



**THE CITY OF WINNIPEG**

# **BID OPPORTUNITY**

**BID OPPORTUNITY NO. 855-2009**

**2009 OUTFALL MAINTENANCE PROGRAM: RADCLIFF ROAD OUTFALL PIPE  
REPLACEMENT AND RIVERBANK STABILITY IMPROVEMENT WORKS AND  
GLASGOW OUTFALL REPAIRS**

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## **PART B - BIDDING PROCEDURES**

### **B1. CONTRACT TITLE**

- B1.1 2009 OUTFALL MAINTENANCE PROGRAM: RADCLIFF ROAD OUTFALL PIPE REPLACEMENT AND RIVERBANK STABILITY IMPROVEMENT WORKS AND GLASGOW OUTFALL REPAIRS

### **B2. SUBMISSION DEADLINE**

- B2.1 The Submission Deadline is 12:00 noon Winnipeg time, December 22, 2009.
- 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. SITE INVESTIGATION**

- B3.1 Further to C3.1, the Bidder may view the Site without making an appointment.
- B3.2 The Bidder is advised that several sinkholes exist on Site in the location of the pipe sections to be removed as part of this project. The sinkholes are shown on the Drawings and are currently fenced off for safety. Caution should be taken to avoid injury when accessing the Site.

### **B4. ENQUIRIES**

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

### **B5. ADDENDA**

- B5.1 The Contract Administrator may, at any time prior to the Submission Deadline, issue addenda correcting errors, discrepancies or omissions in the Bid Opportunity, or clarifying the meaning or intent of any provision therein.
- B5.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.
- B5.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/bidopp.asp>

B5.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

B5.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

## **B6. SUBSTITUTES**

B6.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.

B6.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

B6.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.

B6.4 The Bidder shall ensure that any and all requests for approval of a substitute:

- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;
- (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
- (c) identify any anticipated cost or time savings that may be associated with the substitute;
- (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;
- (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.

B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an "approved equal" or as an "approved alternative", or may refuse to grant approval of the substitute.

B6.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, only to the Bidder who requested approval of the substitute.

B6.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely responsible for disseminating information regarding the approval to any person or persons he wishes to inform.

B6.7 If the Contract Administrator approves a substitute as an "approved equal", any Bidder may use the approved equal in place of the specified item.

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

- B6.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.
- B6.10 Notwithstanding B6.2 to B6.9, and in accordance with B7.6 deviations inconsistent with the Bid Opportunity document shall be evaluated in accordance with B15.1(a).

## **B7. BID COMPONENTS**

- B7.1 The Bid shall consist of the following components:
- (a) Form A: Bid;
  - (b) Form B: Prices;
  - (c) Bid Security
    - (i) Form G1: Bid Bond and Agreement to Bond, or Form G2: Irrevocable Standby Letter of Credit and Undertaking, or a certified cheque or draft;
- B7.2 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.
- B7.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.
- B7.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.
- B7.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Bid.
- B7.5 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.
- B7.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B15.1(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 own name, his name shall be inserted;
  - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
  - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;

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

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

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

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

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

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

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

## **B9. PRICES**

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

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

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

B9.4 Prices from Non-Resident Bidders are subject to a Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

## **B10. QUALIFICATION**

B10.1 The Bidder shall:

- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba; 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.

B10.2 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>

- B10.3 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);
- B10.4 Further to B10.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:
- (a) a valid COR certification number under the Certificate of Recognition (COR) Program administered by the Manitoba Construction Safety Association or by the Manitoba Heavy Construction Association's Safety, Health and Environment 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>)
- B10.5 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.
- B10.6 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.

## **B11. BID SECURITY**

- B11.1 The Bidder shall provide bid security in the form of:
- (a) a bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in the form included in the Bid Submission (Form G1: Bid Bond and Agreement to Bond); or
  - (b) an irrevocable standby letter of credit, in the amount of at least ten percent (10%) of the Total Bid Price, and undertaking issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form included in the Bid Submission (Form G2: Irrevocable Standby Letter of Credit and Undertaking); or
  - (c) a certified cheque or draft payable to "The City of Winnipeg", in the amount of at least fifty percent (50%) of the Total Bid Price, drawn on a bank or other financial institution registered to conduct business in Manitoba.
- B11.1.1 If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.
- B11.1.2 All signatures on bid securities shall be original.
- B11.1.3 The Bidder shall sign the Bid Bond.
- B11.1.4 The Surety shall sign and affix its corporate seal on the Bid Bond and the Agreement to Bond.



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

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

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

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

## **B12. OPENING OF BIDS AND RELEASE OF INFORMATION**

B12.1 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.

B12.1.1 Bidders or their representatives may attend.

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

B12.2 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>

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

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

## **B13. IRREVOCABLE BID**

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

B13.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly executed and the performance security furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid.

## **B14. WITHDRAWAL OF BIDS**

B14.1 A Bidder may withdraw his Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B14.1.1 Notwithstanding 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.

- B14.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid, and only such person, has authority to give notice of withdrawal.
- B14.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:
- (a) retain the Bid until after the Submission Deadline has elapsed;
  - (b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid; and
  - (c) if the notice has been given by any one of the persons specified in B14.1.3(b), declare the Bid withdrawn.
- B14.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B13.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

## **B15. EVALUATION OF BIDS**

- B15.1 Award of the Contract shall be based on the following bid evaluation criteria:
- (a) compliance by the Bidder with the requirements of the Bid Opportunity, or acceptable deviation there from (pass/fail);
  - (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B10 (pass/fail);
  - (c) Total Bid Price;
  - (d) economic analysis of any approved alternative pursuant to B6.
- B15.2 Further to B15.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid 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.
- B15.3 Further to B15.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid or in other information required to be submitted, that he is responsible and qualified.
- B15.4 Further to B15.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.
- B15.4.1 If there is any discrepancy between the Total Bid Price written in figures, the Total Bid Price written in words and the sum of the quantities multiplied by the unit prices for each item, the sum of the quantities multiplied by the unit prices for each item shall take precedence.
- B15.4.2 Further to B15.1(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.

## **B16. AWARD OF CONTRACT**

- B16.1 The City will give notice of the award of the Contract or will give notice that no award will be made.
- B16.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.

- B16.2.1 Without limiting the generality of B16.2, the City will have no obligation to award a Contract where:
- (a) the prices exceed the available City funds for the Work;
  - (b) the prices are materially in excess of the prices received for similar work in the past;
  - (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;
  - (d) only one Bid is received; or
  - (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.
- B16.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B15.
- B16.3.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his Bid upon written request to the Contract Administrator.

## PART C - GENERAL CONDITIONS

### C0. GENERAL CONDITIONS

- C0.1 The *General Conditions for Construction* (Revision 2006 12 15) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at [http://www.winnipeg.ca/matmgt/gen\\_cond.stm](http://www.winnipeg.ca/matmgt/gen_cond.stm)
- C0.2 A reference in the Bid Opportunity to a section, clause or subclause with the prefix “**C**” designates a section, clause or subclause in the *General Conditions for Construction*.

## **PART D - SUPPLEMENTAL CONDITIONS**

### **GENERAL**

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

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

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

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

- Construction of riverbank stability improvement works consisting of rock column installation (including vibratory compaction testing program) and riprap erosion protection measures for the riverbank related activities.
- Installation of temporary trench shoring where required for outfall replacement on Radcliff Road Site.
- Removal of existing outfall pipes and replacement with new outfall pipes including concrete collars between concrete and CMP pipe sections and internal slip joints within the CMP pipes.
- Radcliff Road Outfalls (approximately 16 m of 1200 mm diameter CMP; 13 m of 1200 mm diameter concrete pipe; 15 m of 750 mm diameter CMP; and 13m of 750 mm diameter concrete pipe).
- Glasgow Avenue Outfall (approximately 7m of 1200 mm CMP).
- Inspection and cleaning of Radcliff (RR-11) outfall.
- Site Restoration.

#### **D3. CONTRACT ADMINISTRATOR**

D3.1 The Contract Administrator is KGS Group, represented by:

Roy Houston, P.Eng.  
Manager Civil/Municipal Services  
3<sup>rd</sup> Floor – 865 Waverley Street  
Winnipeg, MB. R3T 5P4

Telephone No. (204) 896-1209  
Facsimile No. (204) 896-0754

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

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

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

#### **D5. NOTICES**

D5.1 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.

D5.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D5.3, D5.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the address or facsimile number identified in D3.1.

D5.3 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 address or facsimile number:

The City of Winnipeg  
Chief Financial Officer  
Administration Building, 3rd Floor  
510 Main Street  
Winnipeg MB R3B 1B9  
Facsimile No.: (204) 949-1174

D5.4 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following address or facsimile number:

The City of Winnipeg  
Internal Services Department  
Legal Services Division  
Attn: City Solicitor  
185 King Street, 3rd Floor  
Winnipeg MB R3B 1J1  
Facsimile No.: (204) 947-9155

## **D6. FURNISHING OF DOCUMENTS**

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

## **SUBMISSIONS**

### **D7. AUTHORITY TO CARRY ON BUSINESS**

D7.1 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.

### **D8. SAFE WORK PLAN**

D8.1 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.

D8.2 The Safe Work Plan should 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>

## **D9. INSURANCE**

- D9.1 The Contractor shall provide and maintain the following insurance coverage:
- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability, broad form property damage cover and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period;
  - (b) automobile liability insurance for owned automobiles used for or in connection with the Work in the amount of at least two million dollars (\$2,000,000.00) at all times during the performance of the Work and until the date of Total Performance;
  - (c) an all risks Installation Floater carrying adequate limits to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of any installation.
- D9.2 Deductibles shall be borne by the Contractor.
- D9.3 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in C4.1 for the return of the executed Contract.
- D9.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

## **D10. PERFORMANCE SECURITY**

- D10.1 The Contractor shall provide and maintain performance security until the expiration of the warranty period in the form of:
- (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; or
  - (b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or
  - (c) a certified cheque or draft payable to "The City of Winnipeg", drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.
- D10.1.1 Where the performance security is in the form of a certified cheque or draft, it will be deposited by the City. The City will not pay any interest on certified cheques or drafts furnished as performance security.
- D10.2 If the bid security provided in his Bid was not a certified cheque or draft pursuant to B11.1(c), the Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

## **D11. SUBCONTRACTOR LIST**

- D11.1 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 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.

## **D12. DETAILED WORK SCHEDULE**

- D12.1 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 C4.1 for the return of the executed Contract.
- D12.2 The detailed work schedule shall consist of the following:
- (a) a Gantt chart for the Work;
- D12.3 Further to, D12.2, the Gantt Chart shall clearly identify the start and completion dates of all of the following activities/tasks making up the Work:
- (a) Geotechnical/Riverbank Stability Works (to be completed prior to other activities on Radcliff site), including Vibratory Compaction Testing Program
  - (b) Installation of Trench Shoring
  - (c) Cleaning and inspection of outfalls (RR-11& RR-11A)
  - (d) Installation of PCP and CSP Outfall Pipes
  - (e) Installation of CSP Slip Joints
  - (f) Installation of Concrete Collars
  - (g) Placement of Riprap
  - (h) Restoration of Sites

## **SCHEDULE OF WORK**

### **D13. COMMENCEMENT**

- D13.1 The Contractor shall not commence any Work until he is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.
- D13.2 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 D7;
    - (ii) evidence of the workers compensation coverage specified in C6.15;
    - (iii) the Safe Work Plan specified in D8;
    - (iv) evidence of the insurance specified in D9;
    - (v) the performance security specified in D10;
    - (vi) the Subcontractor list specified in D11; and
    - (vii) the detailed Work Schedule specified in D12.
  - (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.
- D13.3 The Contractor shall commence the Work on the Site within seven (7) Working Days of receipt of the letter of intent.
- D13.3 The City intends to award this Contract by January 22<sup>nd</sup>, 2010
- D13.3.1 If the actual date of award is later than the intended date, the dates specified for Substantial Performance, and Total Performance will be adjusted by the difference between the aforementioned intended and actual dates.

### **D14. SUBSTANTIAL PERFORMANCE**

- D14.1 The Contractor shall achieve Substantial Performance by March 31, 2010.



D14.2 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 reinspected.

D14.3 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.

#### **D15. TOTAL PERFORMANCE**

D15.1 The Contractor shall achieve Total Performance by June 15, 2010.

D15.2 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 reinspected.

D15.3 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.

#### **D16. LIQUIDATED DAMAGES**

D16.1 If the Contractor fails to achieve Substantial Performance in accordance with the Contract by the day fixed herein for Substantial Performance, the Contractor shall pay the City one thousand dollars (\$1,000.00) per Working Day for each and every Working Day following the day fixed herein for Substantial Performance during which such failure continues.

D16.2 The amount specified for liquidated damages in D16.1 is based on a genuine pre-estimate of the City's damages in the event that the Contractor does not achieve Substantial Performance by the day fixed herein for same.

D16.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

#### **CONTROL OF WORK**

##### **D17. JOB MEETINGS**

D17.1 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.

D17.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

##### **D18. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)**

D18.1 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).

## **MEASUREMENT AND PAYMENT**

### **D19. PAYMENT**

D19.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

## **WARRANTY**

### **D20. WARRANTY**

D20.1 Warranty is as stated in C13.

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

KNOW ALL MEN BY THESE PRESENTS THAT

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

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

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

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

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

BID OPPORTUNITY NO. 855-2009

2009 OUTFALL MAINTENANCE PROGRAM: RADCLIFF ROAD OUTFALL PIPE REPLACEMENT AND RIVERBANK STABILITY IMPROVEMENT WORKS AND GLASGOW OUTFALL REPAIRS

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

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

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

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

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

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

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

SIGNED AND SEALED  
in the presence of:

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

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

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

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

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

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

**FORM H2: IRREVOCABLE STANDBY LETTER OF CREDIT  
(PERFORMANCE SECURITY)**  
(See D10)

\_\_\_\_\_  
(Date)

The City of Winnipeg  
Internal Services Department  
Legal Services Division  
185 King Street, 3rd Floor  
Winnipeg MB R3B 1J1

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 855-2009

2009 OUTFALL MAINTENANCE PROGRAM: RADCLIFF ROAD OUTFALL PIPE REPLACEMENT  
AND RIVERBANK STABILITY IMPROVEMENT WORKS AND GLASGOW OUTFALL REPAIRS

Pursuant to the request of and for the account of our customer,

\_\_\_\_\_  
(Name of Contractor)

\_\_\_\_\_  
(Address of Contractor)

WE HEREBY ESTABLISH in your favour our irrevocable Standby Letter of Credit for a sum not exceeding  
in the aggregate

\_\_\_\_\_ Canadian dollars.

This Standby Letter of Credit may be drawn on by you at any time and from time to time upon written demand for payment made upon us by you. It is understood that we are obligated under this Standby Letter of Credit for the payment of monies only and we hereby agree that we shall honour your demand for payment without inquiring whether you have a right as between yourself and our customer to make such demand and without recognizing any claim of our customer or objection by the customer to payment by us.

The amount of this Standby Letter of Credit may be reduced from time to time only by amounts drawn upon it by you or by formal notice in writing given to us by you if you desire such reduction or are willing that it be made.

Partial drawings are permitted.

We engage with you that all demands for payment made within the terms and currency of this Standby Letter of Credit will be duly honoured if presented to us at:

\_\_\_\_\_  
(Address)

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

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

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

\_\_\_\_\_  
(Date)

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

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

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

\_\_\_\_\_  
(Name of bank or financial institution)

Per: \_\_\_\_\_  
(Authorized Signing Officer)

Per: \_\_\_\_\_  
(Authorized Signing Officer)



## PART E - SPECIFICATIONS

### GENERAL

#### E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

- E1.1 These Specifications shall apply to the Work.
- E1.2 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/Spec/Default.stm>
- E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.2.3 Further to C2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.3 The following are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
855-2009-Drawing_LD-5469	Cover Sheet
855-2009-Drawing_LD-5470	Radcliff Road Plan and Profile Outfalls (RR-10 & RR-11)
855-2009-Drawing_LD-5471	Radcliff Road Existing Site Conditions
855-2009-Drawing_LD-5472	Radcliff Road Rockfill Columns, Excavation and Regrading Plans
855-2009-Drawing_LD-5473	Radcliff Road Sections and Details
855-2009-Drawing_LD-5473	Glasgow Avenue Plan and Profile Outfall (RR-48)
855-2009-Drawing_LD-5474	Miscellaneous Details
855-2009-Drawing_LD-5475	Hand Rail Details

#### E2. SOILS INVESTIGATION REPORT

- E2.1 Further to C:3.1, of the General Conditions, geotechnical test holes have been drilled in the vicinity of the proposed Works to determine the character of the subsurface soil to facilitate the design of the Work. The information is considered accurate at the locations indicated and at the time of the investigation. However, considerable variations in the soil conditions may exist between test holes and fluctuations in ground water levels can be expected seasonally. Test hole logs are included.
- E2.2 Bidders are responsible for any interpretation they place on the supplied information and are expected to make such additional investigation of the soil as they feel necessary to satisfy themselves.
- E2.3 Any test borings made by the Bidder shall be done in accordance with the requirements of the appropriate authority of the City of Winnipeg. Bidders shall notify the Contract Administrator prior to starting any soil boring operation.

### GENERAL REQUIREMENTS

#### E3. OFFICE FACILITIES

- E3.1 The Contractor shall supply office facilities meeting the following requirements:
- The field office shall be for the exclusive use of the Contract Administrator.
  - 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, 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 fluorescent fixtures and have a minimum of three wall outlets.
  - (f) The building shall be furnished with two desks, two drafting tables, table 3m X 1.2m, one stool, one four drawer legal size filing cabinet, and a minimum of 12 chairs.
  - (g) The building shall have a working landline telephone service connection.
  - (h) 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.
  - (i) 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 deems it necessary.
- 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 until Total Performance.

#### **E4. DANGEROUS WORK CONDITIONS**

- E4.1 Further to clause C 6.24 of the General Conditions, the Contractor shall be aware that underground chambers, manholes, and sewers are considered a confined space and shall follow the "Guidelines for confined Entry Work" as published by the Manitoba Workplace Safety and Health Division.
- E4.2 The Contractor shall be aware of the potential hazards that can be encountered in gate chambers, manholes and sewers such as explosive gases, toxic gases and oxygen deficiency.
- E4.3 The air in a confined space must be tested before entry and continuously during the time that personnel are inside the space. Equipment for continuous monitoring of gases must be explosion-proof and equipped with a visible and audible alarm. The principal tests are for oxygen deficiency, explosion range and toxic gases. Testing equipment must be calibrated in accordance with manufacturer's specifications.
- E4.4 The Contractor shall ventilate all confined spaces including underground chambers, tunnels, pipes and shafts as required and approved by the Manitoba Workplace Safety and Health Act (the "Act"). If no ventilation is supplied, a Worker must wear a respirator or supplied air to enter the confined space.
- E4.5 Workers must wear a respirator or supplied air at all times when entering a chamber, manhole or sewer where live sewage is present.
- E4.6 The Contractor shall provide a photoionization detector (PID) on Site at all times to monitor potential hydrocarbon vapours in the confined spaces. The gas detector and safety equipment conforming to the Act shall be made available to the Contract Administrator for his use during inspections. In addition, the Contract Administrator shall collect discrete air samples for laboratory analysis.
- E4.7 The Contract Administrator may issue a Stop Work order to the Contractor if the above guidelines are not being followed. The Contractor shall not resume his operations until the Contract Administrator is satisfied the Contractor is following the appropriate procedures. The

Contractor shall have no claim for extra time or costs due to the Stop Work order for not following these safety guidelines.

#### **E5. WATERWAY BY-LAW AND PERMITS**

- E5.1 The Contractor shall note that all Works fall within 107 metres (350 feet) of the regulated summer water level of the Red River and are therefore within the jurisdiction of the Waterway By-law. The Contract Administrator will apply and pay for the required Waterway Permits for the permanent Work. The Contractor shall adhere to restrictions imposed by the permit.
- E5.2 The Contractor shall be responsible to apply and pay for a Waterway Permit for all temporary Works including construction access ramps as outlined in E11.3.
- E5.3 Under no circumstances will stockpiling of any material be permitted within 107 metres of the regulated summer water level of the Red River.

#### **E6. ENVIRONMENTAL PROTECTION PLAN**

- E6.1 The Contractor shall plan and implement the Work of this Contract strictly in accordance with the requirements of the Environmental Protection Plan as herein specified, Fisheries Authorization & CEAA Screening report.
- E6.2 The Contractor is advised that at least the following Acts, Regulations, and By-laws apply to the Work and are available for viewing at the office of the Contract Administrator.

##### **A. Federal**

1. Canadian Environmental Assessment Act (CEAA) c.37
2. Transportation of Dangerous Goods Act and Regulations c.34
3. The Fisheries Act
4. Navigable Waters Protection Act

##### **B. Provincial**

1. The Dangerous Goods Handling and Transportation Act D12
2. The Endangered Species Act E111
3. The Environment Act c.E125
4. The Fire Prevention Act F80
5. The Manitoba Heritage Resources Act H39.1
6. The Manitoba Noxious Weeds Act N110
7. The Manitoba Nuisance Act N120
8. The Public Health Act c.P210
9. The Workplace Safety and Health Act W210
10. And current applicable associated regulations.  
(Note: Provincial regulations updated as of September 1999)

##### **C. Municipal**

1. The City of Winnipeg By-law No. 2480/79 and all amendments up to and including 7969/2000
2. The City of Winnipeg By-law No. 1573/77 and all amendments up to and including 7670/2000
3. And any other applicable Acts, Regulations, and By-Laws.

- E6.3 The Contractor is advised that the following environmental protection measures apply to the Work.

## **A. Materials Handling and Storage**

1. Construction materials shall not be deposited or stored on riverbanks or river shorelines unless written acceptance from the Contract Administrator is received in advance.
2. Construction materials and debris shall be prevented from entering the Red River. In the event that materials and/or debris inadvertently enter the watercourse, the Contract shall be required to remove the material and restore the watercourse to its original condition.

## **B. Fuel Handling and Storage**

1. The Contractor shall obtain all necessary permits from Manitoba Conservation for the handling and storage of fuel products and shall provide copies to the Contract Administrator.
2. All fuel handling and storage facilities shall comply with The Dangerous Goods and Transportation Act Storage and Handling of Petroleum Products Regulation and any local land use permits.
3. Fuels, lubricants, and other potentially hazardous materials as defined in The Dangerous Goods and Transportation Act shall be stored and handled within the approved storage areas.
4. In accordance with Section 2.5 (Construction: General Guidelines) of the Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat. (DFO and DNR, 1996), the Contractor shall ensure that any temporary fuel storage areas established for construction of the project are contained by an impermeable dike and are located a minimum distance of 100 metres away from the high water line of the Red River. Dikes shall be designed, constructed, and maintained to retain not less than 100% of the capacity of the total number of containers or 110% of the largest container, whichever is greatest. The dikes shall be constructed of clay or similar impervious material. If this type of material is not available, the dike shall be constructed of locally available material and lined with high density polyethylene (HDPE). Furthermore, the fuel storage area(s) shall be secured by a barrier such as a high fence and gate to prevent vandalism.
5. The Contractor shall ensure that all fuel storage containers are inspected daily for leaks and spillage.
6. Products transferred from the fuel storage area(s) to specific Work Sites shall not exceed the daily usage requirement.
7. When servicing requires the drainage or pumping of fuels, lubricating oils or other fluids from equipment, a groundsheet of suitable material (such as HDPE) and size shall be spread on the ground to catch the fluid in the event of a leak or spill.
8. Refuelling of mobile equipment and vehicles shall take place at least 100 metres from a watercourse.
9. The area around storage Sites and fuel lines shall be distinctly marked and kept clear of snow and debris to allow for routine inspection and leak detection.
10. A sufficient supply of materials, such as absorbent material and plastic oil booms, to clean up minor spills shall be stored nearby on-site. The Contractor shall ensure that additional material can be made available on short notice.

## **C. Waste Handling and Disposal**

1. The construction area shall be kept clean and orderly at all times during and at completion of construction.

2. At no time during construction shall personal or construction waste be permitted to accumulate for more than one day at any location on the construction Site, other than at a dedicated storage area as may be approved by the Contract Administrator.
3. All resulting debris shall be deposited at a Waste Disposal Ground operating under the authority of Manitoba Regulation #150/91. Exceptions are liquid industrial and hazardous wastes which may require special disposal methods (see SC:21.4 D).
4. Indiscriminate dumping, littering, or abandonment shall not take place.
5. No on-site burning of waste is permitted.
6. Waste storage areas shall not be located so as to block natural drainage.
7. Run-off from a waste storage area shall not be allowed to cause siltation of a watercourse.
8. Waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.
9. Equipment shall not be cleaned near watercourses; contaminated water from onshore cleaning operations shall not be permitted to enter watercourses.

**D. Dangerous Goods/Hazardous Waste Handling and Disposal**

1. Dangerous goods/hazardous wastes are identified by, and shall be handled according to, The Dangerous Goods Handling and Transportation Act and Regulations.
2. The Contractor shall be familiar with The Dangerous Goods Handling and Transportation Act and Regulations.
3. The Contractor shall have on-site staff that is trained and certified in the handling of the dangerous/hazardous goods, when said dangerous/hazardous goods are being utilized on-site for the performance of the Work.
4. Different waste streams shall not be mixed.
5. Disposal of dangerous goods/hazardous wastes shall be at approved hazardous waste facilities.
6. Liquid hydrocarbons shall not be stored or disposed of in earthen pits on-site.
7. Used oils shall be stored in appropriate drums, or tankage until shipment to waste oil recycling centres, incinerators, or secure disposal facilities approved for such wastes.
8. Used oil filters shall be drained, placed in suitable storage containers, and buried or incinerated at approved hazardous waste treatment and disposal facilities.
9. Dangerous goods/hazardous waste storage areas shall be located at least 100 metres away from the high water line and be dyked.
10. Dangerous goods/hazardous waste storage areas shall not be located so as to block natural drainage.
11. Run-off from a dangerous goods/hazardous waste storage area shall not be allowed to cause siltation of a watercourse.

12. Dangerous goods/hazardous waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.

#### **E. Emergency Response**

1. The Contractor shall ensure that due care and caution is taken to prevent spills.
2. The Contractor shall report all major spills of petroleum products or other hazardous substances with significant impact on the environment and threat to human health and safety (as defined in Table 1 below) to Manitoba Conservation, immediately after occurrence of the environmental accident, by calling the 24-hour emergency phone number (204) 945-4888. The Contract Administrator shall also be notified.
3. The Contractor shall designate a qualified supervisor as the on-site emergency response co-ordinator for the project. The emergency response co-ordinator shall have the authority to redirect manpower in order to respond in the event of a spill.
4. The following actions shall be taken by the person in charge of the spilled material or the first person(s) arriving at the scene of a hazardous material accident or the on-site emergency response co-ordinator:
  1. Notify emergency-response co-ordinator of the accident:
    - identify exact location and time of accident
    - indicate injuries, if any
    - request assistance as required by magnitude of accident (Manitoba Conservation 24-hour Spill Response Line (204) 945-4888, Police, Fire Department, Ambulance, company backup)
  - Attend to public safety:
    - stop traffic, roadblock/cordon off the immediate danger area
    - eliminate ignition sources
    - initiate evacuation procedures if necessary
  - Assess situation and gather information on the status of the situation, noting:
    - personnel on-site
    - cause and effect of spill
    - estimated extent of damage
    - amount and type of material involved
    - proximity to waterways, sewers, and manholes
  - 
  - If safe to do so, try to stop the dispersion or flow of spill material:
    - approach from upwind
    - stop or reduce leak if safe to do so
    - dike spill material with dry, inert sorbet material or dry clay soil or sand
    - prevent spill material from entering waterways and utilities by diking
    - prevent spill material from entering manholes and other openings by covering with rubber spill mats or diking
  - Resume any effective action to contain, clean up, or stop the flow of the spilled product.
5. The emergency response co-ordinator shall ensure that all environmental accidents involving contaminants shall be documented and reported to Manitoba Conservation according to The Dangerous Goods Handling and Transportation Act Environmental Accident Report Regulation 439/87.
6. When dangerous goods are used on-site, materials for containment and cleanup of spill material (e.g. absorbent materials, plastic oil booms, and oversized recovery drums) shall be available on-site.

7. Minor spills of such substances that may be contained on land with no significant impact on the environment may be responded to with in-house resources without formal notification to Manitoba Environment.
8. City emergency response, 9-1-1, shall be used if other means are not available.
9. The on-site emergency response coordinator shall contact The Canadian Coast Guard, Selkirk (204) 785-6030, if the spill material reaches and is on or in the Red or Assiniboine Rivers.

**Table 1 Spills that must be reported to the Manitoba Conservation as Environmental Accidents**

<u>Classification</u>	<u>Hazard</u>	<u>Reportable Quantity/Level</u>
1	Explosives	All
2.1	Compressed Gas (flammable)	100 L*
2.2	Compressed Gas	100 L*
2.3	Compressed Gas (toxic)	All
2.4	Compressed Gas (corrosive)	All
3	Flammable Liquids	100 L
4	Flammable Solids	1 kg
5.1	PG** I & II	1 kg or 1 L
	PG III	50 kg or 50 L
5.2	Organic Peroxide	1 kg or 1 L
6.1	PG I	1 kg or 1 L
	PG II & III	5 kg or 5 L
6.2	Infectious	All
7	Radioactive	Any discharge or radiation level exceeding 10 mSv/h at the package surface and 200 uSv/h at 1 m from the package surface
8	Corrosive	5 kg or 5 L
9.1	Miscellaneous	50 kg (except PCB mixtures)
9.1	PCB Mixtures	500 g
9.2	Aquatic Toxic	1 kg or 1 L
9.3	Wastes (Chronic Toxic)	5 kg or 5 L

\* Container capacity (refers to container water capacity)

\*\* PG = Packing Group(s)

**F. Vegetation**

1. Vegetation shall not be distributed without written permission of the Contract Administrator. The Contractor shall protect plants or trees which may be at risk of accidental damage. Such measures may include protective fencing or signage and shall be approved in advance by the Contractor Administrator.
2. Trees damaged during construction activities shall be examined by bonded tree care professionals; viable trees damaged during construction activities shall be pruned according to good practise by bonded tree care professionals. Damaged trees which are not viable shall be replaced at the expense of the Contractor.

3. Trees identified to be at risk by the Contract Administrator are to be strapped with 25 x 100 x 2400 millimetre wood planks, or suitably protected as approved by the Contract Administrator.
4. Herbicides and pesticides shall not be used adjacent to any surface watercourses.
5. All landowners adjacent to the area of application of herbicides or pesticides shall be notified prior to the Work.
6. Trees or shrubs shall not be felled into watercourses.
7. Areas where vegetation is removed during clearing, construction, and decommissioning activities, shall be revegetated as soon as possible in accordance with the landscaping plans forming part of the contract, or as directed by the Contract Administrator.

#### **G. Landscaping**

1. Restoration of boulevards requiring topsoil and sod.

#### **H. Red and Assiniboine Rivers Navigation Protection**

##### Dangerous Goods/Hazardous Waste Handling and Disposal

- (a) The Red and Assiniboine Rivers are open to navigation from approximately mid April to mid November, annually. During this period, it will be the responsibility of the Contractor to fully ensure the safety of river users.
- (b) The Contractor shall provide, install, and maintain adequate warning signs and lighting on any structure beyond the water's edge to notify boats and other craft navigating on the Red River that construction is underway. These warnings shall meet the requirements of the Winnipeg Rivers and Streams Authority Number One and of the Canadian Coast Guard.
- (c) Prior to commencing any applicable operations over the Red River, the Contractor shall provide to the Contract Administrator a copy of all necessary approvals received by the Contractor.

### **E7. SHOP DRAWINGS**

#### **E7.1 Description**

- (a) This Specification shall revise, amend and supplement the requirements of CW 1100.
  - (i) The term 'shop drawings' means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, including Site erection drawings which are to be provided by the Contractor to illustrate details of a portion of the Work.
  - (ii) The Contractor shall submit specified shop drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be show on all submissions for Engineering review.
- (b) Shop Drawings
  - (i) Original drawings are to be prepared by Contractor, Subcontractor, Supplier, Distributor, or Manufacturer, which illustrate appropriate portion of Work; showing fabrication, layout, setting or erection details as specified in appropriate sections.
  - (ii) Shop drawings for the following structural components shall bear the seal of a registered Contract Administrator of Manitoba.
    - (a) Shoring.
    - (b) Reinforcing steel.
    - (c) Metal Fabrications.

- (c) Contractor's Responsibilities
  - (i) Review shop drawings, product data and samples prior to submission and stamp and sign drawings indicating conformance to the Contract requirements.
  - (ii) Verify:
    - (a) Field Measurements
    - (b) Field Construction Criteria
    - (c) Catalogue numbers and similar data
  - (iii) Coordinate each submission with requirements of Work and Contract Documents. Individual shop drawings will not be reviewed until all related drawings are available.
  - (iv) Notify Contract Administrator, in writing at time of submission, of deviations from requirements of Contract Documents.
  - (v) Responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator's review of submission, unless Contract Administrator gives written acceptance of specified deviations.
  - (vi) Responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.
  - (vii) The Contractor shall make any corrections required by the Contract Administrator and shall resubmit the required number of corrected copies of Shop Drawings. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Contract Administrator on previous submission.
  - (viii) After Contract Administrator's review and return of copies, distribute copies to subtrades as appropriate.
  - (ix) Maintain one (1) complete set of reviewed shop drawings, filed by Specification Section Number, at the Site of the Work for use and reference of the Contract Administrator and Subcontractors.
- (d) Submission Requirements
  - (i) Schedule submissions at least 14 Calendar Days before dates reviewed submissions will be needed, and allow for a 14 Calendar Day period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.
  - (ii) Submit five (5) paper prints of shop drawings. The Contractor is advised that the Contract Administrator will retain three (3) copies of all submittals and return two (2) copies to the Contractor.
  - (iii) Accompany submissions with transmittal letter, containing:
    - (a) Date
    - (b) Project title and Bid Opportunity number
    - (c) Contractor's name and address
    - (d) Number of each shop drawing, product data and sample submitted
    - (e) Specification Section, Title, Number and Clause
    - (f) Drawing Number and Detail/Section Number
    - (g) Other pertinent data
  - (iv) Submissions shall include:
    - (a) Date and revision dates.
    - (b) Project title and Bid Opportunity number.
    - (c) Name of:
      - (a) Contractor
      - (b) Subcontractor
      - (c) Supplier
      - (d) Manufacturer
      - (e) Separate detailer when pertinent
    - (d) Identification of product of material.
    - (e) Relation to adjacent structure or materials.
    - (f) Field dimensions, clearly identified as such.



- (g) Specification section name, number and clause number or drawing number and detail/section number.
  - (h) Applicable standards, such as CSA or CGSB numbers.
  - (i) Contractor's stamp, initialled or signed, certifying review of submission, verification of field measurements and compliance with Contract Documents.
- (e) Other Considerations
- (i) Fabrication, erection, installation or commissioning may require modifications to equipment or systems to conform to the design intent. Revise pertinent shop drawings and resubmit.
  - (ii) Material and equipment delivered to the Site of the Works will not be paid for at least until pertinent shop drawings have been submitted and reviewed.
  - (iii) Incomplete shop drawing information will be considered as stipulated deductions for the purposes of progress payment certificates.
  - (iv) No delay or cost claims will be allowed that arise because of delays in submissions, re-submissions and review of shop drawings.

## **E8. FLOW CONTROL**

- E8.1 During winter months land drainage and storm relief sewers can receive flow of an undetermined amount from groundwater infiltration, watermain breaks, snow melt and other unforeseen sources.
- E8.2 Provide flow control measures to contend with and maintain flow in the storm relief sewer directed to the outfall pipe being replaced. Flow control measures shall include but not be limited to diversions, flumes and by-pass pumping.
- E8.3 Discharge hoses for by-pass pumping shall not be laid across vehicle or pedestrian traffic areas and must be protected from freezing during winter months. Pumping equipment if used, shall be set-up in a location and in such a way to not be a noise problem for nearby residences
- E8.4 Provide a flow control plan to the Contract Administrator for review before removing any existing sewer pipe.
- E8.5 Costs for flow control shall be considered incidental to the installation of CSP and PCP outfall pipe, under the items "Removal and Installation of CSP Outfall" and "Removal and Installation of PCP Outfall".
- E8.6 In the event the flow in the sewer system is expected to exceed the sewer capacity due to spring runoff, the Contract Administrator may suspend Work activities that require temporary by-pass pumping and temporary shutdown of the Site. Suspension of these activities will continue until the high flow diminishes in the sewer.
- E8.7 If in the opinion of the Contract Administrator suspension of Work activities that require temporary by-pass pumping and temporary shutdown of the Site may cause a delay in completion of the Work through no fault of the Contractor, the completion date of the Work will be adjusted accordingly.

## **E9. CHANNEL PROTECTION**

The ice surface and riverbank channel shall be cleared of construction materials prior to ice break-up. The Contractor shall clean up all materials, including but not limited to: soil, snow fence, construction debris, etc. from this construction activity. All items that will have an adverse impact on the channel shall be removed. Channel Protection shall be considered incidental to the Works of this Contract and no measurement or payment will be made for this item.

## **E10. MOBILIZATION AND DEMOBILIZATION**

- E10.1 Mobilization and demobilization will include but not be limited to start-up costs, equipment setup and removal, field office and storage facilities set-up and removal and Site cleanup.
- E10.2 Mobilization and demobilization will be measured on a unit basis and paid for at the Contract Unit Price for "Mobilization and Demobilization" in accordance with this specification, accepted and measured by the Contract Administrator.
- E10.3 50% of the Mobilization and Demobilization unit price will be paid on the first progress payment.
- E10.4 The remaining 50% of the Mobilization and Demobilization unit price will be paid subsequent to the completion of the Work and restoration and clean up of the Site.

## **E11. SITE DEVELOPMENT AND RESTORATION**

### **E11.1 Description**

This Specification shall cover all aspects of the Site Development and restoration Work, including erection, maintenance and removal of safety fencing, sediment control Works, snow clearing, protection of existing trees, general access development, access maintenance and removal, and Site restoration.

### **E11.2 Materials**

#### **E11.2.1 Equipment**

All equipment, implements, tools and facilities used shall be of a size and type as required to complete the Work in a reasonable time, approved by the Contract Administrator. The Contractor shall keep all equipment in good Working order, and have sufficient standby equipment available at all times, as required.

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

#### **E11.3.1 Site and Construction Access**

- (a) The Contractor shall be responsible to develop suitable Site access. This includes but is not limited to, temporary bridging over structures, temporary removal and reinstallation of safety fencing, any landscaping and grading repairs, restoration of vegetation, etc. necessary to restore any Site and construction access areas to their pre-existing condition. Prior to commencing construction the Contractor shall submit their site access plan to the Contract Administrator for approval.
- (b) All construction access ramps from the top bank area down to the edge of the river shall be constructed by excavating to the necessary ramp grade and disposing of the material off Site. Under no circumstances will the excavated material or any additional materials be placed as fill in the ramp area. Detailed construction access ramp drawings are to be submitted to the Contract Administrator for approval a minimum seven (7) days prior to any construction activity on Site.
- (c) The Contractor is responsible for obtaining and paying for all required permits and permissions that are necessary for Site access, including a Waterways Permit, if required by the City of Winnipeg. Contact Anne-Marie Hamilton, P.Eng., Riverbank Management Contract Administrator at 986-5159 for information regarding Waterways Permits.
- (d) The locations of the Contractor's construction access ramps shall be restored to the same condition or better than it was prior to the initiation of any Work.

#### **E11.3.2 Frozen Waterways Permit**

The Contractor is responsible for obtaining a Frozen Water Permit for permission to Work on the river ice. Contact the City of Winnipeg Police Service.

### E11.3.3 Vegetation Removal

Some vegetation (small trees and sod) removal may be permitted in order to facilitate Site access. Existing vegetation shall not be removed without prior approval from the Contract Administrator. The Contractor shall load and haul any removed vegetation, and dispose of the material off Site immediately upon collection. Stockpiling shall not be permitted unless written approval has been obtained from the Contract Administrator.

### E11.3.4 Snow and Ice Removal

Snow cover shall be cleared from the riverbank and hauled off-site prior to placement of the rockfill riprap. The methodology to clear the snow shall be subject to the approval of the Contract Administrator.

Ice at the shoreline of the River shall be broken and cleared before the placement of riprap below ice level. Care shall be taken to ensure that the ice is removed, and does not become trapped below rockfill riprap placement.

### E11.3.5 Safety Fence

The Contractor shall erect and maintain for the duration of the project a safety fence, acceptable to the Contract Administrator, to restrict access to the Site. The fencing shall enclose the entire Site with appropriate gates or openings that are closed at the end of each Work day. Appropriate signs shall be erected to warn all recreational users of the river that an open water hazard exists. This shall include but not be limited to snowmobilers and skiers. The installed fencing shall consist of Dupont Number L70 orange plastic safety fence or approved equal in accordance with B6, with a mesh spacing of 45 mm, constructed as shown in the contract drawings. Upon completion of the Work, the fence shall be removed and disposed of off Site.

### E11.3.6 Environmental Regulations

- (a) The Contractor shall adhere to all relevant Federal and Provincial environmental regulations.
- (b) The Contractor shall plan to Work in accordance with the current environmental regulations of "Manitoba Stream Crossing Guidelines for Protection of Fish and Fish Habitat", Fisheries and Oceans, and Manitoba Natural Resources.
- (c) The Contractor shall supply, in writing, prior to commencement of Work on-site, a detailed plan for sediment control on this project.
- (d) The Contractor shall ensure that a sufficient supply of suitable spill kits are on-site to cleanup minor spills, should they occur. The Contractor shall supply the name, address and phone number of a local supplier, where additional kits are available on short notice.

### E11.3.7 General Site Cleanup and Restoration

All areas of the construction Site shall be restored to a condition at least equivalent to its original condition prior to initiation of Work. This may include, but is not necessarily limited to the Contractor's lay down area, the removal of the Contract Administrator Site trailer, and removal of all temporary fencing.

### E11.3.8 Topsoil and Sod

All topsoil and sodding Work shall be performed in accordance with CW 3510. Topsoil and Sodding Work shall include all existing grassed areas disturbed by the Contractor during construction. The Contractor shall restore all areas disturbed during construction to existing condition or better, using topsoil and sod at his own cost.

## E11.4 Method of Measurement and Payment

## Site Development and Restoration

The Site development and restoration will be measured and paid for at the Contract Lump Sum Price for "Site Development and Restoration", which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification.

### E12. INSTALLATION OF SILT FENCE

#### E12.1 Description

E12.1.1 This specification covers the erection of temporary silt fencing, which shall be installed and maintained at the locations shown on the drawings to control runoff and minimize the release of detrimental silt loading to watercourses.

E12.1.2 The scope Work included in this specification is as follows:

- (a) Supply and Install temporary silt fencing at the locations as indicated on the Drawings, in accordance with the detailed drawing provided, immediately upon completion of the rockfill column and riprap placement and prior to undertaking any other activities on the Site where silt fencing is required.
- (b) Maintain the silt fencing in serviceable condition throughout the entire duration of activities at the Site where silt fencing is required, including final restoration and cleanup of the construction Site.
- (c) Remove the silt fencing and restore the area where the fencing was installed, without further disturbing the area and without releasing any deleterious substances to the adjacent watercourse.

#### E12.2 Materials

##### E12.2.1 Fences Posts

- (a) Fence posts shall be 100 mm diameter untreated wood posts or 50 mm diameter steel.

##### E12.2.2 Filter Fabric

- (a) Filter Fabric Shall be a woven geotextile material specifically designed for a silt fence applications, meeting the following minimum requirements:

Property	Test Method	Value
Grab Tensile Strength	ASTM D 4632	0.55 kN
Grab Tensile Elongation	ASTM D 4632	15%
Mullen Burst	ASTM D 4786	2060 kPa
Puncture	ASTM D 4833	0.285 kN
Trapezoid Tear	ASTM D 4533	0.285 kN
UV Resistance	ASTM D 435	5 80 % @ 500 hrs
Apparent Opening Size (AOS)	ASTM D 4751	0.60 mm
Flow Rate	ASTM D 4491	405 l/min/m <sup>2</sup>

Acceptable Product: "Amoco 2130 Silt Fence Fabric" or approved equal in accordance with B6.

##### E12.2.3 Wire Mesh

- (a) Wire mesh shall be galvanized or plain metal with wire gauge = 3.0 mm, wire spacing @ 150 mm o/c.

**E12.2.4 Fencing Material Fasteners**

- (a) Staples or wire ties of sufficient strength and spacing to withstand 500 N (100 lbf) pull test at any point on the wire mesh.

**E12.3 Construction Methods**

**E12.3.1** Ensure that no deleterious substances are discharged into the adjacent watercourse at any time during construction activities.

**E12.3.2 Silt Fence Installation**

- (a) Excavate 150 x 150 anchor trench along alignment of silt fence as indicated.
- (b) Install fence posts as indicated. Ensure that fence posts are firmly driven into undisturbed soil, or are completely and firmly backfilled if installed via auger methods. Attach wire mesh as support backing for silt fence filter fabric with fasteners as specified in E12.2.4. Attach silt fence filter fabric on top of wire mesh in similar fashion. Overlap any fence seams (wire mesh or filter fabric) by 450 mm minimum. Ensure that wire mesh and filter fabric are installed on the upslope side of the post and are fully laid in anchor trench as shown.
- (c) Install and compact impermeable excavated materials into anchor trench and slope as indicated. Compact to 95% of maximum dry density (ASTM D-698).

**E12.3.3 Silt Fence Maintenance**

- (a) Inspect silt fence daily, prior to starting any other construction activities. If fence posts are found loose or not upright, repair in accordance with installation procedure as specified in E12.3.2. If silt fence is found to be loose or torn, repair or replace as necessary to comply with E12.3.2.
- (b) If silt deposition at the fence is 300 mm or more in depth, carefully remove and dispose of silt offsite without disturbing silt fence.

**E12.3.4 Silt Fence Removal**

- (a) The silt fence shall remain in place until new vegetation growth has established on the bank, as determined by the Contract Administrator.
- (b) Upon authorization of the Contract Administrator, remove all fence posts, wire mesh, fabric, and fasteners from Site.
- (c) Restore areas disturbed in accordance with E11 without releasing any deleterious substances to the adjacent watercourse.

**E12.4 Measurement and Payment**

**E12.4.1** The supply, placement, and removal of silt fence shall be measured on a length basis and paid for at the Contract Unit Price per lineal metre for "Silt Fence". The length to be paid for shall be the total number of metres supplied and placed in accordance with this Specification, accepted and measured by the Contract Administrator. Payment of silt fence shall be in accordance with the following payment schedule:

- (a) Sixty percent (60%) of the Contract Unit Price per lineal metre for "Silt Fence" shall be paid following supply and installation.
- (b) Forty percent (40%) of the Contract Unit Price per lineal metre for "Silt Fence" shall be paid following final removal.

**E12.4.2** Removal of accumulated sediment from the silt fence is considered incidental to the Work and no separate measurement or payment will be made.

**E13. TREE REMOVAL**

**E13.1** Description

- E13.1.1 This specification shall cover the removal of existing trees.
- E13.1.2 The Work to be done by the Contractor under this specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.
- E13.2 **Materials**
- E13.2.1 **Existing Trees to be Removed**  
The existing trees to be removed include, but not limited to ash, elm, cottonwood, basswood, oak, pine, maple, spruce, etc., all of which may be cut with standard chain saw equipment. The existing trees range from 50 mm to 1,000 mm diameter.
- E13.3 **Construction Methods**
- E13.3.1 Prior to commencement of the Work the Contract Administrator shall identify all trees for removal. The Contractor shall cut down only trees designated to be removed, and grub out all stumps and roots greater than 100 mm diameter. In general, the Contractor shall start at the top of the tree and remove branches or trunks not longer than 2 m. Trees are to be felled so as to land within the limits of the Works. 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 an approved disposal Site, acceptable to the Contract Administrator.
- E13.3.2 The Contractor shall take all precautions to prevent damage to structures, adjacent property and to trees and shrubs. In the event of damage, the Contractor will be held liable, and shall be required to provide appropriate restoration at his cost, to the satisfaction of the Contract Administrator.
- E13.3.3 Any trees damaged during construction activities shall be examined by a bonded tree care professional and pruned as required. Damaged trees which are not viable shall be replaced by the Contractor at his own cost.
- E13.4 **Measurement and Payment**
- E13.4.1 The removal of existing trees shall be measured on a per tree basis and paid for at the Contract Unit Price per unit for "Tree Removal", "50 mm to 250 mm diameter", "greater than 250 mm to 500 mm diameter", "greater than 500 mm diameter". The amount to be paid shall be the total number of trees removed in accordance with this specification, accepted and measured by the Contract Administrator.
- E13.4.2 The removal of trees and brush less than 50 mm diameter is considered incidental to the Work and no separate measurement or payment will be made.
- E14. PROTECTION OF EXISTING TREES**
- E14.1 Removal of some trees will be required. The Contract Administrator will identify which trees will be removed. The Contractor shall take the following precautionary steps to avoid damage from construction activities to any existing trees not marked for removal within the limits of the construction area.
- E14.1.1 Do not stockpile materials and soil or park vehicles and equipment within 2 metres of trees.
- E14.1.2 Strap mature tree trunks with 25 x 150 x 2400 wood planks. Smaller trees shall be similarly protected using appropriately sized wood planks.
- E14.1.3 Excavations shall be carried out in a manner to minimize damage to existing root systems. Where roots must be cut to facilitate an excavation they shall be neatly pruned at the face of the excavation.

- E14.1.4 Work on Site shall be carried out in a manner to minimize damage to existing tree branches. Where damage to tree branches does occur, the Contractor shall neatly prune the damaged branch.
- E14.1.5 American elm trees shall not be pruned between April 1st and August 1st and Siberian elm trees between April 1st and July 1st of any year under provisions of The Dutch Elm Disease Act.
- E14.2 All damage to existing trees due to construction activities shall be repaired to the requirements and satisfaction of the City of Winnipeg, Public Works Department, Forestry Branch at the Contractor's expense.
- E14.3 Costs for protection of trees shall be considered incidental to the tree Site Development and Restoration.

## **E15. VIBRATORY COMPACTION TESTING PROGRAM**

### **E15.1 Description**

This Specification covers the Vibratory Compaction Testing Program to demonstrate that the means, procedures, and equipment, proposed by the Contractor, will achieve the specified density of the rockfill backfill in rock columns.

Prior to installing the rockfill columns, three (3) test columns shall be dug, backfilled and vibratory compacted as described in E16. These test columns will ultimately be included in the final column layout.

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 as hereinafter specified.

### **E15.2 Materials**

#### **E15.2.1 Rockfill Backfill**

The rockfill backfill to be supplied for the Vibratory Compaction Testing Program and the rock columns during construction shall be as specified in E16.

#### **E15.2.2 Acceptance of Material**

The Contractor shall supply a representative sample of rockfill backfill at least ten (10) Business Days prior to the commencement of the Compaction Testing Program. The Contract Administrator shall perform the necessary tests to determine compliance with the properties specified in E16

### **E15.3 Equipment**

#### **E15.3.1 General**

All equipment, implements, tools and facilities used shall be of a size and type as required to complete the work in a reasonable time, approved by the Contract Administrator. The Contractor shall keep all equipment in good working order, and have sufficient standby equipment available at all times, as required.

##### **(a) Drill Rig**

Holes for the Compaction Testing Program and rock columns shall be drilled with drill rig equipment of suitable size and capacity to drill to the necessary diameter and depth and the specified penetration into the glacial till.

##### **(b) Sleeving**

The Contractor shall supply steel casing to sleeve the rock column shaft as required to maintain column shafts during backfilling.

(c) Vibratory Compaction Equipment

The Contractor shall use vibratory equipment to densify the rockfill backfill material for a length of time to ensure that the relative density of the rockfill material is increased a minimum of 15% over uncompacted caissons throughout the entire depth of the rock column. Compacting with a vibrating plate compactor, drop hammer, backhoe bucket, or other similar approaches shall not be accepted.

E15.4 Compaction Test Procedure

E15.4.1 As a result of the Vibratory Compaction Testing Program, the Contractor must establish the following:

- (a) The compaction equipment proposed for use.
- (b) The protocol for backfilling and compacting.
- (c) The amount of compaction effort required to achieve the minimum specified density.

E15.4.2 All vibratory compaction must be demonstrated to achieve a uniform minimum increase of 15% in relative density of the rockfill from the bottom of the caisson to the top. It is anticipated the Contractor will use a vibrating device that can be directly inserted to the bottom of the rockfill column without and will not require the addition of water throughout the rockfill column compaction process.

All testing shall be carried out in the presence of the Contract Administrator. The Compaction Testing Program shall be conducted on site within rockfill columns used for the riverbank remediation.

E15.4.3 The direct insertion vibratory method compaction tests without the use of additional water shall be conducted in four test shafts, drilled from ground surface to the underlying dense till. The diameter of the test shaft shall be the same diameter as proposed for the rockfill columns. Each test shaft shall be completed in the following manner:

- (a) Auger the rock column hole from ground surface down to a minimum of 0.3 metre into the underlying dense till.
- (b) Install a steel sleeve if necessary that extends from ground surface to the underlying till.
- (c) Fill the rock column hole with the rock as specified in E16. The Contractor is to take care to ensure that all rockfill material from each truck used to fill the rockfill column is placed inside the rockfill column test shaft. Only rockfill from an integer number of trucks shall be placed inside the rockfill column test shaft.
- (d) The Contract Administrator will make an estimation of the uncompacted density of the rockfill material within the rockfill column test shaft, based upon the known volume of the test shaft and the weight of the rockfill within the test shaft.
- (e) Vibro-compact the rockfill until a minimum 15% improvement in density is achieved.
- (f) The steel sleeve is to be removed from the rockfill column test shaft.

E15.5 Acceptance of Compaction Testing Program

Construction of additional rock columns shall not commence until the Contractor has successfully completed the Compaction Testing Program. The Contractor may be advised that additional tests shall be performed until he has demonstrated that his compaction equipment and methods will achieve the specified level of compaction. Additional payment for either rockfill, rockfill columns shaft drilling, or sleeving will not be made to the Contractor for additional compaction tests required because of earlier failed tests. Acceptance or approval of the



Compaction Testing Program shall in no way relieve the Contractor of his contractual obligation of achieving the specified design of compaction during construction.

**E15.6 Method of Measurement**

No separate measurement will be made for the Vibratory Compaction Testing Program. Shaft drilling, sleeving and rockfill will be paid for separately based upon the unit prices under E16.9.1 for Shaft Drilling, E16.9.2 for Rockfill Column Backfill, and E16.9.3 for Sleeving.

**E16. ROCKFILL COLUMNS**

**E16.1 Description**

This Specification shall cover the installation of the rockfill columns, including the auger drilling, sleeving, cuttings removal, supply, placement, placement and vibratory compaction of rockfill, supply, backfill and compaction of clay cap, and provisions for handling groundwater infiltration.

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 as hereinafter specified.

**E16.2 Materials**

**E16.2.1 General**

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

**E16.2.2 Rockfill Column Backfill**

- (a) The rockfill material for use as backfill shall consist of a clean free draining, sound, dense, durable, crushed rock. The material shall be free from organics, roots, silts, sand, clay, snow, ice or any other material that would detract from the strength and drainage characteristics of clean rockfill.
- (b) Individual particles shall be shaped such that no dimension is greater than two times the smallest dimension. Flat, elongated, or platy particle shapes will not be accepted.
- (c) Should the Contractor choose to use limestone, it shall be durable white crystalline limestone. Softer buff to yellow dolomite or dolostone will not be accepted.
- (d) The rockfill material shall meet the following requirements:

Parameter	Test Method	Specified Limit
Bulk Specific Gravity	ASTM C127	2.6 minimum
Absorption	ASTM C127	2.5 % maximum
LA Abrasion Loss	ASTM C131	32% maximum
Soundness	ASTM C88	13% maximum
Gradation	ASTM D5519	See below

- (e) Rockfill column backfill shall be well graded having a full range and even distribution of sizes and shall conform to the following gradation:

Canadian Metric Sieve Size (millimeters)	Percent of Total Dry Weight Passing Each Sieve
150	100%

75	40-70%
25	0-5%

E16.2.3 Clay Cap

The impervious clay cap at the top of the rockfill columns shall consist of a high plasticity clay material, with a liquid limit in excess of 50%. The clay shall be free of deleterious material such as roots, organic material, ice, snow or other unsuitable materials, and may be salvaged from the on-site excavation, as approved by the Contract Administrator. Frozen material will not be accepted.

E16.2.4 Rockfill Column Sleeves

- (a) During augering of the rockfill columns, it may be necessary to use steel sleeves to prevent the sidewalls of the columns from caving. The sleeves shall be of a length suitable to extend from ground surface down to a minimum of 0.6 metres into the underlying till material.
- (b) The Contract Administrator will make no payment for excess rockfill material that is used because the Contractor used a sleeve with a diameter larger than that selected by the Contractor in its bid.

E16.3 Equipment

E16.3.1 General

All equipment, implements, tools and facilities used shall be of a size and type as required to complete the work in a reasonable time, approved by the Contract Administrator. The Contractor shall keep all equipment in good working order, and have sufficient standby equipment available at all times, as required.

E16.3.2 Vibratory Compaction Equipment

- (a) The Contractor shall use vibratory equipment that can be directly inserted to the bottom of the rockfill column to densify the rockfill backfill throughout the entire depth of the rockfill column as described in E15.

E16.4 Submittals

- E16.4.1 The Contractor shall submit the proposed supplier(s) and location of quarry Sites for supply of rockfill backfill.

E16.5 Quarry Sites

- E16.5.1 Contractors supplying rockfill riprap shall be responsible for demonstrating that the material is of adequate quality and volume to meet the material specifications contained herein.

E16.6 Testing and Approval

- E16.6.1 All materials set forth in 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 for any materials taken by the Contract Administrator for testing purposes.
- E16.6.2 The Contract Administrator will visit proposed quarry Sites for inspection of the proposed rockfill material and quarry faces a minimum of fourteen (14) days prior to supply and placement of rockfill backfill.
- E16.6.3 No supply and placement of rockfill backfill will be permitted prior to the Contract Administrator reviewing the source.
- E16.6.4 The procedures for preparation of all rockfill samples for use in material inspection and testing shall be subject to review and acceptance by the Contract Administrator for

individual tests. The samples may be obtained from crushed and processed material at the sizing necessary for specific tests if the material is deemed to be representative of the rockfill backfill that will be used, subject to the acceptance of the Contract Administrator.

E16.6.5 The testing frequency necessary to confirm the material quality will be specified at the discretion of the Contract Administrator.

#### E16.7 Construction Methods

##### E16.7.1 General

The excavation shall be supervised at all times, and open shafts shall be adequately guarded or covered for safety.

##### E16.7.2 Construction Timing and Sequence

- (a) Construction of rock columns shall not proceed until the Contractor has demonstrated his construction procedures by successfully completing the Vibratory Compaction Testing Program as specified in E15.
- (b) The Contractor shall submit their rock column installation sequence to the Contract Administrator for review a minimum of one (1) week prior to the start of construction. The Contractor will not start to install rockfill columns other than those used for rockfill column compaction tests until the Contract Administrator has reviewed the construction sequence and has provided written approval.

##### E16.7.3 Excavation

- (a) The rock column shafts shall be excavated by drill rig augers to the depth as shown on the Drawings. Note that the glacial till and/or bedrock contact elevation may vary and the depth of excavation may differ from that shown on the Drawings.
- (b) Drilling shall not commence until the rockfill is on Site to backfill the shaft.
- (c) Any deleterious or sloughed material shall be removed from the rock column shaft prior to backfilling.
- (d) Discharge of water contained within the auger hole from displacement of the rockfill during backfill will be acceptable. The Contractor shall be responsible to contain and direct any displaced water such that it will not affect other construction Work or cause excessive erosion of the native riverbank soils. The control of the water shall be considered incidental to the Work.
- (e) The construction of the rock columns shall be a continuous operation with backfilling immediately following excavation.
- (f) The Contractor must complete backfilling of each rock column before commencing to excavate adjacent rock columns.
- (g) Excavated material shall be removed from the riverbank area immediately upon excavation and disposed of offsite. Stockpiling of excavated material on the riverbank area will not be permitted.

##### E16.7.4 Sleeving Rock Column Shafts

- (a) The Contractor shall install steel sleeving as required to control sloughing and caving of the shafts.
- (b) Shafts shall only be sleeved where it is not possible to advance and maintain an open hole during the excavating, backfilling and compacting procedures, and the Contractor shall only be paid for sleeving approved by the Contract Administrator. If the Contractor uses sleeves that do not extend from ground surface to the bottom of the hole, a pro-rated payment for the sleeve will be made based upon the actual length of the sleeve used.

##### E16.7.5 Backfilling and Compaction

- (a) Backfilling and compacting of rockfill shall follow the protocol established during the Compaction Testing Program in E15. Deviations from the accepted compaction

procedures shall not be permitted without prior written approval from the Contract Administrator.

- (b) Excavated rock column shafts shall be backfilled immediately upon excavation. No hole shall remain without backfill overnight, or for a period beyond four (4) hours.
- (c) After placement of the rockfill to the required dimensions shown on the Drawings, the impervious clay cap shall be placed in layers not exceeding 200 millimetres, and compacted to a minimum of 95% of the Standard Proctor Maximum Dry Density. The clay cap shall be located within undisturbed native material surrounding the caisson approximately at the base of the existing parking lot fill. Care shall be taken to ensure that an effective seal results between the wall of the shaft excavation and the clay material placed, to protect against water infiltration into the shaft, as approved by the Contract Administrator.

**E16.7.6 Supply of Rockfill Column Backfill**

The Contractor shall monitor the supply rate of the rockfill material to ensure that the backfilling operations are not delayed.

**E16.7.7 Stockpiling of Rockfill Material**

Stockpiling of rockfill material will not be permitted on the riverbank except at locations where existing rockfill columns are in place, subject to the approval of the Contract Administrator.

**E16.7.8 Contaminated Rockfill Material**

Where crushed limestone has become contaminated with silt, clay, snow, ice or other deleterious material due to the Contractor's method of operation, negligence, failure to backfill in a timely manner, etc. the material shall be classified as rejected backfill and shall be weighed prior to disposal for deduction from the total weight of crushed limestone measured for payment.

**E16.8 Method of Measurement**

**E16.8.1 Shaft Drilling**

The drilling of shafts for the rockfill columns will be measured on a length basis. The length to be paid for shall be the total number of vertical metres of shaft drilled, measured from the ground surface at the time of the rockfill column installation carried out in accordance with this Specification, acceptable to the Contract Administrator, as computed from measurements made by the Contract Administrator.

**E16.8.2 Rockfill Column Backfill**

The supply, placement and compaction of the Rockfill Backfill will be measured on a weight basis. The weight to be paid for shall be the total number of metric tonnes of Rockfill Backfill material, supplied and placed in accordance with this Specification, acceptable to the Contract Administrator, as measured on a certified weigh scale. The Contractor shall provide the weigh tickets to the Contract Administrator for the material supplied to the Site at the time of delivery. No payment will be made for any weigh tickets that are not supplied at the time of delivery.

**E16.8.3 Sleeving**

Sleeving of the rockfill caissons will be measured on a unit basis. The Contractor shall be paid for the total number of sleeves used in accordance with this Specification, as measured by the Contract Administrator. Only the sleeved holes that are approved by the Contract Administrator will be paid for.

**E16.9 Basis of Payment**

**E16.9.1 Shaft Drilling**

Drilling of the rockfill column shafts will be paid for at the Contract Unit Price for "Shaft Drilling", measured as specified herein, which price shall be payment in full for supplying all

materials and performing all operations herein described, and all other items incidental to the Work included in this Specification.

**E16.9.2 Rockfill Backfill and Compaction**

The supply, placement and compaction of the Rockfill Backfill in the Rockfill Columns will be paid for at the Contract Unit Price for "Rockfill Backfill and Compaction", measured as specified herein, which price shall be payment in full for supplying all materials and for performing all operations herein described, and all other items incidental to the Work included in this Specification.

**E16.9.3 Sleeving**

Sleeving of the Rockfill Column shafts will be paid for at the Contract Unit Price for "Sleeving", measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described, and all other items incidental to the Work included in this Specification.

**E17. ROCKFILL RIPRAP**

**E17.1 Description**

E17.1.1 This Specification shall cover the supply and placement of rockfill riprap.

**E17.2 Materials**

E17.2.1 The rockfill material for use as riprap shall consist of a clean free draining, sound, dense, durable, crushed rock. The material shall be free from organics, roots, silts, sand, clay, snow, ice or any other material that would detract from the strength and drainage characteristics of clean rockfill.

E17.2.2 Individual particles shall be shaped such that no dimension is greater than two times the smallest dimension. Flat, elongated, or platy particle shapes will not be accepted.

E17.2.3 Should the Contractor choose to use limestone, it shall be durable white crystalline limestone. Softer buff to yellow dolomite or dolostone will not be accepted.

E17.2.4 The rockfill material shall meet the following requirements:

Parameter	Test Method	Specified Limit
Bulk Specific Gravity	ASTM C127	2.6 minimum
Absorption	ASTM C127	2.5 % maximum
LA Abrasion Loss	ASTM C131	32% maximum
Soundness	ASTM C88	13% maximum
Gradation	ASTM D5519	See below

E17.2.5 Rockfill riprap shall be well graded having a full range and even distribution of sizes and shall conform to the following gradation:

<u>Canadian Metric Sieve Size (millimeters)</u>	<u>Percent of Total Dry Weight Passing Each Sieve</u>
450	100%
300	35-80%
100	20-60%
50	10-30%
5	0-5%

### E17.3 Submittals

- E17.3.1 The Contractor shall submit the proposed supplier(s) and location of quarry Sites for supply of riprap.
- E17.3.2 Representative samples of the rockfill riprap submitted for material testing purposes shall be completed as specified herein.

### E17.4 Quarry Sites

- E17.4.1 Contractors supplying rockfill riprap shall be responsible for demonstrating that the material is of adequate quality and volume to meet the material specifications contained herein.

### E17.5 Testing and Approval

- E17.5.1 All materials set forth in 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 for any materials taken by the Contract Administrator for testing purposes.
- E17.5.2 The Contract Administrator will visit proposed quarry Sites for inspection of the proposed rockfill material and quarry faces a minimum of fourteen (14) days prior to supply and placement of riprap.
- E17.5.3 No supply and placement of riprap will be permitted prior to the Contract Administrator reviewing the source.
- E17.5.4 The procedures for preparation of all rockfill samples for use in material inspection and testing shall be subject to review and acceptance by the Contract Administrator for individual tests. The samples may be obtained from crushed and processed material at the sizing necessary for specific tests if the material is deemed to be representative of the riprap that will be used, subject to the acceptance of the Contract Administrator.
- E17.5.5 The testing frequency necessary to confirm the material quality will be specified at the discretion of the Contract Administrator.

### E17.6 Construction Methods

- E17.6.1 Rockfill riprap shall be restored over the rock columns after they are backfilled to the lines and grades shown on the drawings. Riprap shall be placed over the geotextile membrane at the location of the backfilled outfall excavation as shown on the drawings.
- E17.6.2 Rockfill Riprap shall be pushed or rolled into place in such a manner that the larger rocks are uniformly distributed and the smaller rocks serve to fill the places between the larger rocks such that excessive segregation of the various particle sizes does not occur.
- E17.6.3 Sufficient levelling shall be done to produce a neat and uniform surface, conforming to the shape and dimensions shown on the Drawings.
- E17.6.4 The allowable fill tolerances shall be within  $\pm 50$  mm of the grades and thickness shown on the Drawings, provided positive downslope grading is achieved.
- E17.6.5 Provide a smooth uniform surface from the existing grade and new riprap when placing outside edges or transitions, as accepted by the Contract Administrator.
- E17.6.6 Temporary stockpiling of riprap along the riverbank shall not be permitted. Material shall be placed to the required lines and grade shown the Drawing immediately upon delivery to the Site.

### E17.7 Measurement and Payment

- E17.7.1 The supply and placement of rockfill riprap shall be measured on a weight basis and paid for at the Contract Unit Price for "Rockfill Riprap". The weight to be paid for shall be the total number of metric tonnes of rockfill supplied and placed in accordance with this Specification, as measured by a certified weigh scale and accepted by the Contract Administrator.

E17.7.2 The Contractor shall provide the weigh tickets to the Contract Administrator for the material supplied to the Site at the time of delivery. No payment will be made for any weigh tickets which are not supplied at the time of delivery, or which are lost.

## **E18. SUPPLY AND INSTALLATION OF TEMPORARY TRENCH SHORING**

### **E18.1.1 Excavation**

- (a) Remove excavated material from the Site immediately. Excavated material shall not be stockpiled on-site unless it will be used as backfill the same day it is excavated.
- (b) All Working areas below grade shall be kept adequately and securely supported during and after excavation until the shoring and bracing is in place to prevent loss of ground or injury to any person from falling material.

### **E18.1.2 Excavation Security Fence**

- (a) Further to Clause 3.1 of CW 1130, completely cover the excavation and provide a security fence to completely surround the excavation when unattended generally in accordance with the following.
- (b) Security fence shall be chain link fence or approved equal, a minimum 1.80 metres high with metal support posts embedded far enough into the ground and spaced close enough together so the fence will not sag or collapse.
- (c) Attach fencing securely to posts.
- (d) Secure the gate or end of the fencing to a post with chain and a padlock.
- (e) Provide alternate security fence proposal to Contract Administrator for approval.

### **E18.1.3 Shoring**

- (a) The type, strength, and amount of shoring and bracing shall be such as the nature of the ground and attendance conditions may require, taking into account property lines, existing slopes, utilities and roadways.
- (b) Shoring and bracing shall be so spaced and dimensioned as to prevent caving, loss of ground, surface settlement, or squeezing of the soil beyond the neat lines of excavation. It shall be free from defects that might impair its strength or suitability for the Work. Sheeting/shoring and bracing shall conform to the latest revisions of the "Construction Safety Act" of the Department of Labour of the Government of Manitoba and in accordance with Province of Manitoba "W210 The Workplace Safety and Health Act" and "Guidelines for Excavation Work".
- (c) Supporting design calculations as required to facilitate review of the submission for conformance with the Contract Documents.
- (d) Submit AutoCAD Shop Drawings and design calculations for the shoring/excavation system designed and sealed by a Professional Engineer registered or licensed to practice in the Province of Manitoba and experienced in the structural design of shoring systems. The designer of the shoring system shall inspect the system during construction and certify, in writing to the Contract Administrator, that construction is in conformance with the approved design.
- (e) Shoring and bracing shall be installed such that the structure size and wall thickness shown on the drawings can be obtained subsequent to installation of the shoring system.
- (f) Shoring and bracing shall remain in place until concrete has attained 75% of the design strength.

### **E18.1.4 Monitoring Movement of Shoring**

The Contractor shall submit to the Contract Administrator a plan for monitoring the movement of trench shoring during construction a minimum of two (2) Working Days prior to the installation of trench shoring. The monitoring plan shall be by approved survey methods for vertical or horizontal movement of the shoring, acceptable to the Contract

Administrator. Costs for monitoring shall be incidental to the installation of the trench shoring.

**E18.2 Measurement and Payment**

E18.2.1 Shoring will be paid for at the contract unit price for "Temporary Trench Shoring". Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification with the exception of excavation. Excavation costs will be paid for as part of removal and installation of PCP and/or CSP outfall pipe as described in E19 Outfall Sewer Repairs.

**E19. OUTFALL SEWER REPAIRS**

**E19.1 Description**

This Specification shall amend and supplement Standard Specifications CW 2130, CW 2160, and CW 3610.

The Work to be done by the Contract under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Work hereinafter specified.

**E19.2 Materials**

**E19.2.1 Handling and Storage of Materials**

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

**E19.2.2 Testing and Approval**

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 supplied for testing purposes.

**E19.2.3 Slip Joint**

Shop drawings shall be submitted for all slip joints. The slip joint shall be installed as shown on the drawings. Galvanizing shall be hot-dip conforming to the requirements of CSA G164-N1981, to a minimum net retention of 600g/m<sup>2</sup>. All bolts and nuts shall be galvanized steel conforming to ASTM A-325. All welding shall be fully approved by the Canadian Welding Bureau in conformance with CSA Standard W.47.1. Welding splatter and other fabricator burrs, where exposed, shall be ground off and/or field smooth, and left ready for subsequent operations. All miscellaneous metal, after fabrication, shall be hot-dip galvanized.

**E19.2.4 Galvanized Primer**

Galvanized primer for repair of damaged coating shall be zinc rich, ready mix to CGSB-1-GP-181M.

**E19.2.5 Bedding and Backfill Material**

Sand bedding and Modified Class 2 backfill material as per CW 2030, modified to have 0.6 m of compacted excavated Site select material as opposed to the detailed 0.3 m of compacted excavated material.

**E19.2.6 CSP Outfall Pipe**

- (a) 750 mm outfall pipes shall have a minimum wall thickness of 2.0. mm
- (b) 1200 mm outfall pipes shall have a minimum wall thickness of 2.8 mm.



E19.2.7 CSP Couplers, CSP Saddles and Concrete Transition Coupler

- (a) Material for CSP to CSP connections shall conform to CSA Specification CAN3-G401. Standard or dimpled with bolt and angle attachments.
- (b) Material for CSP saddle connections shall conform to CSA Specification CAN3-G401. Galvanized primer for repair of damaged coating shall be zinc rich, ready mix to CGSB-1-GP-181M.
- (c) Material for concrete transition collars shall be in accordance with CW 2160 Type B concrete.

E19.2.8 PCP Outfall Pipe

- (a) 300 millimetre and larger reinforced concrete bell and spigot pipe in accordance with CAN/CSA A257.2 and ASTM C76.
- (b) Reinforced concrete bell and spigot straight wall pipe used for jacking in accordance with CAN/CSA A257.2 and ASTM C76. Outside of bell ends to be fitted with a 14 gauge steel band with a width of 1.5 times the length of the bell end groove.

E19.2.9 Debris Grating

Shop drawings shall be submitted for the debris gratings and shall be installed as shown on the drawings. Galvanizing shall be hot-dip conforming to requirements of CSA G164-N1981 to a minimum net retention of 600g/m<sup>2</sup>. All bolts and nuts shall be typical steel, conforming to ASTM A-320 Grade B8M. All welding shall be fully approved by the Canadian Welding Bureau in conformance with CSA Standard W47.1. Welding shall be done by currently licensed welders only. Welding splatter and other fabricator burrs, where exposed, shall be ground off and/or filed smooth, and left ready for subsequent operations. All miscellaneous metal, after fabrication, shall be hot-dip galvanized. No separate measurement will be made for hot-dip galvanizing.

E19.2.10 Handrails and Pipe Sleeve

Shop drawings shall be submitted for the three-rail handrail and pipe sleeve and shall be installed as shown on the drawings. Galvanizing shall be hot-dip conforming to requirements of CSA G164-N1981 to a minimum net retention of 600g/m<sup>2</sup>. All bolts and nuts shall be type 316 stainless steel conforming to ASTM A-320 Grade B8M. All welding shall be fully approved by the Canadian Welding Bureau in conformance with CSA Standard W47.1. Currently licensed welders shall do the welding. Welding splatter and other fabricator burrs where exposed, shall be ground off and/or filed smooth, and left ready for subsequent operations. All miscellaneous metal, after fabrication, shall be hot-dip galvanized. No separate measurement will be made for hot-dip galvanizing.

E19.2.11 Equipment

All equipment, implements, tools and facilities used shall be of a size and type as required to complete the Work in a reasonable time, approved by the Contract Administrator. The Contractor shall keep all equipment in good Working order, and have sufficient standby equipment available at all times, as required.

E19.3 Construction Methods

E19.3.1 Bedding

Ensure bedding is thoroughly tamped and that the pipe is uniformly supported throughout and completed in accordance with CW 2030, unless otherwise indicated by the Contract Administrator.

E19.3.2 Backfill

- (a) Backfill around the pipe, in maximum 300-mm lifts, alternating from side to side. At no time should the difference in backfill elevation on either side of the pipe be greater than 450 mm. Work must be completed in accordance with CW 2030, unless otherwise indicated by the Contract Administrator.

- (b) Backfilling above the pipe shall be in accordance with CW 2030 for Modified Class 2 backfill. The top 600-mm of backfill is to be Site select excavated material, as approved on Site by the Contract Administrator, not the standard 300 mm excavated material. The Contractor shall ensure the compaction equipment utilized, is consistent with degree of compactive effort required to achieve the specified densities, and adequately protects against overloading the pipe.

#### E19.3.3 Trench Shoring And Excavation

- (a) At locations shown on the drawings the trench shall be dug and maintained using a wood or steel shoring, designed and sealed by a Structural Professional Engineer who is a practicing member of the Association of Professional Engineers and Geoscientists of the Province of Manitoba (APEGM). The Contractor shall provide AutoCAD shop drawings to the Contract Administrator, for review, prior to the start of excavation. Work must be completed in accordance with CW 2030, unless otherwise indicated by the Contract Administrator.
- (b) The Contractor shall provide temporary shoring as specified in section E18 at the locations and to the grades shown on the drawings. The temporary shoring installed during the construction operations must be removed upon completion of construction. Shoring installed shall be common for the weir structure and pipe trench.
- (c) The Contractor shall take precautionary steps to prevent damage from construction activities to adjacent private property. All damage to adjacent private property caused by the Contractor's activities shall be repaired to, equal or better condition than prior to construction, as approved by the Contract Administrator. No separate measurement or payment will be made for the protection of adjacent private property.

#### E19.3.4 Diversion of Flows

Flows such as snowmelt, rainfall, a watermain break, or any other flow travelling through the outfall shall be diverted during construction. The cost of the flow diversion is considered incidental to the installation of the pipe.

#### E19.3.5 Removal and Installation of CSP

- (a) CSP field cuts shall be straight circumferential cuts. Clean all ends free of burrs etc., and touch up all areas affected by Work with galvanized primer.
- (b) The Contractor shall excavate and dispose of the existing outfall piping and debris grate in accordance with the Standard Construction Specifications.
- (c) All outfall pipes shall be installed as shown on the drawings and in accordance with CW 3610.
- (d) All pipes shall be laid to the established line and grade.
- (e) The existing outfall pipes shall be temporarily removed or otherwise protected as approved by the Contract Administrator.
- (f) Work required for "Removal and Installation of CSP shall include removal and disposal of existing the CSP, including any debris found within.

#### E19.3.6 Connection of New CSP to Existing CSP

- (a) Connection of New CSP outfall to an existing CSP outfall shall be carried out in accordance with Section 9.3 of CW 3610 Installation of Culverts.

#### E19.3.7 Connections

- (a) Provide lean mix concrete pipe bedding and backfill to the lines and grades as detailed in the contract drawings.
- (b) Slip joints are to be internal unless noted otherwise on the drawings. The receiving pipes are to be cleaned of all surface debris, including but not limited to frozen backfill, ice and internal sediment.
- (c) The slip joints are to be installed in locations as shown on the drawings and as directed by the Contract Administrator. Angle brackets are to be located at the 9:00

and 3:00 o'clock position unless approved otherwise by the Contract Administrator. Bolts are to be tightened evenly throughout the coupler.

E19.3.8 Installation of Debris Grate

Debris Grates shall be installed as detailed and in the location shown on the contract drawings.

E19.3.9 Supply and Installation of Handrails and Pipe Sleeves

Supply and Installation of Handrails and Pipe Sleeves shall be installed as detailed and in the location shown on the contract drawings.

E19.3.10 Shop Drawings

Submit prepared shop drawings for the: slip joint and debris grate details in accordance with Clause 1.5 of CW 1110.

E19.4 Method of Measurement and Payment

E19.4.1 Removal and Installation of CSP Outfall

- (a) The removal of existing CSP and supply and installation of the new CSP shall be measured on a linear basis. The length to be paid for shall be the total number of linear meters of CSP, measured from the tie-in point to the tip of the manufactured bevelled end section, horizontally above the center of the pipe installed in accordance with this Specification and acceptable to the Contract Administrator. The bevelled end section, and removal of both the existing CSP, existing debris grates and existing concrete collars shall be considered incidental to the installation of the CSP and no separate payment will be made.
- (b) Separate measurement will be made for each size and class of outfall pipe.
- (c) Payment for excavation, bedding and backfill shall be included in the price per metre of CSP culvert installed.
- (d) Removal of existing CSP and supply and installation of new CSP will be paid for at the Contract Unit Price for "Items of Work" listed below, measured specified herein, which price shall be payment in full for supplying all materials and performing all operations described and all other items incidental to the Work included in this Specification.

**Items of Work:** Removal and Installation of CSP Outfall

- i. 750mm dia. CSP
- ii. 1200mm dia. CSP

E19.4.2 Removal and Installation of Precast Concrete Pipe (PCP) Outfall

- (a) The removal of existing PCP and supply and installation of the new PCP shall be measured on a linear basis. The length to be paid for shall be the total number of linear meters acceptably supplied and installed with necessary hardware, measured horizontally, at grade, above the centre line of the pipe culvert, as computed by measurements made by the Contract Administrator.
- (b) Separate measurement will be made for each size and class of outfall pipe.
- (c) Payment for excavation, bedding and backfill shall be included in the price per metre of PCP culvert installed.
- (d) Removal of existing PCP and supply and installation of new CSP will be paid for at the Contract Unit Price for "Items of Work" listed below, measured specified herein, which price shall be payment in full for supplying all materials and performing all operations described and all other items incidental to the Work included in this Specification.

**Items of Work:** Removal and Installation of PCP Outfall

- i. 750mm dia. PCP
- ii. 1200mm dia. PCP

#### E19.4.3 Supply and Installation of Internal Slip Joints

The supply and installation of Slip Joints shall be measured on a unit basis. The units to be paid for shall be the total number of internal slip joints installed in accordance with this Specification and acceptable to the Contract Administrator as computed from measurements made by the Contract Administrator.

Separate measurement will be made for each size of internal slip joints

Supply and installation of internal slip joints will be paid for at the Contract Unit Price for the "Items of Work" listed below, measured specified herein, which price shall be payment in full for performing all operations described and all other items incidental to the Work included in this Specification.

**Items of Work:** Supply and Installation of Internal Slip Joints

- i.. 750mm dia. Slip Joint
- ii. 1200mm dia. Slip Joint

#### E19.4.4 Supply and Installation of Debris Grates

The supply and installation of the Debris Grate shall be measured on a unit basis. The units to be paid for shall be the total number of Debris Grates installed in accordance with this Specification and acceptable to the Contract Administrator as computed from measurements made by the Contract Administrator.

Separate measurement will be made for each size of debris grate

Supply and installation of Debris Grate will be paid for at the Contract Unit Price for the "Items of Work" listed below, measured specified herein, which price shall be payment in full for performing all operations described and all other items incidental to the Work included in this Specification.

**Items of Work:** Supply and Installation of Debris Grates

- i.. 750mm dia. Debris Grate

#### E19.4.5 Installation of Existing Debris Grates

The installation of the existing Debris Grates shall be measured on a unit basis. The units to be paid for shall be the total number of existing Debris Grates installed in accordance with this Specification and acceptable to the Contract Administrator as computed from measurements made by the Contract Administrator.

Installation of Existing Debris Grates will be paid for at the Contract Unit Price for "Install Existing 1200 mm dia. Debris Grate", measured specified herein, which price shall be payment in full for performing all operations described and all other items incidental to the Work included in this Specification.

#### E19.4.6 Supply and Installation of Handrails and Pipe Sleeves

Supply and installation of Handrails and Pipe Sleeves will be measured and paid for at the contract lump sum price for "Supply and Installation of Handrails and Pipe Sleeves", measured specified herein, which price shall be payment in full for performing all operations described and all other items incidental to the Work included in this Specification. Removal of the existing handrails and pipe sleeve will be considered incidental to the installation of the supply and installation of handrails and pipe sleeves.

#### E19.4.7 Supply and Installation of Trench Shoring

The supply and installation of the trench shoring shall be paid be paid for at the contract lump sum price for "Supply and Installation of Trench Shoring", as specified in E18, which price shall be payment in full for performing all operations described, including but not

limited to excavation within the shoring and all other items incidental to the Work included in this Specification.

**E19.4.8 Supply and Placement of Lean Mix Concrete**

The supply and installation of lean mix concrete shall be paid for at the contract unit price for "Lean Mix Concrete", which price shall be payment in full for performing all operations described and all other items incidental to the Work included in this Specification.

**E20. CONSTRUCTION OF CONCRETE COLLAR**

**E20.1 Description**

**E20.1.1** All lean mix concrete work in this project, materials and construction methods, shall be according to the details in this specification.

**E20.2 Materials**

**Concrete Mix Design**

Concrete mix design and steel reinforcement shall be as indicated in the Construction Notes on the Drawings.

**E20.3 Cold Weather Requirements**

- (a) Should any concrete Work be required to be carried out when the mean daily temperature is below 5°C or anticipated to be below 5°C within the next 24 hours, cold weather requirements will be specified herein.
- (b) All freshly placed concrete shall be protected from the elements and from defacements due to construction operations.
- (c) The following are minimum requirements for protecting concrete during and after placement during freezing weather, but mere adherence to these requirements will not relieve the Contractor of the necessity for producing concrete which has not been weakened or injured by frost or freezing, or replacing such damaged Work at no additional expense to the City;
  - (i) Before any concrete is placed, all ice, snow, and frost shall be completely removed from all form Work, and other surfaces against which concrete temperatures of such surfaces raised above 7°C for twenty-four (24) hours minimum prior to concreting. Where concrete Work is to come in contact with the earth, the surface of the earth shall be completely free of frost when concrete is placed thereon.
  - (ii) Concrete aggregates and water shall be heated to not over 80°C. Concrete shall be not less than 20°C or more than 30°C in temperature when deposited. Concrete when placed during freezing weather, or if freezing is anticipated during curing period, shall be fully enclosed and the temperature of same maintained at not less than 20°C for five (5) days nor less than 5°C for an additional five (5) days.
  - (iii) Heating enclosures shall be strong and wind-proof, well ventilated with heating units so located as to prevent local overheating or drying of the concrete or damage from combustion gases. Only indirect fired heaters will be accepted. Units must be vented outside the enclosure. No direct fired units will be accepted.
  - (iv) The Contractor shall inform the Contract Administrator well in advance as to the methods of enclosure and frost protection he proposes to employ.

**E20.4 Measurement and Payment**

**E20.4.1** Cold weather requirements shall be considered incidental to the the construction of cast-in-place concrete and no measurement or payment will be made for this item.

**E20.5 Construction Methods**

**E20.5.1** Cast in place Concrete Construction

- (a) Construct cast in place concrete in accordance with CW 2160, except as supplemented, revised or amended in this specification and as indicated in the construction notes on the Drawings.
- (b) Adjust the location of reinforcing steel adjacent to openings to frame those openings in accordance with good practice, and maintain the bar spacing intent.
- (c) Do not use welded splices for reinforcing steel.
- (d) Order all wall reinforcing steel in lengths to best suit the spacing of walers so that reinforcing bars will not be bent or misformed in order to remove the walers.

E20.5.2 Backfill

- (a) Place and compact backfill material as indicated on the Drawings in accordance with CW 2030.
- (b) Do not place backfill material in a frozen state.
- (c) Supply heating and hoarding in accordance with CW 2160 if required to ensure material does not freeze before compaction is complete.
- (d) Notify the Contract Administrator at least one (1) full Working Day in advance of any backfilling operation. No Backfill shall be placed against concrete until approved by the Contract Administrator and in no case before field cured test cylinders show the concrete strength to be 75% of that specified.

E20.5.3 Grout

- (a) Mix and apply grout in accordance with the manufacturer's instructions. Consistency to be suitable for the intended application.

E20.6 Measurement and Payment

E20.6.1 Construction of the concrete collar will be measured on a unit basis and paid for at the Contract Unit Price for "Items of Work" listed below . Said price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this specification.

**Items of Work:** Construction of Concrete Collar

- i.. 750mm dia. Concrete Collar
- ii. 1200mm dia. Concrete Collar

**E21. GEOTEXTILE**

E21.1 Description

E21.1.1 This Specification shall cover the supply and placement of the geotextile fabric below the rockfill riprap.

E21.2 Materials

E21.2.1 Each geotextile roll to be used shall be tagged to provide product identification for inventory and quality control purposes.

E21.2.2 Geotextile rolls shall be furnished with suitable wrapping for protection against moisture and extended exposure from the sun, and contamination from dirt, dust, and any other deleterious materials. The geotextile shall remain wrapped in a protective covering until it is used.

E21.2.3 Non-woven geotextile fabric shall meet or exceed the following requirements:

Parameter	Test Method	Minimum Criteria
Grab Tensile Strength	ASTM D4632	900 N

Mullen Burst	ASTM D3786	2600 kPa
Puncture	ASTM D4833	550 N
Trapezoidal Tear	ASTM D4533	350 N
Apparent Opening Size	ASTM D4751	1.2 mm
Permittivity	ASTM D4491	1.2 sec <sup>-1</sup>
zFlow Rate	ASTM D4491	60 L/sec/m <sup>2</sup>

E21.2.4 Suitable products shall be Amoco 4553, Layfield LP 8, Emco R080, Geotex 801, Terrafix 600R, Armtec 250, Mirafi 180 N, Trevira 011/250, or approved equivalent.

**E21.3 Construction Methods**

E21.3.1 Geotextiles shall consist of non-woven fabric.

E21.3.2 All Work related to the geotextile storage, handling, and installation shall comply with the procedures and recommendations of the manufacturers, and as accepted by the Contract Administrator.

E21.3.3 Snow and ice shall be cleared from the riverbank in accordance with E11.3.4 prior to placement of geotextile.

E21.3.4 The fabric shall be loosely laid in order to allow conformity to the bedding surface. Folds and wrinkles in the fabric shall be avoided. Pins, nails or weights shall be installed to hold the fabric in place such that placement of fill material will not excessively stretch or tear the fabric and seam overlaps will be maintained.

E21.3.5 The fabric shall be overlapped in a downstream direction (upstream panel overtop of downstream panel) at all joints a minimum of 600 mm. The overlap shall be pinned or secured as approved by the Contract Administrator.

E21.3.6 A minimum of 300 mm of material shall be placed over the fabric prior to equipment passage.

E21.3.7 Riprap shall be placed on the geotextile in such a manner that the geotextile is not damaged, torn, excessively stretched, or punctured.

E21.3.8 Any damaged geotextile, as identified by the Contract Administrator, shall be repaired immediately at the Contractors own cost. All fill material shall be cleared a minimum of 1 m around the damaged area. The damaged area shall be covered with a geotextile patch that shall be large enough to be sewn or overlapped a minimum of 600 mm onto the undamaged geotextile.

**E21.4 Measurement and Payment**

E21.4.1 The supply and placement of geotextile, and related Work specified herein will be measured on an area basis and paid for at the Contract Unit Price for "Geotextile". The area to be paid for shall be the total number of square metres of ground covered by geotextile, placed in accordance with this Specification, accepted and measured by the Contract Administrator.

E21.4.2 Overlap at all joints shall be considered a single layer of geotextile for measure and payment purposes.

E21.4.3 Geotextile used for repairs will be excluded from the quantity paid.

**E22. STRAW MULCH**

E22.1 Description

E22.1.1 This Specification shall cover the supply and placement of straw mulch on all areas of the riverbank to provide temporary erosion protection where existing vegetation has been removed.

## E22.2 Materials

E22.2.1 The material shall consist of wheat or barley straw, or other plants approved by the Contract Administrator. The straw mulch shall be air dried, reasonably light in colour, and shall not be musty, mouldy, caked or otherwise of low quality. The mulch shall be free of coarse (chaff) material and free of noxious weeds and/or seeds to prevent the introduction of weeds into previously seeded and planted areas. Dry mulching material that breaks down and does not bend will not be acceptable. The power mulching process shall produce a minimum of 75% of the straw being between 150 mm and 200 mm in length.

## E22.3 Construction Methods

### E22.3.1 General

- (a) The Contractor shall supply and place straw mulch material immediately after final grading is completed and prior to March 31 of any year.
- (b) Straw mulch shall be placed ensuring that there is a minimum of 90% ground coverage by area, as measured and accepted by the Contract Administrator.
- (c) Mulched areas shall be inspected periodically and after runoff producing storm events. Damaged areas shall be repaired immediately as determined by the Contract Administrator. Areas requiring remulching as directed by the Contract Administrator will be re-measured and additionally paid for at the Contract Unit Price for the Work item.

### E22.3.2 Spreading of Straw Mulch Material

- (a) The straw mulch material shall be spread at a rate of 0.45 kg/m<sup>2</sup>, to a layer 25 to 50 mm in thickness. Mulch that remains clumped or bunched after application shall be separated and respread.

### E22.3.3 Removal of Straw Mulch

- (a) Immediately prior to placement of topsoil and sod and/or topsoil and seed all straw mulch shall be removed and disposed of off Site.

## E22.4 Measurement and Payment

E22.4.1 Supply placement and removal of straw mulch will be measured on an area basis and paid for at the Contract Unit Price for "Straw Mulch". The area to be paid for shall be the total number of square metres of ground covered by straw mulch, supplied and placed in accordance with this specification, accepted and measured by the Contract Administrator.

## **E23. ALLOWANCE FOR SITE INSTRUMENTATION**

E23.1 The Contractor is advised that geotechnical instrumentation will be installed by a drilling contractor concurrently with this contract. The costs for the instrumentation will be paid for under the item "Allowance for Site Instrumentation". The Contractor shall make an allowance in his schedule for co-ordinating his Work with, and maintaining access for, the forces of the Contract Administrator and a drilling contractor. The geotechnical instrumentation referred to in this specification is separate from any instrumentation the Contractor may install for monitoring movement of trench shoring Work. The Work is anticipated to take approximately 1 day. No extra payment will be made for the co-ordination or access requirements describe above.

## **E24. TENSION CRACK SEALING**

E24.1 Description



- E24.1.1 This Specification shall cover the existing tension crack sealing at the site, including excavation and reworking of excavated material, and impervious clay supply and placement.
- E24.1.2 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 an incidental to the satisfactory performance and completion of all work as hereinafter specified.
- E24.2 Materials
- E24.2.1 The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification.
- E24.2.2 Native Material to be Excavated
- (a) The materials covered in this specification consist of the in-situ overburden soils, and may include but not necessarily be limited to organic topsoil, clay, silt, sand, gravel, fill, rubble, roots, riprap, concrete blocks, etc., all of which may be excavated with hydraulic excavation equipment.
- E24.2.3 Clay Backfill
- (a) The impervious clay backfill to be used for the crack sealing shall consist of a high plasticity clay material, with a liquid limit in excess of 50%. The clay shall be free of deleterious material such as roots, organic material, ice, snow or other unsuitable materials, and may be salvaged from the on-site excavation, as approved by the Contract Administrator. Frozen material will not be accepted.
- E24.3 Construction Methods
- E24.3.1 General
- (a) The existing tension cracks are located in upper bank areas. The limits of the tension crack sealing will be laid out in the field by the Contract Administrator.
- E24.3.2 Tension Crack Excavation
- (a) Tension cracks shall be excavated as shown on the Drawings
- (b) All excavated material shall be removed off site immediately upon excavation or stockpiled as directed by the contract administrator.
- E24.3.3 Clay Backfill
- (a) The excavation within the limits of the existing tension cracks shall be infilled with clay backfill material. The clay backfill material shall be pushed and kneaded into place to ensure that the entire excavated volume is entirely filled with clay, and that no void spaces remain. The clay backfill shall be compacted to a minimum of 95% of the SPMDD.
- (b) Clay backfill for placement within the excavated tension crack shall not be stockpiled on the riverbank.
- E24.4 Measurement and Payment
- E24.4.1 The supply and placement of the tension crack sealing will be measured on a length basis. The length to be paid for shall be the total number of Lineal metres of "Tension Crack Sealing", supplied and placed in accordance with this Specification, as measured in the field and accepted by the Contract Administrator.
- E24.5 Basis of Payment
- E24.5.1 The supply and placement of crack sealing will be paid for at the Contract Unit Price per Lineal metre for the "Tension Crack Sealing", measured as specified herein, which shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

## **E25. NATIVE GRASSES AND TREES REVEGETATION**

### **E25.1 Description**

This Specification shall cover the installation of native grasses and trees within the lower and mid bank areas.

The work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead labour, materials, and all other things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.

### **E25.2 Materials**

#### **E25.2.1 Description**

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

### **E25.3 Lower and Mid Bank Revegetation**

#### **E25.3.1 Seed Mixture**

Grass seed shall consist of a Canada common native seed mix as follows:

- 20% Slender Wheatgrass
- 20% Switchgrass
- 20% Big Bluestem
- 20% Canada Wildrye
- 10% Fringed Brome
- 10% Canada Milkvetch

Grass species that may be substituted in varying percentages (no greater than 20%) as alternatives to those listed above include;

- Prairie Cordgrass
- Streambank Wheatgrass
- Western Wheatgrass
- Northern Wheatgrass

Oats shall be Canada No. 1 Grade.

#### **E25.3.2 Trees**

The trees to be placed as part of the lower and mid bank revegetation shall consist of native species approximately 75 mm " in diameter. The number and species of trees to be planted will be based on the number and species of trees removed during construction and will be determined by the Contract Administrator.

Tree species specific to the Site include :

- Manitoba Maples
- Green Ash
- American Elm
- Basswood
- Cottonwood

### **E25.4 Construction Methods**

#### **E25.4.1 Seeding**

Grass seed shall be sown at a rate of 0.22 kg per 100 square metres.

Oats shall be sown at a rate of 0.38 kg per 100 square metres.

Oats and grass seed may be mixed and sown together or they may be sown separately.

#### E25.4.2 Trees

The trees replanted in the lower and mid bank areas shall be planted in the general vicinity of where trees were removed prior to the commencement of works or as directed by the Contract Administrator.

#### E25.5 Maintenance of Seeded Area

Areas seeded with native grasses shall be mowed during the first growing season to control pioneering weeds and other competition. For the purposes of this project a weed is defined as any plant not included in the seed mix. Mowing should be done before the general height is 150 to 250 mm, or when the weedy foliar cover reaches 50 percent of the seeded area, or when the weed species begin to flower. The first mowing shall be set at a height of 75 mm with the following mowings to be set at a height of 100 to 200 mm. Rotary, flail, or sickle bar type mowing equipment is acceptable.

All other maintenance of seeded area shall be in accordance with

#### E25.6 Quality Control

##### E25.6.1 Inspection

All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection by the Contract Administrator including all operations from the selection of materials through the final acceptance of the specified work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection of approval that may have been previously given.

##### E25.6.2 Access

The Contract Administrator shall be afforded full access for the inspection of materials at the site to determine whether the material is being selected and placed in accordance with this Specification.

#### E25.7 Method of Measurement

##### E25.7.1 Topsoil and Seeding

The supply and placement of the native grass seeding within the lower and mid bank areas will be measured on an area basis. The area to be paid for shall be the total number of square metres seeded in accordance with this Specification and as measured by the Contract Administrator.

##### E25.7.2 Tree Planting

The supply and planting of trees within the lower and mid bank areas will be measured on a unit basis. The Contractor shall be paid for the total number of trees planted as replacement of those trees removed as part of the works in accordance with this Specification and as measured by the Contract Administrator.

#### E25.8 Basis of Payment

##### E25.8.1 Topsoil and Seeding (Native Grass Seed Mix)

The supply and placement of the native grass seeding within the lower and mid bank areas will be paid for at the Contract Unit Price per square metre of seeding for the "Topsoil and Seeding (Native Grass Seed Mix)" measured as specified, herein, which price shall be payment in full supplying all materials and performing all operations herein described, and all other items incidental to the work included in this Specification.

## E25.8.2 Tree Planting

The supply and planting of trees within the lower and mid bank areas will be paid for at the Contract Unit Price per tree for the "Tree Planting", measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described, and all other items incidental to the work included in this Specification.

## E26. ALLOWANCE FOR SITE INSTRUMENTATION

E26.1 The Contractor is advised that geotechnical instrumentation may be installed by a drilling contractor concurrently with this contract. The costs for the instrumentation will be paid for under the item "Allowance for Site Instrumentation". The Contractor shall make an allowance in his schedule for co-ordinating his Work with, and maintaining access for, the forces of the Contract Administrator and a drilling contractor. The geotechnical instrumentation referred to in this specification is separate from any instrumentation the Contractor may install for monitoring movement of trench shoring Work. The Work is anticipated to take approximately 2 days. No extra payment will be made for the co-ordination or access requirements describe above.

## E27. SEWER CLEANING

### E27.1 Description

- (a) This Specification shall amend and supplement Standard Specifications CW 2140.
- (b) A limited amount of sewer cleaning has been included in the Contract due to the unpredictable conditions of outfalls. The length of time spent on sewer cleaning shall be at the discretion of the Contract Administrator.

### E27.3 Construction Methods

- (a) Advise the Contract Administrator immediately when pipe material or backfill material is observed during the cleaning of a sewer. The Contract Administrator will direct one of the following operations be performed.
  - (i) Complete or attempt to complete cleaning of the sewer.
  - (ii) Suspend cleaning operations and inspect the sewer.
  - (iii) Simultaneously clean and inspect the sewer

### E27.4 Measurement and Payment

#### E27.4.1 Amend Section 4.1 of Specification CW 2140 to read:

- (b) Sewer Cleaning will be measured on a time basis and paid for at the Contract Unit Price for "Sewer Cleaning". The time to be paid will be the total number of hours of sewer cleaned in accordance with this specification, accepted and measured by the Contract Administrator.
- (c) Sewer Cleaning shall include all water supply costs, permits (D.F.O. or otherwise), cleaning, reverse set-up cleaning, dumping, travel time, tipping fees, units, flow control and what ever may be required for the cleaning of the outfall pipe.
- (d) 75% of the payment will be made upon satisfactory completion of the cleaning work. The remaining 25% of the payment will be made upon final acceptance of the sewer cleaning as determined by the review of the corresponding video inspection.

#### E27.4.2 Delete sections 4.3, 4.7and 4.8 of specification 2140.

## E28. SEWER INSPECTION

### E28.1 Description

E28.1.1 This Specification shall amend and supplement Standard Specifications CW 2145.

E28.1.2 This Specification covers inspection of sewers and manholes using internal video equipment for the purposes of assessing thoroughness of cleaning, observing and

recording structural and service defects and construction features and to verify new sewer construction prior to acceptance.

**E28.3 Construction Methods**

**E28.3.1 Sewer Condition Coding**

Sewer pipes shall be coded according to the Standard Specifications CW 2145.

**E28.4 Measurement and Payment**

**E28.4.1 Amend Section 4.4 of specification 2145 to read:**

- (a) Sewer Inspection or reverse set up-inspection will be measured on a lump sum basis for each size and type of sewer and paid for at the Contract Unit Price for "Sewer inspection".
- (b) Payment will not be made until the required report submissions are accepted by the Contract Administrator.

**E28.4.2 Delete Section 4.6 of Specification 2145.**

**E29. RIVERBANK REGRADING**

**E29.1 Description**

**E29.1.1** This Specification shall cover the riverbank regrading at the site, including excavation and reworking of excavated material, and impervious clay supply and placement.

**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 an incidental to the satisfactory performance and completion of all work as hereinafter specified.

**E29.2 Materials**

**E29.2.1** The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification.

**E29.2.2 Native Material to be Excavated**

- (a) The materials covered in this specification consist of the in-situ overburden soils, and may include but not necessarily be limited to organic topsoil, clay, silt, sand, gravel, fill, rubble, roots, riprap, concrete blocks, etc., all of which may be excavated with standard hydraulic excavation equipment.

**E29.2.3 Clay Backfill**

- (a) The impervious clay backfill to be used for riverbank regrading shall consist of a high plasticity clay material, with a liquid limit in excess of 50%. The clay shall be free of deleterious material such as roots, organic material, ice, snow or other unsuitable materials, and may be salvaged from the on-site excavation, as approved by the Contract Administrator. Frozen material will not be accepted.

**E29.3 Construction Methods**

**E29.3.1 General**

- (a) The riverbank regrading will be completed in the mid and upper bank portions of the bank where slope instabilities have created depressions. The limits of the riverbank regrading will be laid out in the field by the Contract Administrator.

**E29.3.2 Native Material to be Excavated**

- (a) All excavated material shall be removed off site immediately upon excavation or stockpiled as directed by the contract administrator.

**E29.3.3 Clay Backfill**

- (a) The depressions within the limits of the existing mid and upper bank slope failures shall be infilled with clay backfill material. The clay backfill material shall be pushed and kneaded into place to ensure that the entire excavated volume is entirely filled with clay, and that no void spaces remain. The clay backfill shall be compacted to a minimum of 95% of the SPMDD.
- (b) Clay backfill for placement within the limits of the existing mid and upper bank slope failures shall not be stockpiled on the riverbank.

#### E29.4 Measurement and Payment

The supply and placement of the riverbank regrading will be measured on a volume basis. The volume to be paid for shall be the total number of cubic metres of "Riverbank Regrading", supplied and placed in accordance with this Specification, as measured in the field and accepted by the Contract Administrator.

#### E29.5 Basis of Payment

The supply and placement of riverbank regrading will be paid for at the Contract Unit Price per cubic metre for the "Riverbank Regrading", measured as specified herein, which shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

### **E30. VERIFICATION OF WEIGHTS**

- E30.1 All material which is paid for on a weight basis shall be weighed on a scale certified by Consumer & Corporate Affairs, Canada.
- E30.2 All weight tickets shall have the gross weight and the time and date of weighing printed by an approved electro/mechanical printer coupled to the scale.
- E30.3 The tare weight and net weight may either be hand written or machine printed. All weights, scales and procedures shall be subject to inspection and verification by the Contract Administrator. Such inspection and verification may include, but shall not be limited to:
  - (a) checking Contractor's scales for Consumer & Corporate Affairs certification seals;
  - (b) observing weighing procedures;
  - (c) random checking of either gross or tare weights by having such trucks or truck/trailer(s) combinations as the Contract Administrator shall select weighed at the nearest available certified scale;
  - (d) checking tare weights shown on delivery tickets against a current tare.
- E30.4 The Contractor shall ensure that each truck or truck/trailer(s) combination delivering material which is paid for on a weight basis carries a tare not more than one (1) month old.
- E30.5 The tare shall be obtained by weighing the truck or truck/trailer(s) combination on a certified scale and shall show:
  - (a) upon which scale the truck or truck/trailer(s) combination was weighed;
  - (b) the mechanically printed tare weight;
  - (c) the license number(s) of the truck and trailer(s);
  - (d) the time and date of weighing.

### **E31. TRUCK WEIGHT LIMITS**

- E31.1 The City shall not pay for any portion of material which results in the vehicle exceeding the maximum gross vehicle weight allowed under *The City of Winnipeg Traffic By-Law*, unless such vehicle is operating under special permit.



## **DRAWINGS**



## **APPENDIX A - TESTHOLE LOGS**