coarse Aggregate
  - (i) The maximum nominal size of coarse aggregate shall be sized to suit the Contractor's mix design. Gradation shall be in accordance with the latest CSA A23.1, Table 11, Group 1. The coarse aggregate shall satisfy the Standard Requirements specified in the latest CSA A23.1, Table 12, "Concrete Exposed to Freezing and Thawing".
  - (ii) Coarse aggregate shall consist of crushed stone or gravel or a combination thereof, having hard, strong, durable particles free from elongation, dust, shale, earth, vegetable matter or other injurious substances. Coarse aggregate shall

- be clean and free from alkali, organic or other deleterious matter; and shall have an absorption not exceeding two and a quarter percent (2.25%).
- (iii) The aggregate retained on the 5 mm sieve shall consist of clean, hard, tough, durable, angular particles with a rough surface texture, and shall be free from organic material, adherent coatings of clay, clay balls, and excess of thin particles or any other extraneous material.
  - (iv) Coarse aggregate when tested for abrasion in accordance with the latest ASTM C131 shall not have a loss greater than thirty percent (30%).
  - (v) Tests of the coarse aggregate shall not exceed the limits for standard for requirements prescribed in the latest CSA A23.1, Table 12, for concrete exposed to freezing and thawing.
- (c) Fine Aggregate
- (i) Fine aggregate shall meet the grading requirements of the latest CSA A23.1, Table 10, Gradation FA1.
  - (ii) Fine aggregate shall consist of sand, stone, screenings, other inert materials with similar characteristics or a combination thereof, having clean, hard, strong, durable, uncoated grains free from injurious amounts of dust, lumps, shale, alkali, organic matter, loam, or other deleterious substances.
  - (iii) Tests of the fine aggregate shall not exceed the limits for standard requirements prescribed in the latest CSA A23.1, Table 12.

E25.2.8 Cementing Materials

- (a) Cementing materials shall conform to the requirements of the latest CSA A3001.

E25.2.9 Silica Fume

- (a) Should the Contractor choose to include silica fume in the concrete mix design, it shall not exceed eight percent (8%) by mass of cement.

E25.2.10 Fly Ash

- (a) Fly ash shall be Type C1 or Type F and shall not exceed twenty-five percent (25%) by mass of cement.

E25.2.11 Cementitious materials shall be stored in a suitable weather-tight building that shall protect these materials from dampness and other destructive agents. Cementitious materials that have been stored for a length of time resulting in the hardening or formation of lumps shall not be used in the Work.

E25.2.12 Admixtures

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

E25.2.13 Water

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

E25.2.14 Concrete Supply

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

E25.2.15 Reinforcing Steel

- (a) Reinforcing steel shall be deemed to include all reinforcing bars, tie-bars, and dowels.
- (b) All reinforcing steel shall conform to the requirements of the latest CSA Standard G30.18, Grade 400 W, Billet-Steel Bars for Concrete Reinforcement. All reinforcing steel shall be new deformed billet steel bars. All bars, including ties, shall be hot-dip galvanized in accordance with the latest ASTM A767 for a minimum net retention of 610 g/m<sup>2</sup>. Reinforcing steel supply and installation will be incidental to construction of concrete pile foundation and no separate payment will be made.

E25.2.16 Anchor Bolts, Nuts, and Washers

- (a) Anchor bolts, nuts, and washers shall be in accordance with the latest ASTM F1554 (Grade 55), and shall be hot-dip galvanized full length in accordance with the latest ASTM F2329 for a minimum net retention of 610 g/m<sup>2</sup>, for the entire length of the anchor bolts. The top threaded portion of the anchor bolts shall be 300 mm long and the bottom threaded portion of the anchor bolts shall be 100 mm long. Anchor bolt supply and installation will be incidental to construction of concrete pile foundation and no separate payment will be made.

E25.2.17 Anchor Bolt Templates

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

E25.2.18 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.

E25.2.19 Precompressed Foam Joint Filler

- (a) Precompressed foam joint filler shall be "Emseal BEJS System", satisfying the requirements of ASTM C711 and G155, or equal as accepted by the Contract Administrator, in accordance with B6.
- (b) The sealant system shall be comprised of three components:
  - (i) Cellular polyurethane foam impregnated with hydrophobic 100% acrylic, water-based emulsion, factory coated and highway-grade, fuel resistant silicone;
  - (ii) Field-applied epoxy adhesive primer; and
  - (iii) Field-injected silicone sealant bands.

- (c) 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.
- (d) BEJS foam seal to be installed into manufacturer's standard field-applied epoxy adhesive. The BEJS SYSTEM is to be installed recessed from the surface such that when the field-applied injection band of silicone is installed between the substrates and the foam-and-silicone-bellows, the system will be 1/2" (12mm) down from the substrate surface.
- (e) Material shall be capable, as a dual deal, of movements 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 (3) 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 capability (+50% nominal material size) with twenty-four (24) hours at 20°C.

#### E25.2.20 Miscellaneous Materials

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

#### E25.3 Construction Methods

##### E25.3.1 Location and Alignment of Piles

- (a) Pile construction shall not commence until the Contractor has obtained clearance from the appropriate Utility Authorities including but not limited to Manitoba Hydro, MTS and City of Winnipeg Water and Waste.
- (b) Piles shall be placed in the positions shown on the Drawings and as directed by the Contract Administrator in the field.
- (c) The deviation of the axis of any finished pile shall not differ by more than one percent (1%) from the vertical.

##### E25.3.2 Buried Utilities

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

##### E25.3.3 Excavation

- (a) Pile excavation shall be achieved by auguring (i.e. drilling) or hydro-jet excavation for the full depth of all piles unless noted otherwise on the Drawings.

- (b) It may be necessary to hydro-jet excavate utilities adjacent to a pile location to adequately ascertain the location or provide enough "slack" in conduits to move them slightly to avoid interference with the pile locations. The Contract Administrator may elect to alter the location of a pile if hydro-jet excavation shows that utilities cannot be avoided.
- (c) Upon reaching the required elevation, the bottom of the excavation shall be cleaned as directed by the Contract Administrator in the field.
- (d) All excavated material from the piles shall be promptly hauled away from the Site to an approved disposal area as located by the Contractor.
- (e) Upon completion of the cleaning out of the bottom to the satisfaction of the Contract Administrator, the reinforcement and anchor bolts shall be set in place and the concrete poured immediately. Under no circumstances shall a hole be left to stand open after excavation has been completed.
- (f) If any hole is condemned because of caving, it shall be filled with lean-mix concrete and a new hole excavated as near as possible to the location shown on the Drawings. In locations where underground utilities have been exposed, the underground utilities shall be covered with clean sand to 300 mm minimum cover around the utility. Payment will not be made for condemned piles.

#### E25.3.4 Sleeving

- (a) Steel or corrugated metal pipe sleeving shall be used if required to temporarily line the excavation to prevent bulging or caving of the walls.
- (b) The sleeving shall be designed by the Contractor and constructed to resist all forces that may tend to distort it.
- (c) The sleeving shall be withdrawn as the concrete is placed in the excavation. The sleeving shall extend at least 1 m below the top of the freshly deposited concrete at all times.
- (d) The clearance between the face of the excavation and the sleeving shall not exceed 75 mm.
- (e) The sleeving may remain cast in place if required to protect nearby utilities at the direction of the Contract Administrator. The top of sleeving shall be 300 mm below the top of finished grade.

#### E25.3.5 Inspection of Excavations

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

#### E25.3.6 Placing Reinforcing Steel

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

#### E25.3.7 Placing Anchor Bolts

- (a) The anchor bolts shall be aligned with the steel templates matching the bolt holes in the sign structure base plate. The setting templates shall be held in place by the top

and bottom nuts of the anchor bolts. The anchor bolts shall be plumb. Extreme care shall be used in this operation. Placement of anchor bolts without the steel template will not be permitted.

- (b) The threaded portion of the anchor bolts projecting above the top surface of pile shall be coated with oil, before the concrete is poured, to minimize the fouling of threads splattered by concrete residue.

#### E25.3.8 Forms

- (a) For hydro-jet excavated piles, the top of the piles shall be formed with tubular forms (Sonotube) to a minimum depth of 1500 mm below final grade.
- (b) For bored piles the top of the piles shall be formed with tubular forms (Sonotube) to a minimum depth of 1000 mm below final grade.
- (c) In locations of caving, the tubular form (Sonotube) should extend a minimum of 500 mm below where the shaft becomes uniform. The minimum depth of the tubular forms (Sonotube) shall be as specified by E25.3.8(a) and E25.3.8(b).
- (d) The forms shall be sufficiently rigid to prevent lateral or vertical distortions from the loading environment to which they shall be subjected. Forms shall be set to the design grades, lines, and dimensions, as shown on the Drawings.

#### E25.3.9 Placing Concrete

- (a) Care shall be taken to ensure that anchor bolts are vertically aligned and that anchor bolts and conduits are properly positioned prior to placement of concrete.
- (b) Concrete shall not have a free fall of more than 2.0 m and shall be placed so that the aggregates will not separate or segregate. The slump of the concrete shall not exceed 110 mm. The concrete shall be vibrated throughout the entire length of the pile.
- (c) Concrete shall be placed to the elevations as shown on the Drawings. The top surface of the pile shall be finished smooth with a hand float and provided with a one percent (1%) slope for drainage away from the centreline of the pile.
- (d) The shaft shall be free of water prior to placing of concrete. Concrete shall not be placed in or through water unless authorized by the Contract Administrator. In the event that tremie concrete is allowed by the Contract Administrator, the concrete shall be placed as specified herein.
- (e) All concrete, during and immediately after deposition, shall be consolidated by mechanical vibrations 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 that may cause honeycombing, pitting, or planes of weakness.

#### E25.3.10 Tremie Concrete

- (a) The shaft of the pile shall be pumped clear of water so that the bottom can be cleaned. Pumping shall then be stopped and water shall be allowed to come into the excavation until a state of equilibrium is reached. Concrete shall then be placed by means of a tremie pipe. The tremie pipe shall have a suitable gate in the bottom to prevent water from entering the pipe. The bottom of the pipe shall be maintained below the surface of the freshly placed concrete. The pipe shall be capable of being raised or lowered quickly in order to control the flow of concrete.
- (b) Tremie concrete shall be poured up to a depth of 600 mm or as the Contract Administrator directs. Pumps shall then be lowered into the excavation and the excess water pumped out. The laitance that forms on top of the tremie shall then be removed and the remainder of the concrete shall be placed in the dry excavation

#### E25.3.11 Protection of Newly Placed Concrete

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

#### E25.3.12 Curing Concrete

- (a) The top of the freshly finished concrete piles shall be covered and kept moist by means of wet polyester blankets immediately following finishing operations and shall be maintained at above ten degrees Celsius (10°C) for at least seven (7) consecutive days thereafter.
- (b) After the finishing is completed, the surface shall be promptly covered with a minimum of a single layer of clean, damp polyester blanket.
- (c) Concrete shall be protected from the harmful effects of sunshine, drying winds, surface dripping or running water, vibration, and mechanical shock. Concrete shall be protected from freezing until at least twenty-four (24) hours after the end of the curing period.
- (d) Changes in temperature of the concrete shall be uniform and gradual and shall not exceed three degrees Celsius (3° C) in one (1) hour or twenty degrees Celsius (20°C) in twenty-four (24) hours.

#### E25.3.13 Form Removal

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

#### E25.3.14 Patching of Formed Surfaces

- (a) Immediately after forms around top of pile have been removed, but before any repairing or surface finishing is started, the concrete surface shall be inspected by the Contract Administrator. Any repair of surface finishing started before this inspection may be rejected and required to be removed.
- (b) All formed concrete surfaces shall have bolts, ties, struts, and all other timber or metal parts not specifically required for construction purposes cut back fifty (50) mm from the surface before patching.
- (c) Minor surface defects caused by honeycomb, air pockets greater than 5 mm in diameter, and voids left by strutting, and tie holes shall be repaired by removing the defective concrete to sound concrete, dampening the area to be patched and then applying patching mortar. A slurry grout consisting of water and cement, shall be well-brushed onto the area to be patched. When the slurry grout begins to lose the water sheen, the patching mortar shall be applied. It shall be struck-off slightly higher than the surface and left for one (1) hour before final finishing to permit initial shrinkage of the patching mortar and it shall be touched up until it is satisfactory to the Contract Administrator. The patch shall be cured as specified in this Specification, and the final colour shall match the surrounding concrete.

#### E25.3.15 Cold Weather Concreting

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

#### E25.3.16 Removal and Restoration of Adjacent Surface Treatments

- (a) If the new pile being constructed is located in a concrete sidewalk/median slab, the existing slab shall be removed to the nearest existing joints. If the nearest existing joint is more than 600 mm beyond the perimeter of the pile, the Contractor shall remove a square section of the existing slab that is 300 mm beyond the pile perimeter. The surface of the slab shall be saw-cut to a depth of 50 mm around the perimeter of the square section. Care shall be taken to ensure that the saw-cut edge of the section is not chipped or broken during the removal of the concrete. Concrete slabs damaged beyond the specified limits shall be replaced at the Contractor's cost to the satisfaction of the Contract Administrator. After the pile has been constructed, the concrete sidewalk/median slab shall be restored flush with the adjacent surface level.
- (b) If the pile being constructed is located in grass boulevard/median, following pile construction disturbed areas shall be backfilled and restored with sod around the new pile as directed by the Contract Administrator.
- (c) If the pile being constructed is located in a paving stone surface, the paving stones shall be temporarily removed to the extent required for new pile construction and appropriately stored by the Contractor. Following pile construction, the Contractor shall cut as required and re-set the salvaged paving stones around the new pile flush with the adjacent surface level, as directed by the Contract Administrator.
- (d) The removal and restoration of surface treatments will be considered incidental to pile construction works at each Site and no separate payment will be made.

#### E25.4 Quality Control

E25.4.1 All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator, including all operations from the selection and production of materials, through to final acceptance of the Work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or Works that are not in accordance with the requirements of this Specification.

E25.4.2 The Contractor shall be responsible for making a thorough inspection of materials to be supplied under this Contract. All material shall be free of surface imperfections and other defects.

#### E25.5 Measurement and Payment

##### E25.5.1 Construction of New Cast-in-Place Concrete Pile Foundations

- (a) Construction of new cast-in-place concrete pile foundations including supply and installation of anchor bolts complete with nuts, washers and steel templates will be measured on a unit basis and paid for at the Contract Unit Price for "Items of Work" listed here below, 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, accepted and measured by the Contract Administrator.

**Items of Work:**

Cast-in-Place Concrete Pile Foundations:

- (i) S792 - 915 mm Diameter Pile;
  - (ii) S793 - 915 mm Diameter Pile;
  - (iii) S794 - 762 mm Diameter Pile.
- (b) Supplying and installing all the listed materials, concrete design requirements, equipment, construction methods, and quality control measures associated with this Specification and the Drawings shall be considered incidental to "Cast-in-Place



Concrete Pile Foundations”, unless otherwise noted herein. No measurement or payment shall be made for this Work unless indicated otherwise.

## **E26. SUPPLY AND INSTALLATION OF NEW STEEL OVERHEAD SIGN SUPPORT STRUCTURES**

### **E26.1 Description**

- (a) The Work covered under this item shall include all operations related to the supply, fabrication, delivery, erection of new steel overhead sign support structures and installation of all sign panels onto the sign support structures.
- (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 the Work as hereinafter specified.

### **E26.2 Materials**

#### **E26.2.1 General**

- (a) The Contractor shall be responsible for the supply, safe storage, and handling of all materials set forth in this Specification.
- (b) All materials used for fabrication of overhead sign support structures shall be new, previously unused material.

#### **E26.2.2 Handling and Storage of Materials**

- (a) All materials shall be handled in a careful and workmanship-like manner, to the satisfaction of the Contract Administrator.

#### **E26.2.3 Structural Steel**

- (a) Structural steel for all components of the overhead sign support structures shall be in accordance with CSA Standard G40.21 M, to the grades indicated on the Drawings. For purposes of hot-dip galvanizing, the silicon content in the steel shall be controlled within zero to three hundredths of a percent (0 to 0.03%) or fifteen hundredths to twenty-two hundredths of a percent (0.15 to 0.22%) for monotubular shafts and arms, and to less than three tenths of a percent (0.3%) for all other steel components.
- (b) The Contractor is advised that copies of mill test certificates showing the chemical and physical properties of all structural steel to be supplied under this Specification must be supplied to the Contract Administrator and be found acceptable prior to commencement of fabrication.
- (c) Steel shall not be acceptable unless the mill test certificate states the grade to be as indicated on the Drawings. Lower grade steel shall not be acceptable (despite favourable published mill test results). Items fabricated without steel certification shall be rejected.

#### **E26.2.4 Flange Bolts, Nuts, and Washers**

- (a) Flange bolts, nuts, and washers shall be in accordance with ASTM F3125 Grade A325, Type 1, hot-dip galvanized in accordance with ASTM F2329.

#### **E26.2.5 Mounting Bracket Fasteners (Bracket-to-Bracket)**

- (a) Mounting bracket fasteners (connecting two (2) clamp brackets) shall be all-thread rod conforming to one (1) of the following:
  - (i) SAE Grade 2 hot dip galvanized;
  - (ii) ASTM A307 Grade B hot dip galvanized;
  - (iii) ASTM F1554 Grade 55 hot dip galvanized.
- (b) Hot-dip galvanizing shall be in accordance with ASTM F2329. Plated coatings will not be accepted.

- (c) Two (2) nuts, two (2) washers and one (1) lock washer (all hot dip galvanized) shall be provided for each segment of threaded rod.
- (d) The Contractor is permitted to field cut the threaded rod to suit the required length. If so, apply Zinga zinc rich galvanizing touch up paint to cut ends.

E26.2.6 Mounting Bracket Fasteners (Bracket to Panel)

- (a) Mounting bracket fasteners connecting the bracket to the aluminum backing bars of the sign panel shall be stainless steel all-thread hex bolts conforming to ASTM F593 Grade 304 or 316.
- (b) One (1) nut, one (1) washer, and one (1) lock washer shall be furnished with each bolt.

E26.2.7 Fasteners for Handhole Covers

- (a) Fasteners for handhole covers shall be in accordance with ASTM A276 Type 316 stainless steel.

E26.2.8 Hot-Dip Galvanizing

- (a) Hot-dip galvanizing of structural steel shall be in accordance with ASTM A123 for a minimum net retention of 610 g/m<sup>2</sup>.

E26.2.9 Galvanizing Touch-up and Field-Applied Galvanizing

- (a) Only approved products listed below shall be used for field-applied galvanizing, to touch-up damaged hot-dip galvanizing on-site and to galvanize field welds.
- (b) Approved products for self-fluxing, low temperature, zinc-based alloy rods in accordance with ASTM A780-09(2015) for "Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings" are as follows:
  - (i) Galvalloy as manufactured by Metalloy Products Company, P.O. Box No. 3093, Terminal Annex, Los Angeles, California, available from Welder Supplies Limited, 150 McPhillips Street, Winnipeg;
  - (ii) Welco Gal-Viz Galvanizing Alloy, as manufactured by Thermocote Welco, Highway 161, York Road, Kings Mountain, North Carolina, available from Welder Supplies Limited, 150 McPhillips Street, Winnipeg.

E26.2.10 Cold Applied Galvanizing Compound

- (a) Approved cold-applied galvanizing compound is as follows:
  - (i) ZINGA, as manufactured by ZINGAMETALL, Ghent, Belgium, available from Pacific Evergreen Industries Ltd. Vancouver, BC, Ph. (604) 926-5564, and Centennial Mine & Industrial Supply, Saskatoon, Sask., Ph. (306) 975-1944.

E26.2.11 Rodent Screen

- (a) Rodent screens shall be ½" – 18F stainless steel (316L) expanded metal sheet or approved equal in accordance with B.7.

E26.2.12 Aluminum T-Bars

- (a) Aluminum T-Bars shall be in accordance with ASTM B221 6061-T6.

E26.2.13 Sign Plates and Panels for Overhead Sign Structures

- (a) For sign structure S794, sign plates will be supplied and installed by the City of Winnipeg Traffic Services.
- (b) For sign structures S792 and S793, sign panels are to be supplied by the Contractor in accordance with E28 and installed on the overhead sign structures in accordance with this specification.

E26.2.14 Welding Consumables

- (a) Welding consumables for all processes shall be certified by the manufacturer to be complying with the requirements of CSA Standard W59 and the following Specifications:
- (i) manual shielded metal arc welding (SMAW): All electrodes shall be basic-type electrodes conforming to CSA W48, classification E480XX, or imperial equivalent;
  - (ii) gas metal arc welding (GMAW): All electrodes shall conform to CSA W48, classification ER480S-X, or imperial equivalent;
  - (iii) flux cored arc welding (FCAW): All electrodes shall conform to CSA W48, classification E480XT-X or imperial equivalent. Electrodes shall be controlled by hydrogen (CH) designation;
  - (iv) submerged arc welding (SAW): All electrodes shall conform to CSA W48, classification F480X-EXXX or imperial equivalent;
  - (v) shielding gas shall be welding grade carbon-dioxide with a guaranteed dew point of negative forty-six degrees Celsius (-46°C);
  - (vi) all electrodes, wires, and fluxes used shall be of a classification requiring a minimum impact of 27 joules at minus eighteen degrees Celsius (-18°C).
- (b) The proposed welding procedures and welding consumable certificates shall be submitted to the Contract Administrator for their approval at least two (2) Calendar Days prior to the scheduled commencement of any fabrication.

#### E26.2.15 Miscellaneous Materials

- (a) Miscellaneous material incidental to this Work shall be as approved by the Contract Administrator.

#### E26.3 Equipment

- E26.3.1 All equipment shall be of a type approved by the Contract Administrator and shall be kept in good working order.

#### E26.4 Construction Methods

##### E26.4.1 General Requirements

- (a) Holes in the base plates shall be sized as shown on the Drawings, and provisions made for field erection must be accurate within plus or minus 13 mm between supports, without affecting final installation and load capacity.
- (b) The base plates for the sign support structures shall be constructed to be fully compatible and mountable on the anchor bolts, provided in the foundations by the Contractor.
- (c) Sufficient reinforced handholes and wiring holes shall be provided for lighting of the signs as shown on the Drawings. All wiring holes shall have threaded couplings. All unused coupling holes shall be capped with a threaded galvanized plug.
- (d) The sign support structure shall be so fabricated that erection can be achieved by means of bolted connections.
- (e) Each sign structure shall be provided with a "raised" structure identification number with a welding electrode in accordance with the details shown on the Drawings. The sign structure identification number shall be placed before hot-dip galvanizing.
- (f) Adequate venting and drainage holes shall be provided in enclosed sections for hot-dip galvanizing. The galvanizing facilities shall be consulted regarding the size and location of these holes.
- (g) Prior to fabrication, the dimensional limitations on the size and shape imposed by the galvanizing facilities shall be determined for hot-dip galvanizing the sign structures.

##### E26.4.2 Fabrication

- (a) All fabrication shall be carried out in accordance with this Specification and the Contract Drawings, as well as AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals - 2015 – 1st Edition, plus all subsequent revisions.
- (b) The punching of identification marks on the members will not be allowed, except for the structure identification number.
- (c) Any damage to members during fabrication shall be drawn to the attention of the Contract Administrator in order that the Contract Administrator may approve remedial measures.
- (d) Dimensions and fabrication details that control the field matching of parts shall receive very careful attention in order to avoid field adjustment.
- (e) All portions of the Work shall be neatly finished. Shearing, cutting, clipping, and machining shall be done neatly and accurately. Finished members shall be true to line, free from twists, bends, sharp corners, and edges.
- (f) Cut edges shall be true and smooth and free from excessive burrs or ragged breaks. Re-entrant cuts shall be avoided wherever possible. If used, they shall be filleted by drilling prior to cutting.
- (g) All holes shall be free of burrs and rough edges.

#### E26.4.3 Welding

- (a) Welding of steel structures shall be in accordance with CSA W59, "Welded Steel Construction".
- (b) All seams shall be continuously welded and free from any slag and splatter. Longitudinal welds shall be a minimum of sixty percent (60%) penetration, except those within 200 mm of baseplates, flanges, and circumferential welds, which shall be one hundred percent (100%) penetration. All circumferential groove welds shall be one hundred (100%) penetration, and where circumferential welds are used at a butt joint, an internal backup strip shall be provided.
- (c) Longitudinal seam welds in horizontal supports shall be located at the top of the horizontal members.
- (d) All welds shall be ground smooth and flush with the adjacent surface prior to hot-dip galvanizing.

#### E26.4.4 Surface Preparation and Cleaning

- (a) Surface preparation and cleaning of materials prior to hot-dip galvanizing shall be in accordance with ASTM A123 and SSPC Specification SP:6, "Commercial Blast Cleaning," unless otherwise specified herein. The Contractor shall ensure that all exterior and interior surfaces of vertical support members of sign structures are blast cleaned prior to pickling to achieve the minimum zinc coating mass of 610 g/m<sup>2</sup>. All welding and provision of holes is to be completed prior to surface preparation and cleaning, except where shown on the Drawings.
- (b) The sandblasting and cleaning of sign structures shall be done in the shop.
- (c) After the structures have been sandblasted they shall be thoroughly cleaned of all sandblasting abrasive grit and debris, with special attention paid to areas of the structure where sand and debris collect, including but not limited to, behind the gusset plates, handholes and base plate.
- (d) After the sign structures have been sandblasted and cleaned, the Contract Administrator will carry out a visual inspection of the structures in the shop before they are shipped to the galvanizing plant.

#### E26.4.5 Hot-Dip Galvanizing

- (a) The hot-dip galvanizing plant shall be a Regular Member of the American Galvanizers Association, Inc.
- (b) All outside surfaces of the overhead sign support structures shall be hot-dip galvanized in accordance with ASTM A123 to a minimum net retention of 610 g/m<sup>2</sup>.
- (c) Adequate venting and drainage holes shall be provided in enclosed sections for hot-dip galvanizing. The galvanizing facility shall be consulted regarding the size and location of these holes. Holes shall be provided by drilling not burning.
- (d) The galvanizing coating on outside surfaces of overhead sign support structures shall be generally smooth and free of blisters, lumpiness and runs. In particular, the outside surfaces of the bottom 2.5 m of the vertical support members shall have a smooth finish equal to the finish on hot-dipped galvanized handrails.
- (e) In addition to the provision of corrosion protection by the galvanized coating, the aesthetic appearance of the structure after hot-dip galvanizing will also be a criterion in the acceptance or rejection of the galvanized coating. The galvanized coating on the entire structure shall have a uniform "silver" colour and lustre. Galvanizing with parts of the structure having dull grey coating or streaks or mottled appearance will not be acceptable. If the galvanizing is rejected for aesthetic reasons, the Contractor shall rectify the appearance by applying spray-on molten zinc metallizing with 85/15 zinc/aluminum alloy. The metallizing shall be carried out in the shop before the structure is installed.
- (f) Minor defects in the galvanizing coating shall be repaired as specified here below for "Field-Applied Touch-Up Galvanizing". The Contract Administrator shall be consulted before repairs are made.
- (g) Other defects and contaminants in the galvanizing coating, such as heavy dross protrusions, flux inclusions and ash inclusions shall be grounds for rejection of the galvanizing coating system.
- (h) The Contractor shall verify the thickness of galvanized coatings as part of their own quality control testing and make their results available to the Contract Administrator.
- (i) All threaded couplings shall be rethreaded after the sign structures have been hot-dip galvanized.
- (j) The sign structures shall be stored on timber blocking after hot-dip galvanizing.

#### E26.4.6 Delivery and Erection

- (a) The Contractor shall notify the Contract Administrator at least two (2) Working Days in advance of the anticipated delivery to the Site and erection of the overhead sign support structures.
- (b) The sign structures shall be lifted and secured with nylon ropes or other approved methods. Use of steel chains and steel hooks against hot-dip galvanized or powder coated surfaces will not be permitted. The structure components (shaft and arm etc.) shall be placed on timber blocking and secured with nylon ropes during their transportation to the Site.
- (c) Refer to E27 and E6 for Traffic Management requirements during erection.

#### E26.4.7 Attachment of Structure to Anchor Bolts

- (a) Each anchor bolt shall be provided with four (4) galvanized nuts: two (2) nuts at the bottom of the anchor bolt to secure the anchor bolt assembly template, one (1) nut below the base plate for levelling the structure, and one (1) nut above the base plate for anchoring the structure.
- (b) The anchor bolts shall have a minimum projection of 25 mm above the anchoring nuts.
- (c) The distance between the top of the concrete pile and the underside of the levelling nut shall not exceed one (1) anchor bolt diameter.

- (d) The threaded portions of the anchor bolts and nuts shall be treated with a wax based lubricant.
- (e) The Contractor shall plumb the shaft by adjusting the levelling and anchor nuts.
- (f) Levelling nuts and anchor nuts shall be tightened to a snug tight condition, defined as the full effort of an ironworker using an ordinary wrench, or a few impacts of an impact wrench.
- (g) The Contractor shall tighten the top anchoring nuts in an alternating “star” type pattern as follows:
  - (i) for anchor bolts less than or equal to 38 mm diameter: 1/3 of a turn (+20°, -0°) past a snug tight condition;
  - (ii) for anchor bolts greater than 38 mm diameter: 1/6 of a turn (+20°, -0°) past a snug tight condition.

**E26.4.8 Structural Bolt Installation**

- (a) Structural bolts for flange and splice connections shall be tightened in accordance with the turn-of-nut method as follows:
  - (i) alternately tighten all bolts to achieve a snug tight condition. The mating surfaces shall be in firm contact;
  - (ii) tighten all bolts in accordance with Table 1, below;
  - (iii) following tightening, check all bolts in the joint by hand using an ordinary wrench.

Table 1: Required Turns Past Snug Tight for Turn-of-Nut Method

Bolt Diameter <i>D</i> (inches)	Bolt Length up to 4 <i>D</i>		Bolt Length over 4 <i>D</i> to 8 <i>D</i>		Bolt Length over 8 <i>D</i> to 12 <i>D</i>	
	Length up to	Required Turns	Length Range	Required Turns	Length Range	Required Turns
1/2"	2"	1/3 ± 30°	2 to 4"	1/2 ± 30°	4 to 6"	2/3 ± 45°
5/8"	2.5"	1/3 ± 30°	2.5 to 5"	1/2 ± 30°	5 to 7.5"	2/3 ± 45°
3/4"	3"	1/3 ± 30°	3 to 6"	1/2 ± 30°	6 to 9"	2/3 ± 45°
7/8"	3.5"	1/3 ± 30°	3.5 to 7"	1/2 ± 30°	7 to 10.5"	2/3 ± 45°
1"	4"	1/3 ± 30°	4 to 8"	1/2 ± 30°	9 to 13.5"	2/3 ± 45°
1 1/8"	4.5"	1/3 ± 30°	4.5 to 9"	1/2 ± 30°	10 to 15"	2/3 ± 45°
1 1/4"	5"	1/3 ± 30°	5 to 10"	1/2 ± 30°	11 to 16.5"	2/3 ± 45°

**E26.4.9 Installation of Sign Panels**

- (a) The Contractor will be responsible for installation of sign panels on the sign support structures.
- (b) The Contractor shall install the sign panels on the sign support structures immediately following erection of the support structures (same day). In no case will a sign support structure be allowed to be erected and left for a significant amount of time (greater than one (1) day) without having the sign panels installed.
- (c) Sign panels shall be installed such that the panels are level to ground after all support structure deflection has occurred.
- (d) Sign panels shall not be twisted or warped following installation.

**E26.4.10 Rodent Screens**

- (a) Rodent screens that will prevent vermin and debris from entering the gap between the bottom of the base plate and the top of the concrete foundation shall be installed in lieu of grout pads at all overhead sign structure bases.
- (b) The entire gap shall be covered with an expanded stainless steel metal screen, in accordance with E26.2.11, "Rodent Screen". The bottom edge of the expanded stainless steel screen shall be in full contact with the surface of the concrete foundation. The top edge of the expanded stainless steel screen shall not extend beyond the top surface of the structure base plate.
- (c) The rodent screen shall be made of one (1) continuous piece of expanded stainless steel with only one (1) overlapping splice where the ends come together and lap a minimum of 75 mm.
- (d) The rodent screen shall be attached to the vertical side of the structure baseplate with self-tapping stainless steel screws (#8-1/2" long) complete with stainless steel washers. Pilot holes shall first be drilled into the baseplate to facilitate screw installation. Screws shall be installed at 200 mm on center maximum and at least one screw shall be installed through the overlapping splice to clamp the two (2) layers of rodent screen together.
- (e) The two (2) overlapping layers of rodent screen shall also be clamped just above the concrete foundation with a stainless steel fastener assembly consisting of a machine screw (#8-5/8" long) complete with a nut, two (2) flat washers and a lock washer. The rodent screen shall be tightly clamped between the flat washers.

#### E26.4.11 Field-Applied Touch-up Galvanizing

- (a) Any areas of damaged galvanizing on the sign structures shall receive field-applied touch-up galvanizing.
- (b) Surfaces to receive touch-up galvanizing shall be cleaned using a wire brush, a light grinding action, or mild blasting to remove loose, scale, rust, paint, grease, dirt, or other contaminants.
- (c) For self-fluxing, low temperature, zinc based alloy rods, preheat the surface to three hundred and fifteen degrees Celsius (315°C) and wire brush the surface during preheating. Rub the cleaned preheated area with the repair stick to deposit an evenly distributed layer of zinc alloy. Spread the alloy with a wire brush, spatula, or similar tool. Field-applied galvanizing shall be blended into existing galvanizing of surrounding surfaces and shall be buffed and polished if required to match the surrounding surfaces. Care shall be taken to not overheat surfaces beyond four hundred degrees Celsius (400°C) and to not apply direct flame to the alloy rods.
- (d) For cold applied galvanizing compound, the approved product shall be applied by either a brush or roller. The compound shall be applied in three (3) coats, with each coat having a dry film thickness of 60 µm (2.36 mils). Each coat shall be left to dry for a minimum of one (1) hour before the application of the next coat.

#### E26.5 Quality Control

##### E26.5.1 General

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

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

#### E26.5.2 Welding Qualifications

- (a) The Contractor shall produce evidence that the plant has recently been fully approved by the Canadian Welding Bureau (C.W.B.) to the requirements of CSA W47.1 Division 2.1 for welding of steel structures.
- (b) Approved welding procedures shall be submitted to the Contract Administrator prior to fabrication of any steel items.

#### E26.5.3 Testing

- (a) In addition to the Contractor's own quality control testing of all materials, welding procedures and steel fabrication including hot-dip galvanizing will be inspected and tested by the Contract Administrator to ascertain compliance with the Specifications and Drawings.
- (b) The Contract Administrator will hire a testing agency certified by the Canadian Welding Bureau to carry out shop fabrication inspection and testing before the overhead sign support structures are approved ready for installation of coating system. The inspector shall have access to all of the fabricator's normal quality control records for this Contract, specified herein. Inspection and testing will include:
  - (i) visual inspection of one hundred percent (100%) of welds;
  - (ii) ultrasonic testing of one hundred percent (100%) of full penetration sections of longitudinal seam welds and circumferential butt welds;
  - (iii) magnetic particle testing of a random ten percent (10%) of partial penetration sections of longitudinal seam welds;
  - (iv) ultrasonic testing of twenty-five percent (25%) of base plate and flange plate welds;
  - (v) inspection of hot-dip galvanizing and coating thickness.
- (c) Welds that are found by any of the inspection and testing methods to be inadequate and unsatisfactory shall be repaired in accordance with CSA W59 and then retested. The cost of the repairs and the cost of the retest shall be paid for by the Contractor.
- (d) No repair shall be made until agreed to by the Contract Administrator.
- (e) Defects in hot-dip galvanizing shall be rectified as directed by the Contract Administrator.

#### E26.5.4 Unacceptable Work

- (a) Any Work found to be unacceptable shall be corrected in accordance with CSA W59;
- (b) No repair shall be made until agreed to by the Contract Administrator.

#### E26.6 Measurement and Payment

##### E26.6.1 Supply and Installation of New Steel Overhead Sign Support Structures

- (a) Supply and installation of new steel overhead sign support structures will be measured on a unit basis per new steel overhead sign support structure supplied and installed, and paid for at the Contract Unit Price for "Items of Work" listed here below, 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, accepted and measured by the Contract Administrator.

**Items of Work:**

Supply and Installation of New Steel Overhead Sign Support Structures:

- (i) S792 – Fermor Avenue. EB, West of Lagimodiere Boulevard;



- (ii) S793 - Fermor Avenue. EB, East of Lagimodiere Boulevard;
  - (iii) S794 – Dawson Road NB; South of Fermor Avenue.
- (b) The installation of sign panels on S792 and S793 shall be considered incidental to the work.

## **E27. TRAFFIC MANAGEMENT FOR OVERHEAD SIGN SUPPORT STRUCTURES INSTALLATION**

### **E27.1 Description**

- E27.1.1 Further to clauses 3.6 and 3.7 of CW 1130-R3, the following shall apply for any overhead sign support structure works:
- (a) multiple lane closures, meaning the simultaneous closure of more than one (1) lane, shall be permitted as described herein, for the installation of overhead sign structures;
  - (b) multiple lane closures will not be permitted:
    - (i) 6:00 am to 8:00 pm Monday through Saturday, unless otherwise approved by the Contract Administrator.
  - (c) complete directional or full closures, for the purpose of installing the bridge-type steel overhead sign support structure shall be limited to a maximum of ten (10) minutes;
  - (d) the Contractor shall submit the online Regional Street Lane Closure Form at least three (3) Business Days prior to beginning Work on any particular street;
  - (e) pedestrian and ambulance/emergency vehicle access must be maintained at all times;
  - (f) flagperson(s) shall be used to affect temporary lane closures during the lifting of structures over open lanes. Flagperson(s) shall meet all applicable Manitoba Workplace Safety and Health regulations;
  - (g) all traffic control shall be implemented in accordance with the City of Winnipeg's latest edition of the Manual of Temporary Traffic Control on City Streets.

### **E27.2 Submittals**

- E27.2.1 The Contractor shall submit detailed traffic management plans for each overhead sign structure location for review a minimum of fourteen (14) days prior to implementing the lane closure(s) or performing any work.
- E27.2.2 The detailed traffic management plans shall be prepared in accordance with the current edition of the City of Winnipeg's Manual of Temporary Traffic Control on City Streets.
- E27.2.3 The detailed traffic management plans shall:
- (a) show a plan view of the area for each stage of construction or traffic control setup;
  - (b) show all applicable signage and traffic management devices to be used;
  - (c) provide all relevant dimensions and geometric layout of devices such as sign spacing, taper lengths, cone spacing, etc.;
  - (d) indicate the general sequence of device installation;
  - (e) indicate the date and time of implementation of the devices;
  - (f) indicate the expected date and time of the removal of the devices;
  - (g) confirm the work zones created by the closures are adequate for the operation of cranes, and other construction operations required for the work; and
  - (h) all other information as deemed necessary by the Contract Administrator and/or other agencies reviewing the submitted traffic management plans.

### **E27.3 Measurement and Payment**

- (a) No measurement or payment will be made for the work described in this Specification. Traffic Management for Overhead Sign Support Structure Installation shall be incidental to the works in E26.

## **E28. SUPPLY OF REFLECTIVE GUIDE SIGN PANELS**

### **E28.1 Description**

#### **E28.1.1 General**

- (a) The work covered under this item shall include all operations related to the supply of reflective guide sign panels for overhead mounted guide sign applications.
- (b) The Work to be done under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work hereinafter specified.

#### **E28.1.2 Scope of Work**

- (a) Supply of guide signs shall include the following:
  - (i) Supply of three (3) new guide signs on Fermor Avenue east bound west of Lagimodiere Boulevard new overhead sign support structure S792.
  - (ii) Supply of three (3) new guide signs on Fermor Avenue west bound east of Lagimodiere Boulevard new overhead sign support structure S793.

#### **E28.1.3 References**

- (a) ASTM B221M Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
- (b) Manual of Uniform Traffic Control Devices for Canada (MUTCD)
- (c) ASTM A193 Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
- (d) ASTM A320 Standard Specification for Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service
- (e) ASTM D4956 Standard Specification for Retroreflective Sheeting for Traffic Control

### **E28.2 Graphical content to be supplied by the Contract Administrator**

- (a) Acting on behalf of the City of Winnipeg, the Contract Administrator will supply the Contractor with the following information within fourteen (14) calendar days of the request by the Contractor:
  - (i) Electronic image file (PDF or JPEG) of the sign panel graphical content
  - (ii) Indication of character font, height, kern, line spacing, minimum edge distances, etc.
  - (iii) Indication of all colors for the sign panel content and background materials
  - (iv) Overall sign panel dimensions, with the sign panel height in increments of 305 mm.
  - (v) Number and spacing of vertical backing bars ("T-bars").
  - (vi) All dimensions will be shown in metric units

### **E28.3 Submittals**

- (a) Shop Drawings for each sign panel to be supplied shall be submitted to the Contract Administrator by the contractor at least fourteen (14) calendar days prior to the commencement of any sign panel fabrication work.
- (b) Shop Drawings shall conform to the following
  - (i) submitted in electrically generated PDF format
  - (ii) be of natural scale (1 horizontal to 1 vertical)

- (iii) must be in full color. Scanned copies of printed materials will not be accepted.
  - (iv) Must be an accurate representation of the font, character size, spacing, edge distances, etc.
  - (v) Show the spacing and edge distances of all vertical backing bars. For Contracts which include sign panel installation and/or installation of sign panels on new or existing structures, the location of the aluminum backing bars shown on the Shop Drawings shall take into consideration of potential conflicts with the mounting configuration on the structure, and shall be coordinated with respect to the shop drawings and/or as-built drawings of the sign panel support structure to which it will be mounted.
  - (vi) Must show at least one sign panel cross section taken vertically through the sign panel showing the aluminum substrate extrusion shape, profile, and connecting hardware information.
  - (vii) All dimensions shall be shown in metric units
  - (viii) Must include a statement of sign panel mass, in kilograms.
- (c) Sheeting Product Data Sheet
- (i) Submit the product data sheet and manufacturer's recommendations for installation for the selected sheeting material(s) to the Contract Administrator at least fourteen (14) Calendar Days prior to commencement of work.
- (d) Connecting hardware
- (i) Submit samples of the connecting hardware to the Contract Administrator at least fourteen (14) Calendar Days prior to commencement of work.

#### E28.4 Materials

##### E28.4.1 General

- (a) All material shall be new, previously unused.
  - (i) The re-use of sign panels after chemical stripping or sanding of the panel will not be accepted.
- (b) The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification. All materials supplied under this Specification shall be subject to inspection and acceptance by the Contract Administrator.

##### E28.4.2 Retro-reflective Sheeting

- (a) Highway sign retro reflective sheeting shall be fabricated using sign sheeting material, conforming to ASTM D4956 Standard Specification for Retro-reflective Sheeting for Traffic Control (latest edition) to Type XI, (full cube prismatic), encapsulated by a flexible transparent plastic film having a smooth outer surface.
- (b) Sheeting shall have a pre-coated adhesive backing protected by an easily removable liner and shall conform to ASTM D4956 Class 1; the adhesive backing shall be pressure-sensitive, require no heat, solvent, or other preparation for adhesion to smooth, clean surfaces.

##### E28.4.3 Retro-reflective Sheeting for Sign Panel Content

- (a) Sign panel content including lettering, line work, symbols etc. shall be fabricated from reflective sign sheeting material meeting the same requirements specified herein for the retro-reflective sheeting and securely affixed to the face of the sign panel.
- (b) The adhesive backing for the panel content shall be ASTM D4956 Class 1; the adhesive backing shall be pressure-sensitive, require no heat, solvent, or other preparation for adhesion to smooth, clean surfaces.

##### E28.4.4 Colors

- (a) All colors used shall conform to ASTM D4956 and as indicated on the graphical content information to be supplied by the Contract Administrator, and in general conformance with the Manual of Uniform Traffic Control Devices for Canada (MUTCD) latest edition.

#### E28.4.5 Substrate

- (a) Sign panel substrate shall consist of horizontally oriented and connected "channels" made from extruded aluminum alloy 6036-T6 conforming to Alcan die number 73247 or approved equal, with anodize treatment, each channel approximately 305 mm in exposed height.
- (b) Aluminum shall conform to ASTM B221M Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.

#### E28.4.6 Panel Clips and Bolts

- (a) Adjacent "channels" of substrate aluminum extrusions shall be connected with panel clips and bolts with geometry as shown on drawing TE-045H published by Manitoba Infrastructure and Transportation Traffic Engineering, as provided in Appendix 'D', or approved equal.
- (b) Clips shall conform to ASTM B221 alloy 6061-T6.
- (c) Clip bolts shall be 3/8" diameter x 3/4" long stainless steel conforming to ASTM A193 or A320, Grade 304 minimum, complete with a stainless steel locknut.
- (d) The head of the bolt shall be fabricated such that it slides into the substrate extrusion flanges while preventing rotation such that the nut can be tightened when connecting panel clips.

#### E28.4.7 Post Clips and Bolts

- (a) Substrate aluminum "channels" shall be connected to vertical backing bars ("T-bars") using post clips and stainless steel bolts with geometry as shown on drawing TE-045i published by Manitoba Infrastructure and Transportation Traffic Engineering, as provided in Appendix 'D', or approved equal.
- (b) Post clips shall be fabricated from aluminum alloy 6356T.
- (c) Post clip bolts shall be 3/8" diameter x 1-3/4" long rectangular head T-bolts, from stainless steel conforming to ASTM A193 or A320, Grade 304 minimum, complete with a stainless steel washer and stainless steel locknut.
- (d) The rectangular head of the T-bolts shall be approximately 25 mm x 15 mm and fabricated such that it slides into the substrate extrusion flanges while preventing rotation such that the nut can be tightened when connecting post clips.

#### E28.4.8 Vertical Backing Bars ("T-Bars")

- (a) Vertical backing bars ("T-Bars") shall be of a type and grade as indicated on the Contract Drawings or as indicated elsewhere in the Contract Documents
  - (i) If not indicated on the contract drawings or specified elsewhere in the Contract Documents, vertical aluminum backing bars ("T-Bars") shall be extruded aluminum T-sections conform to ASTM B221 Grade 6061-T6, and be 102 mm deep x 76 mm wide x 8 mm thick minimum.
- (b) Vertical backing bars ("T-Bars") shall be supplied and installed on the back of the sign panel substrate in accordance with this specification.

#### E28.4.9 Sign Panel Mounting Brackets

- (a) For Contracts including sign panel installation on sign support structures using mounting brackets, the specifications for support structure mounting brackets and associated hardware shall be specified elsewhere. Construction Methods

## E28.5 Construction Methods

### E28.5.1 General

- (a) Sign panels shall be fabricated in a controlled indoor shop-like environment.

### E28.5.2 Substrate assembly

- (a) Edges of all substrate material shall be de-burred to provide a smooth finished edge.
- (b) All connecting hardware shall be firmly tightened and all surfaces firmly in contact, such that when connected the panel is rigidly and firmly fastened together into a single panel.
- (c) Panel clips and bolts shall be installed as follows:
  - (i) Connect adjacent aluminum substrate extrusions using panel clips, complete with 2 bolts per clip;
  - (ii) Horizontal spacing between connecting hardware sets shall be maximum 300 mm on centre, in a staggered fashion between rows of slots, except for the last slots at either end of the section or panel, at which locations a connecting hardware set shall be provided.
  - (iii) All nuts shall be tightened to a snug-tight condition, taking care not to over-tighten resulting in stripping of threads or failure of the lock nut.
- (d) Contractor shall ensure that all connection hardware supplied and installed as specified herein are compatible and when connected result in a rigid sign panel assembly.

### E28.5.3 Sheeting

- (a) Sign panel sheeting material shall be correctly applied in accordance with the sheeting manufacturer's recommendations and industry accepted quality practices.
- (b) Prepare the sign panel substrate in accordance with the retro-reflective sheeting manufacturer's specifications prior to adhesion of the sheeting.
- (c) Retro-reflective sheeting shall be properly trimmed at either end of the panel so to be even with the end of the substrate.
- (d) No more than one (1) material seam per length of panel will be permitted. Excessive patching with off-cut reflective material patched together will not be accepted.
- (e) All material applied shall show no signs of wrinkles or improper adhesion to the viewed surface of the sign panel substrate.
- (f) Reflective material applied shall be completely edge curled vertically down both sides of the full length of the sign panel and the material shall show no signs of wrinkles or excessive bubbling on either sides of the edges of the panel after sheeting application.
- (g) Reflective material shall wrap over the vertical sides of the panel no more than 8 mm and should fit inside the groove edge provided in the aluminum extrusion, or terminated as otherwise recommended by the sheeting manufacturer.
- (h) The presence of tears, holes, scrapes, compressed cells or patches will be grounds of rejection.
- (i) Any joints must be sealed in accordance with the sheeting manufacturer's recommendations.

### E28.5.4 Fabrication Tolerance

- (a) Dimensions of the overall sign panel (height and width) shall be fabricated to within 1% of the specified dimension.
- (b) Graphical content including character height, spacing, line spacing, and line weights shall not deviate from the specified dimension by more than 5%.

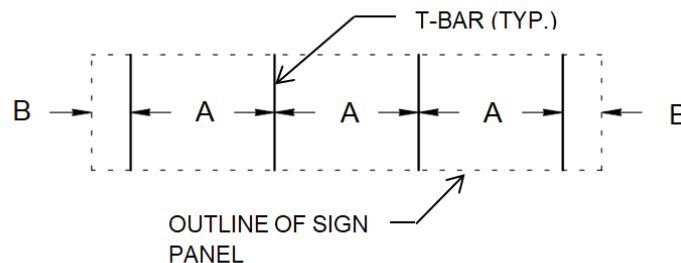
- (c) If present, deviations within the above noted tolerances shall be uniform. In the sole judgement of the Contract Administrator, noticeable deviations in the fabrication tolerance between individual graphical elements, even if they within the above specified limits, are grounds for sign panel rejection. For example, if the line weight of one particular letter on the sign panel was noticeably different than all other letters, the panel would be rejected.
- (d) The flatness of the sign panel shall be measured using a 3 m long straight edge placed flush to the front face of the sign panel in any direction. The maximum single deviation from the straight edge shall be no greater than 15 mm. Multiple deviations (i.e. waviness) in the panel shall be cause for rejection even if deviations are less than 15 mm.
- (e) Regardless of any measured deviation, no defect in the sign panel shall result in a reduction in the legibility of the sign, or the retro-reflective performance of the panel. The Contract Administrator shall be the sole judge as to whether a defect is present and if it requires repair or replacement of the sign panel.

**E28.5.5 Manufacturer's Identification**

- (a) All signs shall be clearly and permanently labeled using durable weather resistant material or engraving with an identification coding. The coding shall appear in characters 6-10 mm high on the lower right back of the sign and shall be imparted in such a manner that the front face of the sign is not damaged. The manufacturer shall include the following information on the label:
  - (i) Manufacturer's name
  - (ii) Month and year of manufacture, in MM-YYYY format.
  - (iii) Brand of sign sheeting material

**E28.5.6 Connecting Vertical Backing Bars ("T-bars")**

- (a) Vertical backing bars ("T-bars") shall be installed on the back of the sign panel substrate square to the sign panel, extend the full height of the sign panel, and in accordance with the spacing shown on the Contract Drawings.
- (b) Where no Contract Drawings are applicable, or if the spacing is not indicated, vertical backing bars shall be installed on that back of the sign panel substrate as indicated in the following table, or as directed by the Contract Administrator:



Typical Sign Width	Number of Vertical Backing Bars	Dimension A [# spaces] x [mm]	Dimension B [mm]
7320 mm (24 ft)	6	5 x 1220	610
6710 mm (22 ft)	5	4 x 1425	505
6100 mm (20 ft)	5	4 x 1225	600

5490 mm (18 ft)	4	3 x 1430	600
4880 mm (16 ft)	4	3 x 1220	610
4270 mm (14 ft)	4	3 x 1200	335
3660 mm (12 ft)	3	2 x 1400	430
3050 mm (10 ft)	3	2 x 1200	325
2440 mm (8 ft)	2	1 x 1000	720

- (c) No holes shall be drilled in the backing bars at the time of fabrication. If required, holes in the backing bars shall only be field drilled at the time of final installation on the support structure to ensure a level and planar sign panel when mounted to the support structure.
- (d) A post clip and bolt shall be provided to connect each side of each vertical backing bar ("T-bar") to the flanges of the aluminum substrate extrusion. The maximum spacing of the post clips and bolts shall be 305 mm and they shall be provided on alternating sides of the vertical backing bar,
  - (i) In addition, the top and bottom of the vertical backing bar shall be fitted with a post clip and bolt on both sides of the backing bar.
- (e) All nuts shall be tightened to a snug-tight condition, taking care not to over-tighten resulting in stripping of threads or failure of the lock nuts or washers.

#### E28.5.7 Packaging and Delivery

- (a) Contractor shall package each preassembled sign panel individually prior to delivery. Packaging shall protect the sign panel from damage to the sheeting or aluminum components and hardware.
- (b) Contractor shall be responsible for safe handling, lifting, hauling, transporting and offloading of sign panels.
- (c) Sign panels shall be protected from damaging effects including scratches, warping, and denting which may be caused during handling.
- (d) For Contracts that do not include installation of the sign panel and are for supply and delivery only, the Contractor shall offload the sign panels at the stated delivery location, and place the sign panel(s) in a location directed by the Contract Administrator or designate.

#### E28.5.8 Delivery Location

- (a) For Contracts that do not include sign panel installation, sign panels shall be delivered to:
  - (i) N/A
- (b) For Contracts that include sign panel installation, sign panels shall be delivered to the work site under the care of the Contractor. Sign panels shall be appropriately protected and stored on site or in a suitable location until final installation occurs.
- (c) Damaged sign panels shall be repaired or replaced to the satisfaction of the Contract Administrator at no additional cost to the City of Winnipeg.

#### E28.6 Quality Control and Quality Assurance

- (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 or by the Quality Assurance Testing Laboratory designated by the Contract Administrator.
- (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.
- (c) The Contract Administrator reserves the right to reject any materials or work which are not in accordance with the requirements of this specification.
- (d) Quality Control shall be undertaken by the Contractor. Quality Assurance testing shall be undertaken by the Contract Administrator.
- (e) The Contract Administrator shall be afforded full access for the inspection and control and assurance testing of sign panel constituent materials, both at the work site and at the location of sign panel fabrication. There shall be no charge to the City of Winnipeg for any materials taken by the Contract Administrator for testing purposes.

#### E28.7 Field Performance Requirements

- (a) Reflective sheeting, processed and applied according to the sheeting manufacturer's recommendations (or as specified in this specification when there is an exception to the manufacturer's recommendations), shall perform satisfactorily for the number of years required under Warranty as stated in this Specification.
- (b) The sheeting (including all sign panel content) shall be considered unsatisfactory if it has deteriorated due to natural causes (precluding unnatural causes such as vehicle impact or vandalism), to the extent that the sign is ineffective for its intended purpose, when viewed from a moving vehicle under normal day and night driving conditions or shows any of the following defects:
  - (i) Cracks discernible with the unaided eye from the driver's position while in an outside lane at a distance of 15 meters (50 feet) or greater from the sign
  - (ii) Peeling in excess of 6.4 millimeters (1/4 inch)
  - (iii) Shrinkage in excess of 3.2 millimeters (1/8 inch) total per 1.2 meters (48 inches) of sheeting width
  - (iv) Fading or loss of color to the extent that color fails to meet the requirements in ASTM D4956.
  - (v) Loss of reflectivity to a level below 20% of the minimum values specified in ASTM D4956 or in this specification for new sheeting when measured at the angles specified for each type.

#### E28.8 Warranty

- (a) Before final acceptance of the sign panel(s) by the Contract Administrator, the sign panel Supplier shall provide the Contract Administrator with a written warranty stating that they will perform satisfactorily in the field for a period of twelve (12) years from the issuance of the Certificate of Total Performance. The Supplier shall state that they have reviewed the fabrication and installation procedures and find them in accordance with their recommendations.
  - (i) The Supplier shall warranty the replacement of the entire sign panel, including removal of the existing panel and installation of replacement panel in the field, at no cost to the City of Winnipeg or the Contractor, in the event that the sign panel(s) do not meet the field performance requirements specified in E28.7 for a period of seven (7) years from the issuance of the Certificate of Total Performance.
  - (ii) The Supplier shall warranty the replacement of the sheeting material only, including panel removal and reinstallation in the field, at no cost to the City of Winnipeg or the Contractor, in the event that the sign panel(s) do not meet the field performance requirements specified in E28.7 during the period of eight (8) to twelve (12) years from the issuance of the Certificate of Total Performance.



## E28.9 Measurement and Payment

### E28.9.1 Supply of Sign Panels

- (a) Supply of Sign Panels will be measured on a unit basis and paid for at the Contract Unit Price per sign for the following "Items of Work", which 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, accepted and measured by the Contract Administrator.

#### **Items of Work**

Supply of Reflective Guide Sign Panels

- (i) 5.275 m x 2.438 m
- (ii) 5.000 m x 2.438 m

## **E29. TEMPORARY EAST END CROSSOVERS**

### DESCRIPTION

#### E29.1 General

- E29.1.1 This Work covered under this Specification shall include all operations related to the temporary traffic crossover at the east end of the Site.
- E29.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of the Work as hereinafter specified. All materials supplied under this Specification shall be subject to inspection and acceptance by the Contract Administrator.
- E29.1.3 Site specific requirements as well supply, loading, hauling, unloading, storing and installing temporary crash attenuation units shall be as per Manufacturer's recommended procedures.

### MATERIALS

#### E29.2 Temporary Crash Attenuators

- E29.2.1 The Contractor shall supply and install Test Level II Sentry Longitudinal Energy Dissipater (SLED) units by Traffix Devices or approved equal in accordance with B6.

### CONSTRUCTION METHODS

- E29.3 The Work to be done by the Contractor under this Specification shall include:
- (a) Summer 2019: Remove and temporarily store existing precast concrete barriers to the limits shown on the Drawings. Barriers shall not be stored within 20 m of existing pavement;
  - (b) Summer 2019: Install two (2) temporary crash attenuators at the ends of the median barrier as shown on the Drawings prior to traffic using the crossover;
  - (c) As required: Provide temporary crash protection for blunt concrete median barrier ends. This will occur at the end of the existing concrete median barrier when the existing crash attenuator has been removed but the new concrete median barrier has yet to be poured and also at the end of the new concrete median barrier before the new crash attenuator has been fully installed.
  - (d) Fall 2019: Remove temporary crash attenuators and re-install precast concrete barriers for the winter of 2019/ 2020;
  - (e) Spring 2020: Remove and temporarily store existing precast concrete barriers to the limits shown on the Drawings. Barriers shall not be stored within 20 m of existing pavement;

- (f) Spring 2020: Install two (2) temporary crash attenuators at the ends of the median barrier as shown on the Drawings prior to traffic using the crossover;
- (g) Fall 2020: Remove temporary crash attenuators and re-install precast concrete barriers.

E29.4 Precast concrete barriers damaged by the Contractor shall be replaced by the Contractor at his own expense.

#### MEASUREMENT AND PAYMENT

E29.5 The work described in this Specification will not be measured and will be paid for at the Contract Lump Sum Price for "Temporary East End Crossovers", which price will be payment in full for supplying all materials/equipment and performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator. Payment will be based on the following schedule:

- (a) End of 2019 Work (completion of E29.3(d)) 50%
- (b) End of 2020 Work (completion of E29.3(g)) 50%

### **E30. CRASH ATTENUATION BARRIERS**

#### DESCRIPTION

E30.1 General

- E30.1.1 The Work covered under this Specification shall include all operations related to the supply, fabrication, delivery and installation of the Crash Attenuation Barriers and associated materials in accordance with AASHTO MASH or NCHRP Report 350.
- E30.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of the Work as hereinafter specified. All materials supplied under this Specification shall be subject to inspection and acceptance by the Contract Administrator.
- E30.1.3 Site specific requirements for the installation of Crash Attenuation Barriers will be in accordance with the Drawings. General supply, loading, hauling, unloading, storing and installing is as per Manufacturer's recommended procedures.
- E30.1.4 The Contractor shall provide manufacturers product data sheet and shop drawings prior to supply and installation. The shop drawings will be subject to acceptance by the Contract administrator.

#### MATERIALS

E30.2 Crash Cushions

- E30.2.1 Materials shall be supplied in accordance with the manufacturer's product manual and in accordance with AASHTO MASH or NCHRP Report 350.
- E30.2.2 The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this specification.
- E30.2.3 The following products will be supplied to the Contractor:
  - (a) React 350 Test Level 3 (unit only) by Trinity Highway Products. The Contractor shall arrange to pick-up the unit at Manitoba Infrastructure's maintenance yard on Wilkes Avenue.
- E30.2.4 The following products will be supplied by the Contractor:
  - (a) Quadguard II Test Level 3 and associated hardware by Trinity Highway Products.

- E30.2.5 The Contractor may request an approved equal for the item listed in E30.2.4 in accordance with B6.
- E30.2.6 Steel posts shall be W150x14. Steel posts and hardware shall conform to CAN/CSA Standard G40.21 Grade 350W or ASTM Standard A36 and shall be hot dip galvanized after fabrication conforming to ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- E30.2.7 Neoprene spacer blocks shall be King Blocks by Trinity Highway Products or approved equal in accordance with B6.
- E30.2.8 Appurtenances including but not limited to Quadbeam panels and associated hardware shall be supplied in accordance with NCHRP Report 350.
- E30.2.9 Concrete and reinforcing steel shall be supplied in accordance with the Drawings and CW 3310-R17.
- E30.2.10 Granular levelling materials shall be Base Course in accordance with CW 3110-R20.

#### CONSTRUCTION METHODS

- E30.3 Handling and Storage of Materials
- (a) All materials shall be handled in a careful and workmanlike manner and the sections and ends shall be stored on blocks or built-up platforms.
  - (b) Bolts and malleable washers shall be stored separately in suitable bins for inspection, checking and handling.
- E30.4 Site Inspection
- (a) Prior to commencing installation at a location, the Contractor shall verify that it can be installed in strict accordance with the Drawings. This shall include contacting all utilities and other owners of underground facilities in order to ensure that the proposed location of the posts is not in conflict with existing or proposed utilities and installations.
  - (b) Should there be a conflict between a proposed location and any facility the Contract Administrator shall be notified immediately.
- E30.5 The Crash Attenuation Barriers shall be installed in accordance with the manufacturer's installation manual.
- E30.5.1 Refer to:
- (a) Quadguard II Assembly Manual, see Appendix 'C';
  - (b) React 350 Assembly Manual, see Appendix 'C'.
- E30.6 Related items, including concrete foundations and backups, reinforcing steel, Quadbeam panels, post installation, neoprene spacer blocks, connection hardware, excavation, granular levelling materials and compaction are to be installed as shown on the Drawings or as per the manufacturer's recommendations.

#### MEASUREMENT AND PAYMENT

- E30.7 Installation of React 350 Crash Attenuator
- E30.7.1 Installation of the React 350 Crash Attenuation Barrier, including picking up the supplied product, installation of all product materials, concrete foundations, reinforcing steel, connection hardware, excavation, granular levelling materials and compaction will be measured for payment on a unit basis and paid for at the Contract Unit Price for "Installation of React 350 Crash Attenuator c/w Concrete Pad and Backup".

E30.8 Supply and Installation of Quadguard II Crash Attenuator

E30.8.1 Supply and Installation of Quadguard II Crash Attenuation Barrier, including all product materials, concrete foundations, reinforcing steel, Quadbeam panels, steel posts, neoprene spacer blocks, connection hardware, excavation, granular levelling materials and compaction will be measured for payment on a unit basis and paid for at the Contract Unit Price for "Supply and Installation of Quadguard II Crash Attenuator c/w Concrete Pad and Transition Assembly".

**E31. OPERATING CONSTRAINTS FOR WORK IN CLOSE PROXIMITY TO THE BRANCH 1 BRANCH 2 INTERCONNECTION PIPE**

E31.1 Description

E31.1.1 General

- (a) This Section details operating constraints for all Work to be carried out in close proximity to the Branch 1 Branch 2 Aqueduct Interconnection. Close proximity shall be deemed to be any construction activity within a 5 m offset from the centreline of the Feedermain.
- (b) The Branch 1 Branch 2 Aqueduct Interconnection is a critical component of the City of Winnipeg Regional Water Supply System and work in close proximity to the pipeline shall be undertaken with an abundance of caution. The pipe cannot be taken out of service to facilitate construction and inadvertent damage caused to the pipe would likely have catastrophic consequences.
- (c) Work around the Interconnection Pipe shall be planned and implemented to minimize the time period that work is carried out in close proximity to the pipe and to ensure that the pipeline is not subjected to excessive construction related loads, including excessive vibrations and/or concentrated or asymmetrical lateral loads during backfill placement.
- (d) The Branch 1 Branch 2 Aqueduct Interconnection is constructed of Prestressed Concrete Pipe. This pipe has limited ability to withstand increased earth and live loading. Therefore, every precaution must be undertaken to ensure that applied loading during all phases of construction is within accepted loading parameters.

E31.1.2 Submittals

- (a) Submit a Construction Method Statement with proposed construction plan including haul routes, excavation equipment locations, loading positioning and base construction sequencing, to the Contract Administrator for review seven (7) days prior to construction. Do not commence construction until the Construction Method Statement has been reviewed and accepted by the Contract Administrator.

E31.2 Construction Methods

E31.2.1 General

- (a) The section of the Interconnection Pipe affected by construction crosses the intersection of Lagimodiere Boulevard and Fermor Avenue as shown on the Drawings.

E31.2.2 Contractors carrying out reconstruction Work in close proximity to the Interconnection Pipe shall meet the following conditions and technical requirements: As per City of Winnipeg Specification CW 3110.

- (a) Pre-work, Planning and General Execution
  - (i) No Work shall commence at the Site until the Construction Method Statement has been submitted and accepted, and the Interconnection Pipe location has been clearly delineated in the field.

- (ii) The Contractor shall verify the Interconnection Pipe location and crown elevation by hydrovac methods prior to commencing excavation. Hydrovac methods shall be performed in the presence of the Contract Administrator.
  - (iii) Notify the Contract Administrator two (2) weeks prior to his intention of starting construction.
  - (iv) Where Work is in close proximity to the Interconnection Pipe, utilize construction practices and procedures that do not impart excessive vibration loads on the Interconnection Pipe or that would cause settlement of the subgrade below the Interconnection Pipe.
  - (v) Crossing of the Interconnection Pipe is prohibited in the time period from removal of existing roadway structure until the completion of granular base construction. At all times prior to completion of final paving; reduce equipment speeds to levels that minimize the effects of impact loading to the pipe.
  - (vi) For construction Work activities either longitudinally or transverse to the alignment of the Interconnection Pipe, work only with equipment and in the manner stipulated in the accepted Construction Method Statement and the supplemental requirements noted herein.
  - (vii) The pipeline elevation datum relative to the proposed roadway shall be adequately verified. Deviations from the elevations noted herein shall be reported to Contract Administrator for review prior to construction of the subgrade.
  - (viii) Construction operations should be staged in such a manner as to limit multiple construction loads at one time, (e.g. offset crossings sufficiently from each other, rollers should remain a sufficient distance behind spreaders to limit loads. A reasonable offset distance is 3m between loads).
  - (ix) The Contractor and all Site supervisory personnel and equipment operators have to be formally briefed to ensure that they are fully cognizant of the associated restrictions, constraints, and risks associated with working adjacent to and over this pipeline. New personnel introduced after commencement of the project need to be formally orientated as to the significance and constraints associated with working over the Interconnection Pipe.
- (b) Demolition and Excavation
- (i) Use of pneumatic concrete breakers within 3 metres of the Interconnection Pipe is prohibited. Pavement shall be full depth saw-cut and carefully removed. Use of hand held jackhammers for pavement removal will be allowed. Use of machine mounted concrete breakers is prohibited.
  - (ii) Where there is less than 1.6 metres of earth cover over the Interconnection Pipe and further excavation is required either adjacent to or over the Interconnection Pipe, utilize only smooth edged excavation buckets, soft excavation or hand excavation techniques. Where there is less than 1 metre of cover over the Interconnection Pipe, carefully expose the Interconnection Pipe by hand excavation to delineate the location and depth of the main, and provide full time supervision of the excavation.
  - (iii) Where there is less than 2.5 m of earth cover over the Interconnection Pipe, offset backhoe or excavation equipment from Interconnection Pipe, a minimum of 3 m from Interconnection Pipe centerline, to carry out excavation.
  - (iv) Equipment should not be allowed to operate while positioned directly over the Interconnection Pipe. Loading of excavated material into trucks shall have the truck positioned on existing grade.
- (c) Subgrade Construction
- (i) Subgrade compaction shall be prohibited within 2 metres of the Interconnection Pipe. Subgrade compaction within 3 metres of the Interconnection Pipe shall be limited to non-vibratory methods only.

- (ii) Subgrade, sub-base and base course construction shall be kept in a rut free condition at all times. Construction equipment is prohibited from crossing pipelines if the grade is insufficient to support the equipment without rutting.
  - (iii) Construction operations shall be staged to minimize the time period between excavation to subgrade and placement of granular sub-base materials. Should bare subgrade be left overnight, measures shall be implemented to protect the subgrade against inadvertent travel over it and to minimize the impact of wet weather.
- (d) Sub-base and Base Course Construction
- (i) Granular material, construction material, soil or other material shall not be stockpiled on the pipelines or within 5 metres of the pipe centerline.
  - (ii) Sub-base or base course materials shall not be dumped directly on pipelines but shall be stockpiled outside limits noted in these recommendations and shall be carefully bladed in-place.
  - (iii) Sub-base compaction within 3 metres of the centreline of the Interconnection Pipe shall be either carried out by static methods (without vibration) or with smaller equipment such as hand held plate packers or smaller roller equipment.

### E31.3 Mandatory Orientation Meeting

E31.3.1 The Contractor shall ensure that all work crew members understand and observe the requirements of this Specification. Prior to commencement of on-site Work, the Contractor shall attend an orientation meeting with the Contract Administrator. Attendance is mandatory for all superintendents, foremen and heavy equipment operators. The purpose of the meeting is to make all workers fully cognizant of the limitations of altered loading on the Interconnection Pipe, the ramifications of inadvertent damage to the pipelines, the constraints associated with work in close proximity to the Interconnection Pipe and the specific details of the Construction Method Statement in instances where a Construction Method Statement is in effect.

E31.3.2 Employees of the Contractor or any sub-contractor that fail to attend the mandatory orientation or fail to comply with the conditions for working in close proximity to the Interconnection Pipe shall be promptly removed from the Site.

### E31.4 Measurement and Payment

E31.4.1 No measurement or payment will be made for the works listed in this specification.

## **E32. INSTALLATION OF STREET LIGHTING AND ASSOCIATED WORKS**

### E32.1 DEFINITIONS

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.

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

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

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.)

RECLAIM material means existing material that has been removed from Manitoba Hydro's system and to be returned to Manitoba Hydro.

SCRAP material means existing material that has been removed from Manitoba Hydro's system and to be recycled/disposed of by the Contractor.

SURPLUS material means new material that has been requisitioned by the Contractor and not incorporated into the work at the end of the Contract.

WORK CLEARANCE means an ELECTRICAL AND/OR NATURAL GAS FACILITIES LOCATE form (see SAMPLE ONLY included as Appendix I) issued by each of Manitoba Hydro's Customer Service Centre (CSC) affected to permit work to commence (Permit to work).

## E32.2 DESCRIPTION

E32.2.1 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.

## E32.3 WORK LOCATIONS

E32.3.1 The proposed street light installation and removals are shown on construction drawings and are as follows:

- (a) Fermor Avenue from Lagimodiere Boulevard to CPR Bridge

## E32.4 COORDINATION OF WORK

E32.4.1 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.

E32.4.2 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.

E32.4.3 Manitoba Hydro's CSC will provide the Limits of Approach applicable to the Contractor on the Work Clearance form.

## E32.5 ORIENTATION

E32.5.1 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.

## E32.6 PRE-CONSTRUCTION MEETING

E32.6.1 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.

E32.6.2 The Contractor's cost to attend this pre-construction meeting shall be incorporated into the unit prices for the work.

### E32.7 QUALIFICATIONS AND CERTIFICATION

E32.7.1 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.

E32.7.2 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.

E32.7.3 Manitoba "Safe work" Bulletin M&E010 dated January 5, 2011 regarding Electrician Licenses discusses the requirements for a "Limited Specialized Trade Licence – 'M-P' Licence – Power Line".

For more information contact:  
Manitoba  
Mechanical and Engineering Branch  
500-401 York Avenue  
Winnipeg, Manitoba R3C 0P8  
Tel. 204-945-3373  
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E32.7.4 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.

E32.7.5 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.

### E32.8 REFERENCED STANDARD CONSTRUCTION SPECIFICATIONS

E32.8.1 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”)

E32.8.2 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 F.

E32.8.3 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.

### E32.9 TOOLS, EQUIPMENT AND MATERIALS

E32.9.1 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.

E32.9.2 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

E32.9.3 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.

E32.9.4 Alternative equipment manufacturers may be considered upon request by the Contractor and shall be approved for use by Manitoba Hydro prior to use.

E32.9.5 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.

### E32.10 MATERIAL SUPPLIED BY MANITOBA HYDRO

E32.10.1 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:

- E32.10.2 Manitoba Hydro Central Stores (contact personnel will be provided to the successful contractor).
- E32.10.3 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.
- E32.10.4 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.
- E32.10.5 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.
- E32.11 MATERIAL SUPPLIED BY CONTRACTOR
- E32.11.1 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.
- E32.12 SURPLUS, RECLAIM AND SCRAP MATERIAL
- E32.12.1 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.
- E32.12.2 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.
- E32.12.3 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.
- E32.13 DE-ENERGIZATION AND LOCKOUT
- E32.13.1 **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.
- E32.13.2 **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.

E32.13.3 The Contractor shall complete a job planning form (an example is included as Appendix J) on a daily basis before any work commences and provide Manitoba Hydro with copies of the job plans if requested.

#### E32.14 TEMPORARY OVERHEAD FEEDS

E32.14.1 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.

E32.14.2 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.

E32.14.3 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.

E32.14.4 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.

#### E32.15 SAFE EXCAVATION

E32.15.1 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 G and Manitoba Workplace Safety and Health Regulation 217 latest revision.

#### E32.16 SAFE HANDLING

E32.16.1 The Contractor shall apply handling techniques in accordance with Manitoba Workplace Health and Safety Regulation 217 (latest revision).

#### E32.17 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.

#### E32.18 PRECAST CONCRETE BASES

E32.18.1 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.

E32.18.2 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.

#### E32.19 STREET LIGHT POLES AND ARMS

E32.19.1 The Contractor shall handle, store, transport, and provide proper load securement for the poles and arms in a manner to prevent damage.

#### E32.20 LUMINAIRES

E32.20.1 The Contractor shall handle, store, transport and unload the luminaires in their original packaging and in a manner to prevent damage.

#### E32.21 SMALL MATERIAL

E32.21.1 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.

#### E32.22 CARE OF MATERIALS

E32.22.1 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.

#### E32.23 WIRE AND CABLE REEL STORAGE

E32.23.1 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.

E32.23.2 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.

#### E32.24 REEL HANDLING

E32.24.1 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.

E32.24.2 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.

- E32.24.3 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.
- E32.24.4 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.
- E32.25 PRESSURIZED WATER/VACUUM EXCAVATION
- E32.25.1 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.
- E32.25.2 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 G.
- E32.26 REMOVAL STREET LIGHT POLE FROM EXISTING BASE
- E32.26.1 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.
- E32.26.2 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.
- E32.26.3 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.
- E32.27 REMOVAL OF BASE AND DIRECT BURIED STREET LIGHT POLE
- E32.27.1 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.
- E32.27.2 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.
- E32.27.3 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.
- E32.28 INSTALLATION OF FOUNDATION - CONCRETE BASE
- E32.28.1 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.
- E32.28.2 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.

- E32.28.3 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.
- E32.28.4 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.
- E32.28.5 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.
- E32.28.6 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.
- E32.29 BASE MOUNTED STREET LIGHT POLES
- E32.29.1 This shall include all work required to install the street light pole on the concrete base as set forth in this Specification.
- E32.29.2 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.
- E32.29.3 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.
- E32.29.4 The Contractor shall level the street light pole in all 4 directions. Leveling shims may be used.
- E32.29.5 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.
- E32.29.6 Unless otherwise specified, excess underground cable and 2C-12 wire shall be left inside the hand hole with the hand hole cover loosely installed.
- E32.29.7 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.
- E32.30 LUMINAIRES AND ASSOCIATED WIRING
- E32.30.1 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.
- E32.30.2 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.

- E32.30.3 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.

#### E32.31 BREAK AWAY BASES

- E32.31.1 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.
- E32.31.2 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.

#### E32.32 SPLICING/CONNECTING CABLES

- E32.32.1 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 H). Termination in the hand hole may include the installation of an inline fuse holder.
- E32.32.2 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).

#### E32.33 EXCAVATION

- E32.33.1 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.
- E32.33.2 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.

#### E32.34 LAYING CABLES

- E32.34.1 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.

- E32.34.2 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.
- E32.34.3 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.
- E32.34.4 During installation, under no circumstance is the cable to be subjected to a bending radius tighter than that detailed in the Standards.
- E32.34.5 Where specified in the Standards or on the construction drawings, the Contractor shall install the street light cable in a conduit.
- E32.35 INSTALLING CONDUIT AND CABLE BY BORING (HORIZONTAL DIRECTIONAL DRILLING)
- E32.35.1 The Contractor shall dig the approaches and openings necessary to install boring equipment, and the boring equipment used shall be of such a nature as to minimize the opening size required. The boring equipment shall produce a straight hole without unnecessary dips or bends. The bore hole shall be only slightly larger than the outside diameter of the conduits or cables to minimize possible settlement. Cables and conduits shall be pulled in with pulling eyes or using a kelly grip in a manner so as to guard against damage.
- E32.35.2 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 G. Maximum pulling tensions on any streetlight cable shall be limited to 2.9 kN/0.65 kips.
- E32.35.3 Drilling fluids and associated waste materials shall be disposed of in a manner that minimizes environmental effects.
- E32.35.4 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.
- E32.36 BURIED UTILITY CROSSINGS
- E32.36.1 All buried obstructions are not necessarily shown on the reference drawings and the locations of those indicated are approximate only.
- E32.36.2 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 G shall be followed when crossing natural gas pipelines and electrical cables by the directional boring method.
- E32.36.3 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.

E32.36.4 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.

#### E32.37 BENDING CABLES/CONDUITS AND INSTALLATION INTO STANDARDS

E32.37.1 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.

E32.37.2 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.

E32.37.3 Unless otherwise directed, excess underground cable and 2C-12 wire shall be left inside the hand hole with the hand hole cover loosely installed.

#### E32.38 BACKFILL

E32.38.1 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.

E32.38.2 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.

E32.38.3 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.

E32.38.4 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.

E32.38.5 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.

#### E32.39 DEFECTIVE WORK & WARRANTY

E32.39.1 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.

E32.39.2 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.

#### E32.40 AS-BUILT DRAWING

E32.40.1 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.

#### E32.41 MEASUREMENT AND PAYMENT

E32.41.1 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.

E32.41.2 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.

- E32.41.3 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.
- E32.41.4 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.
- E32.41.5 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.
- E32.41.6 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.
- E32.41.7 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.

E32.41.8 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.

E32.41.9 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.

E32.41.10 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.

E32.41.11 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.

E32.41.12 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.

E32.41.13 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.

E32.41.14 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.

E32.41.15 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.

E32.41.16 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.

E32.41.17 Expose Underground Cable Entrance of Existing Streetlight Pole and Install New Streetlight Cable(s).

E32.42 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 Specifications.