



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 388-2017

**CONSTRUCTION OF PARKER STORMWATER RETENTION BASIN, OUTFALL,
INLET AND INLET CONTROL CHAMBER - COCKBURN & CALROSSIE SEWER
RELIEF WORKS (CONTRACT 3)**

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

- B1.1 CONSTRUCTION OF PARKER STORMWATER RETENTION BASIN, OUTFALL, INLET AND INLET CONTROL CHAMBER - COCKBURN & CALROSSIE SEWER RELIEF WORKS (CONTRACT 3)

B2. SUBMISSION DEADLINE

- B2.1 The Submission Deadline is 12:00 noon Winnipeg time, August 4, 2017.
- 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 Contract Administrator or an authorized representative will be at the Site at **9:00 a.m.** on **July 25, 2017** to meet Bidders for a Site investigation.
- (a) **Attending the Site investigation is strongly recommended.**
- (b) Bidders are asked to meet the Contract Administrator at the intersection of Daniel Street and Heatherdale Avenue (the lane just north of Parker Avenue) by 9:00 am.
- (c) Parker Avenue west of Daniel Street is anticipated to be closed during the Site investigation for work by Manitoba Hydro. Vehicular access to Parker Avenue and Heatherdale Avenue is available from Daniel Street and Derek Street via Windermere Avenue.
- B3.2 Bidders are advised that portions of the Site are adjacent to other active construction sites and therefore **Personal Protective Equipment (PPE) shall be worn when viewing the Site** (including high-vis vest, hard hat, steel-toed boots, and safety glasses).
- B3.3 The Bidder shall not be entitled to rely on any information or interpretation received at the Site investigation unless that information or interpretation is the Bidder's direct observation, or is provided by the Contract Administrator in writing.

B4. ENQUIRIES

- B4.1 All enquiries shall be directed to the Contract Administrator identified in D5.1.
- 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. CONFIDENTIALITY

B5.1 Information provided to a Bidder by the City or acquired by a Bidder by way of further enquiries or through investigation is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator. The use and disclosure of the confidential information shall not apply to information which:

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

B5.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Bid Opportunity to the media or any member of the public without the prior written authorization of the Contract Administrator.

B6. ADDENDA

B6.1 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.

B6.2 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.

B6.2.1 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>

B6.2.2 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

B6.3 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.

B7. SUBSTITUTES

B7.1 The Work is based on the Plant, Materials and methods specified in the Bid Opportunity.

B7.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.

B7.3 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.

B7.4 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.

- B7.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his/her sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B7.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, to the Bidder who requested approval of the substitute.
- B7.6.1 The Contract Administrator will issue an Addendum, disclosing the approved materials, equipment, methods and products to all potential Bidders. The Bidder requesting and obtaining the approval of a substitute shall be responsible for disseminating information regarding the approval to any person or persons he/she wishes to inform.
- B7.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B7.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/her Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B17.
- B7.9 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.

B8. BID COMPONENTS

- B8.1 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;
- B8.2 Further to B8.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B7.
- B8.3 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.
- B8.4 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.
 - B8.4.1 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.

- B8.5 Bidders are advised not to include any information/literature except as requested in accordance with B8.1.
- B8.6 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 B17.1(a).
- B8.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B8.8 Bids shall be submitted to:
The City of Winnipeg
Corporate Finance Department
Materials Management Division
185 King Street, Main Floor
Winnipeg MB R3B 1J1

B9. BID

- B9.1 The Bidder shall complete Form A: Bid, making all required entries.
- B9.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, his/her name shall be inserted;
 - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
 - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
 - (d) if the Bidder is carrying on business under a name other than his/her own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.
- B9.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B9.2.
- B9.3 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.
- B9.4 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/her own name, it shall be signed by the Bidder;
 - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
 - (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, should be affixed;
 - (d) if the Bidder is carrying on business under a name other than his/her own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.
- B9.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.
- B9.5 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.

B10. PRICES

- B10.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.

- B10.2 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.
- B10.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.
- B10.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B11. DISCLOSURE

- B11.1 Various Persons provided information or services with respect to this Work. In the City's opinion, this relationship or association does not create a conflict of interest because of this full disclosure. Where applicable, additional material available as a result of contact with these Persons is listed below.
- B11.2 The Persons are:
- (a) N/A

B12. QUALIFICATION

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

- (ii) a copy of their valid Manitoba SECOR™ certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Small Employer Certificate of Recognition Program (SECOR™) administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program or
 - (b) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>).
- B12.5 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.
- B12.6 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.
- B13. BID SECURITY**
- B13.1 The Bidder shall provide bid security in the form of:
 - (a) 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.
- B13.1.1 If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.
- B13.1.2 All signatures on bid securities shall be original.
- B13.1.3 The Bidder shall sign the Bid Bond.
- B13.1.4 The Surety shall sign and affix its corporate seal on the Bid Bond and the Agreement to Bond.
- B13.2 The bid security of the successful Bidder and the next two lowest evaluated responsive and responsible Bidders will be released by the City when a Contract for the Work has been duly executed by the successful Bidder and the performance security furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.
- B13.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B13.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.
- B13.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.
- B13.3 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Bid Opportunity.

B14. OPENING OF BIDS AND RELEASE OF INFORMATION

- B14.1 Bids will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Division, or in such other office as may be designated by the Manager of Materials.
- B14.1.1 Bidders or their representatives may attend.
- B14.1.2 Bids determined by the Manager of Materials, or his/her designate, to not include the bid security specified in B13 will not be read out.
- B14.2 Following the Submission Deadline, the names of the Bidders and their Total Bid Prices (unevaluated, and pending review and verification of conformance with requirements) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>
- B14.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>
- B14.4 The Bidder is advised that any information contained in any Bid may be released if required by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law or by City policy or procedures (which may include access by members of City Council).

B15. IRREVOCABLE BID

- B15.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.
- B15.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly executed and the 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.

B16. WITHDRAWAL OF BIDS

- B16.1 A Bidder may withdraw his/her Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.
- B16.1.1 Notwithstanding C23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.
- B16.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid, and only such person, has authority to give notice of withdrawal.
- B16.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:
- (a) retain the Bid until after the Submission Deadline has elapsed;
 - (b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid; and
 - (c) if the notice has been given by any one of the persons specified in B16.1.3(b), declare the Bid withdrawn.
- B16.2 A Bidder who withdraws his/her Bid after the Submission Deadline but before his/her Bid has been released or has lapsed as provided for in B15.2 shall be liable for such damages as are

imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

B17. EVALUATION OF BIDS

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

- (a) compliance by the Bidder with the requirements of the Bid Opportunity, or acceptable deviation there from (pass/fail);
- (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B12 (pass/fail);
- (c) Total Bid Price;
- (d) economic analysis of any approved alternative pursuant to B7.

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

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

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

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

B18. AWARD OF CONTRACT

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

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

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

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

B18.3 The Work of this Contract is contingent upon Council approval of sufficient funding in the 2017 Capital Budget. If the Capital Budget approved by Council does not include sufficient funding for the Work, the City will have no obligation to award a Contract.

B18.4 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 B17.

B18.4.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his/her Bid upon written request to the Contract Administrator.

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
- 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. BACKGROUND AND PROJECT INFORMATION

D2.1 The project involves the construction of a storm water retention basin (SRB) within the Parker Lands as part of the Cockburn and Calrossie Sewer Relief project. The Cockburn and Calrossie Sewer Relief project involves the total separation of the land drainage flows from the existing combined sewers throughout the area bound by Waverley Street, Grant Avenue Pembina Highway and Parker Avenue. Once constructed, the SRB will attenuate the separated LDS flows from north of the Canadian National (CN) Rail Main line via a 2700 mm pipe (installed by others as part of Cockburn Contract 4). The SRB will temporarily store the storm water while reduced flows pass over the weir in the inlet structure and enter a 1200 mm trunk sewer (installed by other as part of Cockburn Contract 2). The flows then continue on to the Red River outfall located at Toilers Park.

D2.2 The Site is at the east end of the Parker Lands (zoned M2 Manufacturing - General) and has generally been vacant land with the exception of a portion of the Site that was used as a rail yard for a period of time between 1930 and 1960 (see Figure 1 below).



Figure 1. Aerial photo of site taken in 1950 (approximate location of SRB limits shown in red)

D2.3 Environmental testing was conducted on the soils within the project Site. Testing demonstrated that soil samples were within acceptable CCME industrial limits and were not considered contaminated (see Geotechnical and Environmental Report in Appendix A),

D2.4 The Brady Road Resource Management Facility (BRRMF) had advised that they will accept the soils from the Project Site (see Confirmation Email in Appendix E). Furthermore, the BRRMF will not charge a tipping fee on clean fill delivered to site. However, due to the volume of clean fill anticipated to be delivered daily, the Contractor would need to provide equipment at the BRRMF to shape the soils.

- D2.5 Rail bed material including metal rail lines are known to exist below grade and should be anticipated during excavation. Removal rail bed material will be considered incidental to excavation.
- D2.6 The majority of existing vegetation (trees and shrubs) within the Parker SRB lands was removed under an earlier contract to approx. 300 above grade. Removal of stumps and root systems is to be assumed to be incidental to excavation.
- D2.7 The project Site is bound to the North by the CN Main line; to the east by the Letellier rail line (operated by CN); to the west by privately owned land and to the south by the future South West Rapid Transit (SWRT) Corridor (currently under construction). Access to the site for construction vehicles and equipment shall be developed by the Contractor from the southwest corner of the Site via the City of Winnipeg easement to the newly relocated Hurst Way (see Drawings). The new alignment of Hurst way is expected to be open to the public prior to commencement of construction of the SRB.
- D2.8 Existing Manitoba Hydro above and below grade utilities are being relocated by others. These utilities include all of their electrical distribution and telecommunication (fiber optic) cables within the Parker SRB lands.
- (a) All of the Manitoba Hydro utilities being relocated are being installed below grade along the west limit of the SRB lands (shown within Future Manitoba Hydro Easement on Drawings). While the relocation work is ongoing, the relocation of the 66 kV distribution lines is expected to extend through October (following the anticipated Award date). The Contractor will be required to coordinate their activities to permit the relocations to be completed.
- (i) **Bidders should assume that the relocations will be ongoing until the beginning of November and should estimate their construction activities around this work.**
- (ii) **Attending the Site visit in advance of Bidding is strongly recommended, so to assist in estimate access and site restrictions.**
- (b) Transmission Lines and tower locations are not being relocated and the contractor must adhere to the Manitoba Hydro's regulations for working near transmission utilities (See E29).
- D2.9 A significant amount of construction work by others will be ongoing immediately adjacent to the SRB lands. This work will primarily be associated with the SWRT project and is expected to occur throughout the construction period of the SRB. This work includes but is not limited to:
- (a) South of the SRB Lands: the construction of the SWRT bus corridor
- (b) East of the SRB Lands: relocation of the west most LeTellier rail wye further to the east; and the construction of an underpass below the LeTellier rail line.
- (c) West of the SRB Lands: Various construction activities throughout the Parker lands.

D3. SCOPE OF WORK

- D3.1 The Work to be done under the Contract shall consist of construction of the new Parker Stormwater Retention Basin, Outfall (into SRB), Inlet/Control Chamber (out of SRB), and associated works.
- D3.2 The major components of the Work are as follows:
- D3.2.1 Phase 1: SRB and Associated Works:
- (a) Site development including the construction of a temporary access road from Hurst Way to the SRB site.
- (b) Excavation (approximately 320,000+/- m³), grading and compaction of new Stormwater Retention Basin

- (c) Installation of ~52 metres of 2740 mm dia. SPCSP at outfall to SRB including bend, bevelled end treatment and concrete transition coupling collar
- (d) Installation of outfall safety fencing and riprap
- (e) Installation of ~18 metres of 2740 mm dia. SPCSP pipe at Inlet/ weir structure
- (f) Construction of inlet headwall complete with wing walls, guard rails and riprap
- (g) Construction of inlet control (weir) chamber
- (h) Installation of ~4 metres of 1200 mm dia. RCP complete with coupler to existing 1200 mm dia. RCP
- (i) Installation of wetland planting from donor sites in and around Winnipeg.
- (j) Fill Stormwater Retention Basin with water from Red River (via existing 1200 mm LDS piping)
- (k) Vegetative landscaping, pedestrian pathways, site furniture and canopy installation.
- (l) Site restoration

D3.2.2 Phase 2: The Naturalization of the SRB

- (a) Establishment of Wetland Planting and development/establishment of the Native Grass Planting

D3.1 The following shall apply to the Work:

- (a) Universal Design Policy

<http://clkapps.winnipeg.ca/DMIS/DocExt/ViewDoc.asp?DocumentTypeld=2&DocId=3604>

D4. DEFINITIONS

D4.1 When used in this Bid Opportunity:

- (a) "Parker Lands" means the lands bound between the Canadian National Railway Line to the north, Parker Avenue and Heatherdale Avenue to the south, and Hurst Way (old alignment) to the west. The area includes land owned by the City, Canadian National Railway and Manitoba Hydro, as well as private land owners;
- (b) "Stormwater Retention Basin" or "SRB" means a constructed pond for the purpose of attenuating stormwater runoff, which for the Contract may mean the Parker Stormwater Retention Basin.
- (c) "Land Drainage System" or "LDS" means a system of single pipes that carries rainfall and snow melt runoff from urban areas to the river system, which for the Contract may mean the upstream 2700 mm diameter pipe from north of the Site or the downstream 1200 mm diameter pipe south of the Site.
- (d) "Normal Water Level" or "NWL" means the most prevalent water level in a watercourse or retention basin. In this particular case the designed NWL of the SRB is 227.7 m.

D5. CONTRACT ADMINISTRATOR

D5.1 The Contract Administrator is KGS Group, represented by:

John Minkevich, P.Eng.
Senior Municipal Engineer
3rd Floor – 865 Waverly Street

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

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

D6. CONTRACTOR'S SUPERVISOR

D6.1 At the pre-construction meeting, the Contractor shall identify his/her designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D7. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

D7.1 The Contract, all deliverables produced or developed, and information provided to or acquired by the Contractor are the property of the City and shall not be appropriated for the Contractors own use, or for the use of any third party.

D7.2 The Contractor shall not make any public announcements or press releases regarding the Contract, without the prior written authorization of the Contract Administrator.

D7.3 The following shall be confidential and shall not be disclosed by the Contractor to the media or any member of the public without the prior written authorization of the Contract Administrator;

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

D7.4 A Contractor who violates any provision of D7 may be determined to be in breach of Contract.

D8. NOTICES

D8.1 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.

D8.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D8.3, D8.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the facsimile number identified in D5.1.

D8.3 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 facsimile number:

The City of Winnipeg
Chief Financial Officer

Facsimile No.: 204 949-1174

D8.4 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following facsimile number:

The City of Winnipeg
Legal Services Department
Attn: Director of Legal Services

Facsimile No.: 204 947-9155

D8.5 Bids Submissions must not be submitted to the above facsimile numbers. Bids must be submitted in accordance with B8.

D9. FURNISHING OF DOCUMENTS

- D9.1 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/her at cost.

SUBMISSIONS

D10. AUTHORITY TO CARRY ON BUSINESS

- D10.1 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.

D11. SAFE WORK PLAN

- D11.1 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.
- D11.2 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>

D12. INSURANCE

- D12.1 The Contractor shall provide and maintain the following insurance coverage:
- (a) Commercial general liability insurance, in the amount of at least ten million dollars(\$10,000,000) inclusive, with the City, Canadian National Railway and Manitoba Hydro added as additional insureds, 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 covering all motor vehicles, owned and operated and used or to be used by the Contractor directly or indirectly in the performance of the Work. The Limit of Liability shall not be less than \$2,000,000 inclusive for loss or damage including personal injuries and death resulting from any one accident or occurrence.
 - (c) an all risks Installation Floater carrying adequate limits to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of any installation.
 - (d) Property insurance for equipment and tools used on the Project that may be owned, rented, leased or borrowed.
- D12.2 Deductibles shall be borne by the Contractor.
- D12.3 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.
- D12.4 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.

D12.5 All policies must be taken out with insurers licensed to carry on business in the Province of Manitoba.

D13. PERFORMANCE SECURITY

D13.1 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.

D13.1.1 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.

D13.2 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.

D13.3 Further to B2.1, the City shall reduce the performance security at the expiration of the warranty period for Phase 1 of the Work to \$300,000 by:

- (a) Where a performance bond is the form of Performance Security, the City shall reduce the bond penalty by issuance of an endorsement (Rider); or
- (b) Where an irrevocable standby letter of credit is the form of Performance Security, the City shall reduce the irrevocable standby letter of credit.

D14. SUBCONTRACTOR LIST

D14.1 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.

D15. DETAILED WORK SCHEDULE

D15.1 The Contractor shall provide the Contract Administrator with a detailed work schedule at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date Specified in the General Conditions for the return of the executed Contract.

D15.2 The detailed work schedule shall consist of the following:

- (a) A critical path method (CPM) schedule for the work; and
- (b) A Gantt chart for the Work based on the CPM schedule;
- (c) as acceptable by the Contract Administrator.
- (d) Further to D15.2(a) the CPM Schedule shall clearly identify the start and completion dates of all of the following activities/tasks making up the work:
 - (e) Commencement date
 - (f) Mobilization

- (g) Excavation and grading for new stormwater retention basin
- (h) Installation of outfall pipe complete with riprap
- (i) Installation of temporary shoring for inlet pipe and inlet control chamber
- (j) Installation of inlet pipe and inlet headwall complete with riprap
- (k) Installation of inlet control chamber
- (l) Installation of slide gate in inlet control chamber
- (m) Installation of Site furniture and canopies
- (n) Installation of landscaping vegetation
- (o) Installation of Site roadways and pathways
- (p) Filling of stormwater retention basin with water
- (q) Any Critical Dates
- (r) Substantial Performance
- (s) Site restoration
- (t) Development/ establishment of naturalized vegetation.
- (u) Total Performance

D15.3 Further to D15.2, the Gantt chart shall, on a weekly basis, show the time required to carry out the Work of each trade or Specification division. Time shall be on the horizontal axis and the type of trade shall be on the vertical axis.

D15.4 The Contractor shall update the schedule to the Contract Administrator prior to each weekly construction site meeting for review and discussion at the meetings.

D16. DEWATERING AND DRAINAGE PLAN

D16.1 In addition to C6 and in co-ordination with E37, the Contractor is solely responsible for planning, implementing, maintaining and monitoring an effective dewatering and drainage system for the Site during performance of the Work.

D16.2 The Contractor is responsible for the control, diversion, storage and pumping of all water including without limitation rain, snow melt, groundwater, leaking infrastructure and water in pipes throughout all stages of the Work. Note that upstream flows via the new 2700 mm LDS pipe would be limited to infiltration, as no land drainage inlets are expected to be connected to the upstream system until April 2018.

D16.3 The Contractor shall submit a Dewatering and Drainage Plan to the Contract Administrator at least five (5) Calendar Days of prior to commencement of Work at the Site. The contractor must obtain approval of the Dewatering and Drainage Plan prior to implementation. If changes are made to the dewatering plan during construction, the Contractor shall submit these changes to the Contract Administrator for approval in advance of implementation of the changes. The Dewatering and Drainage Plan submittal shall include the following at a minimum:

- (a) a sketch or sketches of the Site clearly showing the drainage scheme and flow paths including temporary and permanent features such as ditches/swales, pipe route and layout, pump staging, pump redundancy, storage elements and connections or outlets to the existing land drainage system;
- (b) information for all pipe used including material, diameter, length, fittings, connections, restraints, blocking, protection features;
- (c) dimensions for all swales and ditches to be used;
- (d) description of all erosion protection measures and material used;

- (e) monitoring and maintenance plan including Contractor's designated contact person responsible for dewatering and drainage, inspection intervals and means for supervising and monitoring pumping activity;
 - (f) Pump sizes, pump power source, and noise attenuation features (to be less than 65 dBa), pump power source.
 - (g) co-ordination and consistency with the Depressurization Plan (if required) as specified in E37; and
 - (h) any other related information reasonably requested by the Contract Administrator.
- D16.4 Contractor shall only discharge to the land drainage system meeting in accordance with the requirements specified. The combined or sanitary sewer system is ineligible to use for discharge as part of the scheme identified in the Contractor's Dewatering and Drainage Plan(s).
- D16.5 Do not pump or drain any water containing excessive suspended materials or harmful substances into waterways, sewers or other drainage systems. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with governing authority's limitations and requirements.
- D16.6 The Contractor shall be responsible for all damages within or outside the Site directly resultant from Contractor's actions, omissions or neglect which may be caused by or which may result from water backing up, flowing through, overflowing or excessive surcharge of drainage systems.
- D16.7 The Contractor shall organize and bear all costs related to the effective dewatering of excavations and all other pumping and drainage necessary for the proper execution of the Work, including keeping the pipes, structures, shafts, excavations and trenches free of undesirable accumulations of groundwater, seepage, surface water, melt water or rainwater.
- D16.8 All dewatering equipment and discharge hoses shall be protected from freezing and shall remain fully operational in freezing weather.
- D16.9 Dispose of all water drained or pumped as above by discharging it to land drainage sewers, drainage ditches or natural water course as reviewed by the Contract Administrator, and in compliance with all local, Municipal, Provincial and Federal environmental regulations, ordinances, bylaws, etc., and provide documentation indicating that authority has been granted to discharge effluent water into any drainage ditch, brook, creek or river. Contractor shall develop and implement at their own cost any filtration, settlement or other acceptable treatment methods required prior to disposal.
- D16.10 Keep all drainage channels, gutters, swales, ditches, sewers, culverts and disposal areas free of silt, sand, debris and gravel and remove such deposits as required.
- D16.11 Dewatering and drainage during construction will be considered incidental to Site Development and Restoration.

D17. SITE DEVELOPMENT PLANS

- D17.1 The Contractor shall provide the Contract Administrator with a Site Development Plan at least five (5) Business Days prior to the commencement of any Work on the Site
- D17.2 The Site Development Plan shall include at minimum:
- (a) access points from public roads to laydown/ Work areas;
 - (b) construction access road including ditch and berm crossings;
 - (c) fenced laydown area locations including gates;
 - (d) staging areas for various types of work (Undergrounds, Structures, Roadworks, Hauling Trucks, etc.); and

- (e) office facility locations with power supply, for both the Contractor and Contract Administrator.

SCHEDULE OF WORK

D18. COMMENCEMENT

- D18.1 The Contractor shall not commence any Work until he/she is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.
- D18.2 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 D10;
 - (ii) evidence of the workers compensation coverage specified in C6.15;
 - (iii) the Safe Work Plan specified in D11;
 - (iv) evidence of the insurance specified in D12;
 - (v) the performance security specified in D13;
 - (vi) the Subcontractor list specified in D14;
 - (vii) the Detailed Work Schedule specified in D15;
 - (viii) the Dewatering and Drainage Plan as specified in D16; and
 - (ix) the Site Development Plans as specified in D17
 - (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.
- D18.3 The Contractor shall commence the Work on the Site within seven (7) Working Days of receipt of the letter of intent.
- D18.4 The City intends to award this Contract by October 2, 2017

D19. CRITICAL STAGES

- D19.1 The Contractor shall achieve the critical stage of the Work in accordance with the following requirements:
 - (a) **Critical Stage 1 - March 10, 2018:** Excavation of the SRB, installation of the wetland planting, construction of the outfall piping, construction of the inlet structure (headwall, piping and weir chamber), and all works below the NWL of the SRB.
 - (b) **Critical Stage 2 - March 30, 2018:** Fill the SRB with water to the NWL.
 - (c) **Critical Stage 3 - July 15, 2018:** Completion of all Phase 1 Works including site restorations, with the exception of native plant establishment (establishment of Wetland Planting and Native Grass Planting).

D20. SUBSTANTIAL PERFORMANCE

- D20.1 The Contractor shall achieve Substantial Performance by July 1, 2018.
- D20.2 Substantial Performance will be assessed on Phase 1 Works and will not consider the establishment of Wetland Planting and the works associated with Native Grass Planting.
- D20.3 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.

D20.4 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.

D21. TOTAL PERFORMANCE

D21.1 The Contractor shall achieve Total Performance by June 15, 2020.

D21.2 Total Performance will be considered once the Contract Administrator approves the native plant establishment (Wetland Planting and Native Grass Planting).

D21.3 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.

D21.4 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.

D22. LIQUIDATED DAMAGES

D22.1 If the Contractor fails to achieve, Critical Stages, Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Calendar Day for each and every Calendar Day following the days fixed herein for same during which such failure continues:

- (a) Critical Stages 1 - three thousand dollars (\$3,000)
- (b) Critical Stages 2 - two thousand dollars (\$2,000)
- (c) Critical Stages 3 - one thousand five hundred dollars (\$1,500)
- (d) Substantial Performance – five hundred dollars (\$500);
- (e) Total Performance – five hundred dollars (\$500).

D22.2 The amounts specified for liquidated damages in D22.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve, Critical Stages, Substantial Performance or Total Performance by the days fixed herein for same.

D22.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D23. SCHEDULED MAINTENANCE

D23.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

- (a) Maintenance of Turf Stone access road following manufacturer's recommendations until established,
- (b) Watering and maintaining of all new trees and vegetation until established.

D23.2 Determination of Substantial Performance shall be exclusive of scheduled maintenance identified herein. All scheduled maintenance shall be completed prior to the expiration of the warranty period. Where the scheduled maintenance cannot be completed during the warranty period, the warranty period shall be extended for such period of time as it takes the Contractor to complete the scheduled maintenance.

CONTROL OF WORK

D24. JOB MEETINGS

- D24.1 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.
- D24.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

D25. COORDINATION WITH OTHERS

- D25.1 Work by others on or near the Site will include but not necessarily be limited to:
- (a) Manitoba Hydro – Relocation of fiber optic and distribution lines in the Parker Lands and within the SRB lands. This Work is anticipated to be complete by the end of October 2017.
 - (b) City of Winnipeg Traffic Services Branch - Erection and maintenance of temporary traffic control.
 - (c) Plenary Group (P3 Team working on the City of Winnipeg Southwest Rapid Transit Project) – Construction of transit corridor, pump stations, rail relocations, rail underpass, general road, drainage and land development works within the Parker Lands, along Parker Avenue, and between the LeTellier Rail wye's to the east of the SRB site. (Work associated with the SWRT has commenced and will continue through the course of this project).
 - (d) Ward & Burke– The installation of the new 2700 mm concrete LDS piping from the Parker SRB Lands (south of the CNR line) to the south limit of the Wilton Right-of-way (north of the CNR line) is being installed by Ward & Burke as part of the Cockburn and Calrossie sewer relief project (Contract 4). All works within the Parker SRB lands are anticipated to be complete in August 2017. Work on the 2700 mm sewer north of the CNR line will continue until December 2017.
 - (e) City of Winnipeg Traffic Signals – Erection of TRAINFO (Rail) sensor on the North edge of the SRB. This work is anticipated to be complete prior to construction of the SRB.
 - (f) Private construction works – The privately owned lands west of the SRB lands are intended to be developed as mixed residential. The specific work activities and schedule of this development is not established at this time. The contractor shall assume that work activities may commence within these lands during the course of construction of the SRB.

D26. PEDESTRIAN SAFETY

- D26.1 Further to Section 3.6 of CW 1130 of the Site Requirements, the Contractor shall ensure that pedestrians will not be able to access the Site at any time during construction.

D27. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

- D27.1 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).

D28. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

- D28.1 Further to B12.4, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety

and Health Act (Manitoba). At any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require updated proof of compliance, as set out in B12.4.

D29. WORK UNDERNEATH AND IN THE VICINITY OF HYDRO POWER INFRASTRUCTURE

- D29.1 The Contractor is responsible for notifying Manitoba Hydro in advance of Work in the vicinity and underneath Hydro infrastructure (e.g. overhead transmission lines). The Contractor shall follow all Manitoba Hydro requirements for safe working distances and clearances from Hydro infrastructure including but not limited to overhead electrical lines.
- D29.2 Manitoba Hydro requires a minimum vertical clearance from their overhead electrical lines as follows:
- (a) Minimum 10 feet from overhead distribution lines,
 - (b) Minimum 15 feet from overhead transmission lines.
- D29.3 On May 1, 2017 Manitoba Hydro measured an approximate vertical distance of 35 feet from the existing ground up to the lowest sag in the transmission tower lines.

D30. CONFINED SPACE ENTRY

- D30.1 The Contractor's attention is drawn to the Province of Manitoba Workplace Safety and Health Act ("the Act"), and the Regulations and Guidelines there-under pertaining to Confined Entry Work, and in particular the requirements for conducting hazard/risk assessment and providing personal protective equipment (PPE).
- D30.2 The Contractor shall assist and provide Supplied Air Breathing Apparatus conforming to the requirements of the Act, Regulations and Guidelines for the use of the Contract Administrator where confined entry is required to allow for inspection of the Work.

MEASUREMENT AND PAYMENT

D31. PAYMENT

- D31.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D32. WARRANTY

- D32.1 Notwithstanding C13.2, the warranty period for Phase 1 of the Works shall begin on the date of Substantial Performance and shall expire one (1) year thereafter, except where longer warranty periods are specified in the respective Specification sections, unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.
- D32.1.1 In such case, the date specified by the Contract Administrator for the warranty period to begin shall be substituted for the date specified in C13.2 for the warranty period to begin.
- B3.2 The warranty period for Phase 2 of the Work is as stated in C13.

FORM H1: PERFORMANCE BOND
(See D13)

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. 388-2017

**CONSTRUCTION OF PARKER STORMWATER RETENTION BASIN, OUTFALL,
INLET AND INLET CONTROL CHAMBER - COCKBURN & CALROSSIE SEWER
RELIEF WORKS (CONTRACT 3)**

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 D13)

(Date)

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

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 388-2017

**CONSTRUCTION OF PARKER STORMWATER RETENTION BASIN,
OUTFALL, INLET AND INLET CONTROL CHAMBER - COCKBURN & CALROSSIE
SEWER RELIEF WORKS (CONTRACT 3)**

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 (2007 Revision), International Chamber of Commerce Publication Number 600.

(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>City Drawing No.</u>	<u>Consultant Drawing No.</u>	<u>Drawing Name/Title</u>
LD-8211	C300	Cover Sheet
LD-8212	C301	General Plan and Drawing Index
LD-8213	C302	Existing Site Plan
LD-8214	C303	Site Plan
LD-8215	C304	Outlet– Plan/Profile
LD-8216	C305	Inlet – Plan/Profile
LD-8217	C306	Temporary Site Access - Plan/Profile – Georgina Street to Sta 1+85
LD-8218	C307	Temporary Site Access - Plan/Profile – Sta 1+85 to East Limit
LD-8219	C308	Permanent Site Access - Plan/Profile – Derek Street
LD-8220	C309	Permanent Site Access - Plan/Profile – Daniel Street
LD-8221	C310	Onsite Maintenance Road - Plan/Profile
LD-8222	C311	Typical Sections & Details – Misc.
LD-8223	C312	Typical Sections & Details – Outlet End Treatment & Collar
LD-8224	C313	Typical Sections & Details – Safety Fencing
LD-8225	S301	Inlet Control Chamber – General Arrangement - Plans
LD-8226	S302	Inlet Control Chamber – General Arrangement - Sections
LD-8227	S303	Inlet Headwall Structure – General Arrangement - Plans, Sections and Details
LD-8228	S304	Inlet Control Chamber – Concrete Reinforcing - Plans, Sections and Details
LD-8229	S305	Inlet Headwall Structure – Metal Fabrications - Plans, Sections and Details
LD-8230	S306	Inlet Control Chamber – Miscellaneous Metals - Details
LD-8231	S307	Park Shade Structure – General Arrangement – Plans, Sections and Details
LD-8232	L301	Wetland Planting
LD-8233	L302	Upland Planting
LD-8234	L303	Path Detail
LD-8237	L304	Landscape Details

E2. SOILS INVESTIGATION REPORT

E2.1 Further to C3.1,

- (a) Geotechnical test holes have been drilled in the vicinity of the proposed Works for the new Stormwater Retention Basin to determine the character of the subsurface soil to facilitate the design of the Work. The information listed 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.

- (b) The Geotechnical and Environmental Investigation Report for this Site (including testhole logs and laboratory analytical results) is included as Appendix A.
- (c) Bidders are responsible for any interpretation they place on the supplied information and are expected to undertake additional investigation of the soil at the Site as they feel necessary to complete their Bid.
- (d) 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 a Site trailer with available office space for use by the Contract Administrator.
- E3.2 The office facility shall meeting the following requirements:
 - (a) The field office shall be for the exclusive use of the Contract Administrator and City staff and will be used for weekly Site meetings.
 - (b) The building shall be conveniently located near the Site of the Work.
 - (c) The building shall have a minimum floor area of 25 square metres, two windows 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, 2 desk chairs, 2 meeting tables, one two-drawer filing cabinet, and a minimum of 12 chairs.
 - (g) A portable toilet shall be located near the field office building. The toilet shall have a locking door.
 - (h) The field office building and the portable toilet shall be cleaned on a weekly basis immediately prior to each Site meeting. The Contract Administrator may request additional cleaning when they deem it necessary.
- E3.3 Payment
 - (a) Payment for the office facility will be considered incidental to Site Development and Restoration.

E4. SHOP DRAWINGS

- E4.1 Description
 - E4.1.1 This Specification shall revise, amend and supplement the requirements of CW 1100.
 - (a) 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.
 - (b) 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 shown on all submissions for Engineering review.

E4.1.2 Shop Drawings

- (a) 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.
- (b) Shop drawings for the following structural components shall bear the seal of a Registered Professional Engineer in the Province of Manitoba.
 - (i) Shoring
 - (ii) Reinforcing steel
 - (iii) Metal Fabrications

E4.1.3 Contractor's Responsibilities

- (a) Review shop drawings, product data and samples prior to submission and stamp and sign drawings indicating conformance to the Contract requirements.
- (b) Verify:
 - (i) Field Measurements
 - (ii) Field Construction Criteria
 - (iii) Catalogue numbers and similar data
- (c) Coordinate each submission with requirements of Work and Contract Documents. Individual shop drawings will not be reviewed until all related drawings are available.
- (d) Notify Contract Administrator, in writing at time of submission, of deviations from requirements of Contract Documents.
- (e) 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.
- (f) Responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.
- (g) 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.
- (h) After Contract Administrator's review and return of copies, distribute copies to subtrades as appropriate.
- (i) 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.

E4.1.4 Submission Requirements

- (a) Schedule submissions at least 10 Calendar Days before dates reviewed submissions will be needed, and allow for a 10 Calendar Day period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.
- (b) Submit one (1) digital copy (PDF) of shop drawings..
- (c) Accompany submissions with transmittal letter, containing:
 - (i) Date
 - (ii) Project title and Bid Opportunity number
 - (iii) Contractor's name and address
 - (iv) Number of each shop drawing, product data and sample submitted

- (v) Specification Section, Title, Number and Clause
- (vi) Drawing Number and Detail/Section Number
- (vii) Other pertinent data
- (d) Submissions shall include:
 - (i) Date and revision dates.
 - (ii) Project title and Bid Opportunity number.
 - (iii) Name of:
 - (i) Contractor
 - (ii) Subcontractor
 - (iii) Supplier
 - (iv) Manufacturer
 - (v) Separate detailer when pertinent
 - (iv) Identification of product of material.
 - (v) Relation to adjacent structure or materials.
 - (vi) Field dimensions, clearly identified as such.
 - (vii) Specification section name, number and clause number or drawing number and detail/section number.
 - (viii) Applicable standards, such as CSA or CGSB numbers.
 - (ix) Contractor's stamp, initialed or signed, certifying review of submission, verification of field measurements and compliance with Contract Documents.

E4.1.5 Other Considerations

- (a) Fabrication, erection, installation or commissioning may require modifications to equipment or systems to conform to the design intent. Revise pertinent shop drawings and resubmit.
- (b) 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.
- (c) Incomplete shop drawing information will be considered as stipulated deductions for the purposes of progress payment certificates.
- (d) No delay or cost claims will be allowed that arise because of delays in submissions, re-submissions and review of shop drawings.

E4.2 Measurements and Payment

- E4.2.1** Preparation and submittal of Shop Drawings shall be considered incidental to the Works of this Contract and no measurement or payment will be made for this item.

E5. DANGEROUS WORK CONDITIONS

- E5.1** Further to clause C6.28 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.
- E5.2** 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.
- E5.3** 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.

- E5.4 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.
- E5.5 Workers must wear a respirator or supplied air at all times when entering a chamber, manhole or sewer where live sewage is present.
- E5.6 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 its use during inspections. In addition, the Contract Administrator shall collect discrete air samples for laboratory analysis.
- E5.7 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 its 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.

E6. TRAFFIC MANAGEMENT

- E6.1 Further to clause 3.7 of CW 1130:
- E6.1.1 Maintain both lanes of traffic open on Hurst Way, Georgina Street and all other nearby residential streets during the Works.
- E6.1.2 Staging of hauling trucks will not be allowed within the residential area near the Site. A staging area for trucks will need to be confirmed with the City prior to commencement of the Work.
- E6.1.3 No stockpiling of material will be permitted on the public roadway.
- E6.1.4 Intersecting street and private approach access shall be maintained at all times.
- E6.1.5 Should the Contractor be unable to maintain pedestrian or vehicular access to a residence or business, they shall review the planned disruption with the business or residence and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 24 hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access.
- E6.1.6 Ambulance and emergency vehicle access on Hurst Way and Georgina Street and all other nearby residential streets must be maintained at all times.
- E6.2 Truck Haul Routes
- E6.2.1 The Contractor shall only use truck haul routes as per the City of Winnipeg Traffic By-Law No. 1573/77, the published map "Truck Routes in the City of Winnipeg (2017 or latest available edition) and as approved by the City. The Contractor shall only use the following routes unless otherwise approved by the City:
- E6.2.2 Waverley Street (via Hurst Way)
- E6.2.3 Note that Hurst Way is being reconfigured during the summer of 2017. This construction will re-route Hurst Way up to Georgina Street (new road between Planet Ave and Beaumont Ave) and tie into Parker Avenue.
- E6.3 Payment
- E6.3.1 No separate pay item exists for this work. All work associated with Traffic Management is considered incidental to the Contract.

E7. TRUCK WEIGHT LIMITS

- E7.1 Spring weight restrictions may apply to streets within the area of Work. 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.

E8. SITE DEVELOPMENT AND RESTORATION

E8.1 Description

- E8.1.1 This Specification shall cover all aspects of the Site Development and Restoration Work, including but not limited to mobilization and demobilization, Site access, Site security (fencing and gates), diversion of flows, flow control, erosion and sediment control, snow removal, traffic control and signage, protection of existing trees, removal of trees, office facilities, general access development, access maintenance and removal, tree planting and Site restoration.

E8.2 Materials & Equipment

E8.2.1 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.

E8.3 Construction Methods

E8.3.1 Mobilization and Demobilization

- (a) Mobilization and demobilization will include but not be limited to start-up costs, equipment set-up and removal, field office and storage facilities set-up and removal and Site cleanup.

E8.3.2 Site Access

- (a) The Contractor shall be responsible to develop suitable Site access. This includes but is not limited to supply and installation of rock and geotextiles, temporary land drainage swales to provide positive drainage of storm flows to approved ditch locations, temporary bridging over structures, culvert installation over existing ditching/swales, 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.
- (i) The Site access shall be developed from the southwest corner of the Site via the City of Winnipeg easement to the newly relocated Hurst Way (see Drawings).
- (ii) An additional access for $\frac{3}{4}$ ton and lighter vehicles may also be developed from the Parker SRB lands, across the SWRT corridor, and to Heatherdale Avenue, via the Rockman Street Right-of-way. However this access may not be used for heavy construction vehicles, or hauling of any excavated materials.
- (b) All construction access ramps from the top bank area down to the bottom of the stormwater retention basin shall be constructed to grades equal to or flatter than those shown on the drawings. where flatter grades are required for truck access grade shall be achieved by either cutting at the crest and/or filling at the toe of the slope to ensure that bank stability is maintained throughout construction.
- (i) Under no circumstances shall excavated material or any additional materials be placed as fill at the crest of the bank.

- (ii) Detailed construction access ramp drawings are to be submitted to the Contract Administrator for approval a minimum seven (7) days prior to any ramp 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.
- (d) The locations of the Contractor's construction access roads, where necessary, shall be restored to the same condition or better than it was prior to the initiation of any Work.
- (e) The Contractor is responsible for maintaining the cleanliness of all roadways that their hauling trucks and equipment will be using during the course of the Work,
 - (i) Construction materials, soils and debris shall be prevented from accumulating on local roadways, public and private lands, when tracked out of the Site (specifically, but not limited to trucks hauling excavated materials).
 - (ii) Due to the high number of trucks expected to be entering and leaving the Site daily the Contractor must ensure that public roads in the vicinity of the Site are kept clean from tracked out sediment.
 - (iii) The Contractor shall provide daily road cleaning services (e.g. grader, street sweeper) to the satisfaction of the Contract Administrator. If the Contractor does not adequately maintain road cleanliness the City will clean the affected roadways and cost borne by the City will be withheld from progress payments.
- (f) The Contractor shall provide the appropriate number of flag persons (in accordance with City regulations) to control construction traffic entering and egressing the site at the connection of the temporary access road to the corner of Hurst Way and Georgina Street.

E8.3.3 Frozen Waterways Permit

- (a) The Contractor is responsible for obtaining a Frozen Water Permit for permission to Work on the river ice, if required for filling the SRB with water. Contact the City of Winnipeg Police Service.

E8.3.4 Flow Diversion

- (a) Flows such as snowmelt, rainfall, a watermain break, or any other flow traveling back up through the downstream 1200 mm dia. LDS pipe or coming down the existing 2700 mm RCP LDS pipe shall be diverted during construction as specified in this
- (b) Flow control measures shall include but not be limited to diversions, flumes and by-pass pumping.

E8.3.5 Flow Control

- (a) The contractor shall control water within the project Site as described in Section D16 (Dewatering and Drainage Plan)

E8.3.6 Vegetation Removal

- (a) Some vegetation (living trees smaller than 50 mm, fallen larger 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. Vegetation removal shall be considered incidental to the Work being performed and no payment for this work will be made.

E8.3.7 Snow Removal

- (a) The Contractor shall maintain the condition of the access road for the duration of construction which shall include the removal of snow to permit access.
- (b) Cleared snow must be removed from the SRB lands. Under no circumstances shall snow be stockpiled the crest of the SRB

- (c) Maintenance and snow removal of the Site access shall be considered incidental to the Work being performed and no payment for this work will be made.

E8.3.8 Safety/Construction Fence and Gates

- (a) 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 secure the Site with appropriate gates or openings that are closed at the end of each Work day. Upon completion of the Work, the fence shall be removed and disposed of off-Site.

E8.3.9 Environmental Regulations

- (a) The Contractor shall adhere to all relevant Federal, Provincial and Municipal environmental regulations and the requirements listed in E39.
- (b) The Contractor shall supply, in writing, prior to commencement of Work on-Site, a detailed plan for sediment and erosion control on this project.
- (c) The Contractor shall ensure that a sufficient supply of suitable spill kits is 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.

E8.3.10 General Site Cleanup and Restoration

- (a) All areas of the construction Site shall be restored to a condition at least equivalent to its original condition prior to completion 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 and roadways.

E8.3.11 Permanent Surface Restorations

The Contractor shall permanently restore all existing surface areas disturbed by construction activities including but not limited to areas disturbed by; construction equipment, placement of equipment trailers and where construction materials were stockpiled, shall be restored as follows:

- (a) Boulevards, ditches and grassed areas – sodding using imported topsoil in accordance with CW 3510. The Contractor shall restore all areas disturbed during construction to existing condition or better, using topsoil and sod at its own cost.
- (b) Asphalt surfaces – match existing base course and asphalt thickness or a minimum of 150 mm of base course and 75 mm of Type 1A Asphaltic Concrete, whichever is greater, in accordance with CW 3410.
- (c) Miscellaneous concrete slabs, including sidewalk - in accordance with CW 3235
- (d) Interlocking stones – in accordance with CW 3330.
- (e) Concrete curb and gutter – in accordance with CW 3240.
- (f) Trees - requiring replacement due to construction activities (as directed by the Contract Administrator) shall be installed in accordance with CW 3510 and as per E30. The contractor will not be reimbursed under a separate pay item for replacing trees damaged by construction activities. The work will be considered incidental to Site Development and Restoration.
- (g) Topsoil - All topsoil Work shall be performed in accordance with CW 3510. Topsoil 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 its own cost.

E8.4 Method of Measurement and Payment

E8.4.1 Site Development and Restoration

- (a) 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;

- (b) 40% of the Site Development and Restoration unit price will be paid on the first progress payment following commencement of the Work;
- (c) 30% of the Site Development and Restoration unit price will be paid subsequent to the completion of the Work that includes the SRB excavation and grading, construction of the outfall and inlet structures, and installation of the Site gravel pathways and furniture;
- (d) The remaining 20% of the Site Development and Restoration unit price will be paid subsequent to the completion of the Work and restoration and clean-up of the Site.

E9. SILT FENCE

E9.1 Description

E9.1.1 This Specification covers the erection of temporary silt fencing, which shall be installed and maintained to control runoff at all locations where runoff may either leave the Site and/or enter the City's LDS piping via the SRB and to control deposition of runoff material from impeding the growth of the wetland planting. The silt fencing will provide an additional benefit of creating a barrier for geese and pedestrians from disturbing the naturalized planting as during the establishment period.

E9.1.2 The scope of Work included in this Specification is as follows:

- (a) Supply and Install temporary silt fencing at locations as indicated by the Contract Administrator, in accordance with the drawing details provided, immediately upon completion of the grouted 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 and the establishment period of the naturalized vegetation.
- (c) Upon establishment of the upland planting (or earlier, if directed by the Contract Administrator). remove the silt fencing and restore the area where the fencing was installed, without further disturbing the area and without releasing any deleterious substances into the newly excavated SRB.

E9.2 Materials

E9.2.1 Fence Posts

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

E9.2.2 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	4.405 l/min/m ²

- (b) Acceptable Product: "Amoco 2130 Silt Fence Fabric" or approved equal in accordance with B7

E9.2.3 Wire Mesh

- (a) Wire mesh shall be galvanized or plain metal with wire gauge = 3.0 mm, wire spacing at 150 mm on centre.

E9.2.4 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.

E9.3 Construction Methods

E9.3.1 Ensure that no deleterious substances are discharged into the adjacent watercourse at any time during construction activities.

E9.3.2 Silt Fence Installation

- (a) Excavate 150 x 150 mm 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 E9.2.4. 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).

E9.3.3 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 E9.3.2. If silt fence is found to be loose or torn, repair or replace as necessary to comply with E9.3.2.
- (b) If silt deposition at the fence is 300 mm or more in depth, carefully remove and dispose of silt off-Site without disturbing silt fence.

E9.3.4 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 E8 without releasing any deleterious substances to the adjacent watercourse.

E9.4 Measurement and Payment

E9.4.1 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.

E9.4.2 Removal of accumulated sediment from the silt fence is considered incidental to the Work and no separate measurement or payment will be made.

E10. EROSION CONTROL BLANKETS

E10.1 Description

E10.1.1 This Specification shall cover the supply and placement of erosion control blankets to provide temporary erosion control in localized areas (as directed by the Contract Administrator)

E10.2 Materials

E10.2.1 The blanket material shall consist of wheat or barley straw, coconut fibres, or other plants approved by the Contract Administrator. Acceptable products will be S32 Double Net Straw Blankets with photodegradable netting or approved alternative in accordance with B7. The blanket material shall be air dried, reasonably light in colour, and shall not be musty, mouldy, caked or otherwise of low quality. The blanket material 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.

E10.3 Construction Methods

E10.3.1 General

- (a) The Contractor shall supply and place erosion control blankets immediately after final grading is completed and prior to March 31.
- (b) Erosion control blankets shall be placed as directed, measured and accepted by the Contract Administrator.
- (c) Covered 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 recovering as directed by the Contract Administrator will be re-measured and additionally paid for at the Contract Unit Price for the Work item.

E10.3.2 Installation

- (a) The erosion control blankets shall be installed as per the manufacturer's recommended procedures. Blankets shall be rolled out on smoothed out soils starting from the top of the slope. The Contractor is to start by stapling the blanket at the top of the slope in a 150 mm deep by 150mm wide trench. The trench will be backfilled and compacted so that water will flow evenly onto the blanket.
- (b) The Contractor shall roll the blankets down the slope insuring soil blanket contact. Edges are to be overlapped a minimum 50 mm with parallel blankets.
- (c) If more than one blanket is need for the run down the slope then adjoining ends must be overlapped a minimum 100 mm shingle style. Overlapped areas are to be stapled with a staggered pattern of staples.

E10.3.3 Removal

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

E10.4 Measurement and Payment

E10.4.1 Supply, placement and removal of erosion control blankets will be measured on an area basis and paid for at the Contract Unit Price for "Erosion Control Blankets". The area to be paid for shall be the total number of square metres of ground covered by blankets, supplied

and placed in accordance with this Specification, accepted and measured by the Contract Administrator.

E11. EXCAVATION AND DISPOSAL, SUBGRADE COMPACTION, COMPACTION AND BACKFILL

E11.1 General

- E11.1.1 This Specification covers the Works relating to excavation and disposal, subgrade compaction, compaction and backfill.
- E11.1.2 This Specification shall be used in conjunction with the relevant sections of CW 2030
- E11.1.3 The Contractor is to note that a CN Rail yard existed on a portion of the Site (see Figure 1 in D2) for a period of time between 1930 and 1960. Given the Site history, the Contractor should anticipate unearthing railyard materials during excavation (e.g. railway tracks, ties, steel plates, concrete, etc.). Furthermore, Railway tracks were discovered in May 2017 at the east end of the SRB during the excavation of the receiving shaft for 2700 mm LDS installed as part of the Cockburn and Calrossie Sewer Relief Project (Contract 4). Removal of any rail materials is considered incidental to Excavation.
- E11.1.4 Due to the History of the Site (presence of a rail yard), soil samples were tested for Petroleum Hydrocarbon (PHC), PAH, and metals. Samples were also collected from the coal cinders found with the upper soil strata for flash point. Results from all tests indicate that the soils tested were within the Canadian Council of Ministries of the Environment (CCME) for industrial land use. The soil sampled is not considered contaminated and may be disposed of in any conventional landfill or site that meets the industrial property use guidelines. (see the see Geotechnical-Environmental Report in Appendix A)
- E11.1.5 In preparation for this project, and due to the large volume of soil being excavated, the City of Winnipeg's Brady Road Resource Management Facility ("BRRMF", also known as the Brady Landfill) was contacted to verify that they can accept the soil. The BRRMF identified that the facility is willing to accept any and all soils. A copy of the correspondence with the BRRMF approving the soil is included in the Geotechnical-Environmental Report in Appendix A). Any clean fill material (including soil containing coal cinders) will be accepted to Brady with no tipping fees. However, the Contractor must supply their own equipment and operator to move/shape the material dumped at the BRRMF.
- E11.1.6 The majority of the vegetation (trees and shrubs) were removed from site at part of a separate contract to a height of approximately 300 m from the ground surface. Any tree stump and root systems remaining within the excavation of the SRB are to be removed and are considered incidental to Excavation.

E11.2 Related Specifications

- (a) Environmental protection, Section E39
- (b) Allowance for Environmental Sampling and Testing Section E12

E11.3 Materials

E11.3.1 Definitions

- (a) Common excavation: excavation of materials of whatever nature, including topsoil, clay, dense tills, asphalt, gravel, hardpan, tree stumps, abandoned railway ties & rails, and frozen materials.
- (b) Contaminated soils: soils with levels of contaminants in excess of the CCME Industrial standards.
- (c) Clay Backfill: Impervious clay backfill to be used for retention pond lining, and bermed areas above existing grade shall consist of a high plasticity clay material, non-frozen, 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.

- (d) B-Horizon Soil: Commonly referred to as the subsoil. Formed between the C-horizon and the darker topsoil layer (A-horizon). The B-horizon forms as a result of interactions with the A-horizon and generally has distinct colouration. Relatively small amounts of organics, nutrient and other material will leach, or otherwise move into the upper B-horizon layers from the A-horizon.

E11.4 Execution

E11.4.1 Excavation and Disposal

- (a) Excavate to lines, grades, elevations and dimensions as indicated on the Drawings and as specified by the Contract Administrator.
- (b) All topsoil is to be excavated and removed from the Site.
- (c) Ensure drainage of all excavated areas and maintain crowns and cross slopes to provide surface drainage.
- (d) Excavation of the SRB to be inspected regularly to ensure groundwater levels are at an acceptable level and that there are no apparent slope stability issues.
- (e) Do not disturb foundation materials of adjacent pavements or structures which are to remain in place.
- (f) The Contractor is responsible for arranging for a disposal site for all excavated material, and associated works including transportation and payment of tipping fees.
- (g) Common excavation materials may be disposed of at the Brady Landfill or another acceptable landfill.
- (h) Clean fill transported to Brady Landfill will not be charged a tipping fee. See letter from the City of Winnipeg Environmental Standards, Water and Waste Department (dated August 12, 2016) confirming their acceptance of soils from the Site (Appendix A – within Geotechnical-Environmental Report Appendices). Brady Landfill regular operating hours on weekdays are from 5:30am to 6:00pm and from 9:00am to 5:00pm on weekends. If the Contractor would like to dispose of materials at the Brady Landfill outside of regular operating hours there will be a fee of \$150 per hour that will be the responsibility of the Contractor. Note that Contractor will also be responsible for providing equipment and operator (e.g. dozer) at the Brady Landfill to deal with the excavated material that is dumped at a specified area within the landfill. Brady Landfill will not provide any equipment for earthworks.
- (i) Notify Contract Administrator suspected contaminated materials are encountered in cut sections and remove these materials as directed.
- (j) If unsuitable materials are discovered at the finished grade of SRB excavation walls or bottom the Contract Administrator shall advise to what depth and extent shall be over excavated by the Contractor to the depth and extents directed by the Contract Administrator.
- (k) B-Horizon soil to be salvaged for use as growth media for the wetland planting (see E31).
 - (i) B-Horizon shall not be salvaged from locations below the historic rail yard and must be salvaged from locations approved by the Contract Administrator.
 - (ii) If B-Horizon is intended to be stockpiled in the vicinity of the SRB lands, then a suitable location within the Parker Lands must be arranged with the Contract Administrator. No stockpiling will be permitted at the crest of the SRB within a distance of 40 m from the SRB crest. Stockpiled material is to be covered with poly sheeting to mitigate erosion prior to permanent placement.
 - (iii) Approximately ~355 cubic meters of B-Horizon soil will need to be stockpiled onsite.

E11.4.2 Subgrade Compaction

- (a) The contractor shall provide compact the subgrade as described below, for subgrade below granular pathways, concrete approaches, turf stones, gabion retaining walls,

and select locations along the SRB final grade where unsuitable material was removed and replaced with suitable fill material or as directed by the Contract Administrator.

- (b) Remove stones and boulders exceeding 150 mm maximum dimension from the subgrade before compaction.
- (c) Where directed by the Contract Administrator, shape subgrade to required cross section and grade.
- (d) After grading has been completed, scarify and mix subgrade surface to required depth of subgrade compaction.
- (e) Break soil down to sizes suitable for compaction and mix for uniform moisture and soil conditions to full depth of layer.
- (f) Bring moisture content of soil to within $\pm 2\%$ of the optimum moisture content for each type of material. Add water or aerate as required.
- (g) Compact top 150 mm of cohesive subgrade soils to at least 95% of corrected maximum dry density.

E11.4.3 Placing Fill

- (a) Place suitable Site material to the lines and grades shown on the Drawings, or as directed by Contract Administrator.
- (b) Do not place material which is frozen nor place material on frozen surfaces.
- (c) Do not place material in free standing water. Drain low areas before placing material.
- (d) Place and compact to full width in uniform layers not exceeding 200 mm loose thickness. Contract Administrator may authorize thicker lifts if specified compaction can be achieved.
- (e) Compact to at least 95% of corrected maximum dry density.
- (f) Do not place stones and boulders exceeding 50 mm maximum dimension within 100mm of finished surface in graded areas.

E11.4.4 Finishing and Tolerance

- (a) Blade finished surfaces in cut and fill areas free from ruts, depressions, rocks in excess of 50 mm and debris.
- (b) Roll finished surfaces to a tight dense condition.
- (c) Finished graded area to be within 30 mm of design elevations, but not uniformly high or low, unless otherwise indicated in the Specifications.
- (d) Surfaces to be free from depressions exceeding 30 mm in 5 m.
- (e) Finished surface to provide positive drainage, free from ponding water, except for the bottom of the SRB.

E11.5 Measurement and Payment

E11.5.1 Common Excavation

- (a) Common excavation will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Common Excavation".
- (b) The volume to be paid for shall be the total number of cubic metres excavated and removed from the Site and disposed of at a suitable landfill in accordance with this Specification, accepted and measured by the Contract Administrator.
- (c) The volume of common excavation will be measured by cross-sections in its original position and computed by the method of Average End Areas, or by topographic survey.
- (d) Only material excavated within the limits of excavation will be included in the payment for "Common Excavation".

- (e) Transportation and Disposal of common excavation will be included in the payment for "Common Excavation".
- (f) Disposal of material from stripping topsoil, and removal of miscellaneous bushes, shrubs and tree stumps will be included in the payment for "Common Excavation", unless otherwise indicated.
- (g) Disposal of material from the former CN Rail yard (e.g. rail tracks, ties, metal plates, etc.) within the Site will be included in the payment for "Common Excavation", unless otherwise indicated.
- (h) And offloading, placement and shaping requirements at the delivery site of the excavated material are considered incidental to Common Excavation.

E11.5.2 Subgrade Compaction

- (a) Subgrade Compaction will be measured on an area basis and paid for by the Contract Unit Price for "Subgrade Compaction". The area to be paid for shall be the total number of square meters that are compacted in accordance with this Specification, as computed by the Contract Administrator.

E11.5.3 Fill Material

- (a) Fill material will be measured on a volume basis and paid for at the Contract Unit Price per cubic metre for "Placing Suitable Site Select Fill". The volume to be paid for will be the total number of cubic metres that are placed and compacted in accordance with the Drawings and Specifications, accepted and measured by the Contract Administrator.
- (b) The volume of fill material will be measured by cross-sections and computed by the method of Average End Areas, or by topographic survey.
- (c) Only material placed within the limits indicated on the Drawings will be included in the payment for placing suitable fill, unless the Contractor has been otherwise instructed by the Contract Administrator in writing.
- (d) No measurement or payment will be made for materials rejected by the Contract Administrator.
- (e) Loading, hauling, placing and compaction of suitable Site material will be included in the payment for the placing suitable fill.

E12. ALLOWANCE FOR ENVIRONMENTAL SAMPLING AND TESTING

E12.1 General

E12.1.1 Description

- (a) This specification covers the environmental sampling and testing of soils excavated from within the Site (if required).

E12.1.2 Background

- (a) For a period of time between 1930 and 1960 a CN Rail yard existed within the portion of the Parker Lands designated for the future stormwater retention basin being constructed for the Cockburn and Calrossie Sewer Relief project. In anticipation for Contract 4, a soil sample was collected at the shaft location for the CN Rail crossing (TH15-01) to determine if contaminated soils were present that would require excavated material to be transported to a soil treatment and processing facility, rather than a conventional landfill. The testing indicated that soils were within acceptable guidelines for transport to a conventional landfill such as the City run Brady Road Resource Management Facility (Brady Road landfill).
- (b) The environmental samples collected were submitted to Maxxam Analytics, a CALA accredited analytical laboratory for analysis. Samples for metals analysis were selected from the upper surface soils (<1.5 m) and samples for analysis of PAHs and

PHCs were selected based on those samples which had the highest head space vapour readings. A total of three (3) samples, one from each test hole, were submitted for analysis of metals, PAHs and PHCs.

- (c) The environmental laboratory results were compared to the standards of the Canadian Council of Ministers of the Environment (CCME), which are the guidelines adopted by the Province of Manitoba for the assessment of contaminated sites in Manitoba. For this project, federal criteria from the CCME Canadian Environmental Quality Guidelines (CEQG) for Canadian Soil Quality Guidelines for the Protection of Environmental Human Health (1999, Updated 2007) were used to assess metal, PAH and PHC concentrations in soil. The CCME document Canada-Wide Standards for Petroleum Hydrocarbons (PHCs) in Soil from May 2001 (revised January 2008; Updated July 2012) was also used to assess PHC concentrations. Based on the presence of the adjacent CN railway and the proposed development of a retention pond on the property, land use at the site was considered to be commercial. However, soil that is removed from the site and requiring disposal at a landfill must be compared to industrial property use guidelines. The laboratory data collected from the three environmental test holes was tabulated and compared to the CCME guidelines for industrial land use. Laboratory data is included in use the Geotechnical-Environmental Report in Appendix A) **All test results for PHC, PAH and metals from sampled soils are below the CCME guidelines for industrial land use and are not considered contaminated.**
- (d) While PHC, PAH and metals soil concentrations tested from the sample location and depth do not exceed guideline levels, adjacent soils within the historic rail yard may contain higher concentrations. As such, provisions for testing and sampling soils (at the discretion of the Contract Administrator) have been included in the bid documents.

E12.2 Construction Methods

- E12.2.1 If soil within the Parker SRB are suspected of being contaminated, then the excavated soils will be subject to environmental testing at the discretion of the Contract Administrator.
- E12.2.2 Suspect soils will be stockpiled at an approved location within the Parker SRB Lands.
- E12.2.3 Common Excavation operations may continue in non-impacted areas.
- E12.2.4 The Contractor shall ensure that excavated material is sampled and sent for testing at an accredited laboratory. Sampling shall be undertaken in the presence of the Contract Administrator.
- E12.2.5 Soil samples shall be placed in heavy polyethylene bags, and tested for volatile hydrocarbon vapour concentrations using a Photovac Photo-Ionization Detector (PID), calibrated with an isobutylene standard at the start of the day. Samples for metals analysis to be selected from the upper surface soils (<1.5 m) and samples for analysis of PAHs and PHCs to be selected based on those samples which had the highest head space vapour readings.
- E12.2.6 Select soil samples are to be placed in EPA approved sample containers, and transported to a CALA accredited analytical laboratory for analysis for metals, polycyclic aromatic hydrocarbons (PAHs) and petroleum hydrocarbons (PHCs) including benzene, toluene, ethylbenzene, and xylenes (BTEX) and PHC fractions F1 to F4.
- E12.2.7 Environmental laboratory testing results are to be provided to the Contract Administrator for review.

E12.3 Measurement and Payment

- E12.3.1 Environmental Sampling and Testing will be paid for under the Contract Price for "Allowance for Environmental Sampling and Testing". Costs will be based on actual invoiced costs for sampling and testing with allowable mark-ups in accordance with the General Conditions.

E13. SUPPLY AND INSTALLATION OF TEMPORARY SHORING

E13.1 Description

E13.1.1 This Specification shall cover shoring requirements for the Works related to the installation of the 2700 SPCSP (as required) and Inlet Control Chamber, as shown on the Drawings.

E13.2 Construction Methods

E13.2.1 Excavation

- (a) Remove excavated material from the Site immediately. Excavated material shall not be stockpiled on-Site at crest of SRB. Stockpiled material may be stored on the SRB bottom elevation.
- (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.

E13.2.2 Excavation Depressurization

- (a) It is not anticipated that depressurization will be required for the bulk excavation of the SRB. However depressurization may be required to facilitate the excavation and foundations for the inlet control structure and the grouted riprap at the outlet to the SRB. If depressurization is required it shall be as specified in E37.

E13.2.3 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 as per CW 3550 or approved equal in accordance with B7, 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.

E13.2.4 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 shop drawings can be obtained subsequent to installation of the shoring system.

- (f) Shoring and bracing shall be designed and installed to prevent settlement and damage to existing structures. 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.
- (g) Shoring and bracing shall remain in place until concrete has attained 75% of the design strength.

E13.2.5 Monitoring Movement of Shoring

- (a) 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 performed 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 temporary shoring.

E13.3 Measurement and Payment

E13.3.1 Temporary Trench Shoring for Inlet Pipe

E13.3.2 Shoring will be paid for at the Lump Sum unit price for "Temporary Shoring 2740 mm SPCSP (as required)". 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.

E13.3.3 Temporary Trench Shoring for Inlet Control Chamber

E13.3.4 Shoring will be paid for at the Lump Sum unit price for "Temporary Shoring for Inlet Control Chamber". 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.

E14. SEWER CONSTRUCTION

E14.1 Description

This Specification is for the supply and installation of 1200 mm Reinforced Concrete Pipe and 2740 mm ID galvanized and copolymer coated Structural Plate Corrugated Steel Pipe (SPCSP) at the outfall and inlet areas of the SRB. This Specification shall amend and supplement City of Winnipeg Standard Construction Specifications CW 2130, CW 2160, and CW 3610, and shall cover the installation of sewers and as defined as the Contract Works.

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.

E14.1.1 Submittals

- (a) The Contractor shall submit the following items related to Structural Plate Corrugated Steel Pipe for review and approval to the Contract Administrator at least one (1) week prior to the commencement of Work:
 - (i) Structural Plate Corrugated Steel Pipe (SPCSP) Assembly Instruction Drawings
 - (ii) Additional installation procedures for SPCSP structures including temporary bracing, setup locations and end treatments.
 - (iii) Manufacturers Assembly Instructions.
 - (iv) Proposed delivery and work schedules.
 - (v) The manufacturer's assembly instructions and Specifications shall be used in conjunction with the Specifications. It is the responsibility of the Contractor to ensure the Installation Instructions and Specifications are applied in the field as minimum requirements for a proper installation.

- (b) The Contractor shall submit the following quality control documentation related to Reinforced Concrete Pipe, in accordance with ASTM C76 and CW 2130, for review and approval to the Contract Administrator at least one (1) week prior to the commencement of Work:
 - (i) Mill tests for reinforcing steel
 - (ii) Concrete test results
 - (iii) Results from three-edge bearing test(s).
- (c) The foundation and bedding details shall follow the manufacturer's recommended Installation Instructions and the Specifications, Drawings and Special Provisions.

E14.2 Materials

- (a) Handling and Storage of Materials
- (b) All materials shall be handled and stored in a careful and workman-like manner, to the satisfaction of the Contract Administrator.
- (c) The Contractor shall observe the Manufacturer's recommendations for safe lifting of all pipe sections and shall ensure tolerance for pipe deflection is not exceeded.

E14.2.2 Testing and Approval

- (a) All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials supplied for testing purposes.

E14.2.3 Pipe Foundation Material

- (a) Where required, pipe foundation material shall be well graded 50 mm max crushed sub-base material having the following grading requirements.

Canadian Metric Sieve Size (millimeters)	Percent of Total Dry Weight Passing Each Sieve
50	100%
5	25 - 80%
0.8	5 - 18%

E14.2.4 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.

E14.2.5 Cement Stabilized Fill

Cement Stabilized fill shall be as specified in CW 2060.

E14.2.6 Structural Plate Corrugated Steel Pipe (SPCSP)

- (a) Fabrication Requirements
 - (i) The sheets, plates, and hardware shall be fabricated in accordance with the latest CSA G401-14 "Corrugated Steel Pipe Products
 - (ii) The pipe manufacturer's Quality System shall be certified by an appropriate independent body to meet the requirements of the ISO 9002 Quality Management Program.
 - (iii) Each SPCSP sheet shall be hot dipped galvanized in accordance with CSA G164 with a zinc mass as specified in CSA G401 unless an alternate coating mass is specified
 - (iv) Copolymer coating shall be in accordance with the latest CSA G401 Standard.
 - (v) The nominal plate thickness shall be 3.0 mm.

- (b) Assembly of Plates
 - (i) Offloading of the pipe and hardware at the job Site is the responsibility of the Contractor.
 - (ii) The Contractor shall arrange for the manufacturer of the SPCSP to attend a pre-construction meeting to review plate assembly techniques including plate pre-assembly (to expedite installation).
 - (iii) The Contractor, during plate assembly and placement of backfill, shall provide a dry and accessible work Site and excavation.
 - (iv) The structure shall be assembled in accordance with the manufacturer's Assembly Instructions as provided.
 - (v) Bolting must be done with the curved surface of the nut against the plate.
 - (vi) Before backfilling, all bolts shall be tightened to a torque between 200 and 350 N.m (150 to 250 ft-lbs). The Contract Administrator will randomly verify a minimum of 10% of the bolts are torqued to Specifications using a calibrated torque wrench.
- (c) Manufacturer's Inspection

The Contractor shall arrange for the manufacturer to provide an experienced Site Inspector as a check of proper plate assembly at the start of the plate assembly.

E14.2.7 Reinforced Concrete Pipe (RCP)

- (a) Acceptable Product

Material for 1200 mm I.D. pipe at the inlet structure downstream tie-in to be reinforced concrete to ASTM C76 standard with strength class type IV.
- (b) Pipe Class indicated on the drawings represent long term design conditions and loading. The Contractor shall verify that the pipe class, strength, reinforcing and joint design are suitable for its proposed installation methods and procedures. Design of any pipe to suit installation methods is the responsibility of the Contractor.

E14.2.8 Clay Plug

- (a) A one meter long impervious clay cap plug shall be installed along the new SPCSP piping at locations indicated on the drawings. The clay plug 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.

E14.2.9 Inlet Grating

- (a) Shop drawings shall be submitted for the inlet grating 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 600 g/m².
- (b) All bolts and nuts shall be typical steel, conforming to ASTM A-320 Grade B8M.
- (c) 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.
- (d) All miscellaneous metal, after fabrication, shall be hot-dip galvanized. No separate measurement will be made for hot-dip galvanizing.

E14.2.10 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.

E14.3 Construction Methods

E14.3.1 Pipe Foundation

- (a) Insitu soils shall be excavated to the trench width and subgrade elevations specified on the Drawings.
- (b) The subgrade shall be proof rolled to inspect for soft spots.
- (c) Where soft spots are observed, the subgrade shall be further sub-excavated and filled with additional compacted granular material to the depths specified by the Contract Administrator.
- (d) The Contractor shall abide by the Manufacturer's recommendations for pipe foundation.
- (e) Separation geotextile shall be installed between granular material and the insitu soils.
- (f) 50 mm crushed granular material shall be placed in 100 mm lifts and compacted to 100% Standard Proctor density.

E14.3.2 Bedding

- (a) Ensure bedding is thoroughly tamped and that the pipe is uniformly supported throughout and completed in accordance with CW 2030 and the Drawings, unless otherwise indicated by the Contract Administrator
- (b) The Contractor shall abide by the Manufacturer's recommendations for pipe bedding.

E14.3.3 Backfill

- (a) Backfill around the pipe, in maximum 150 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) The Contractor shall abide by the Manufacturer's recommendations for pipe backfill, procedure and ensure that compaction and backfill procedures do not cause the pipe to deform beyond the Manufacturer's recommended tolerance.
- (c) 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.
- (d) 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.

E14.3.4 Cement Stabilized Fill

- (a) Cement Stabilized fill shall be used as bedding and backfill within the existing 8m ID concrete caisson to fill around the existing 2700 RC pipe, the 2740 SPCSP and the Concrete Transition Coupling Collar.
- (b) The backfill shall be installed in accordance with CW 2030

E14.3.5 Clay Plug

- (a) Construct the impervious clay plug in lifts not exceeding 150 mm, alternating from side to side. The Contractor shall achieve 100% STDD for each lift, and shall arrange for the Contract Administrator to inspect each lift of the clay cap prior to beginning the next lift.
- (b) Clay shall extend from insitu clay on each side of the excavation and from insitu clay below grade to the 0.6 m clay cap along the SRB side slope.

E14.3.6 Concrete Transition Coupling Collar

- (a) The Concrete Transition Coupling Collar for the connection of the new 2740 mm I.D. SPCSP structure to the existing 2700 mm I.D. RCP LDS pipe near the outfall shall be installed as detailed and in the location shown on the Drawings.

E14.3.7 Inlet Grating on Inlet Headwall

- (a) The Inlet Grating shall be installed as detailed and in the location shown on the Drawings.

E14.4 Method of Measurement and Payment

E14.4.1 Supply and Installation of Structural Plate Corrugated Steel Pipe (SPCSP)

- (a) The supply and installation of SPCSP shall be measured and paid for on a linear basis at the contract unit price listed below:

Items of Work: SPCSP Structure

2740 mm I.D. copolymer coated

- (b) The length to be paid for shall be the total number of linear meters acceptably supplied and installed complete with approved joints, bends, construction of transitions and necessary hardware, measured horizontally, at grade, above the centre line of the pipe, as computed by measurement made by the Contract Administrator.
- (c) Payment for excavation, , pipe foundation, bedding and backfill shall be included in the price per metre of SPCSP.
- (d) Construction of the clay plug is considered incidental to installation of the SPCSP pipe. No separate payment will be made for installation of the clay plug.

E14.4.2 Supply and Installation of Reinforced Concrete Pipe (RCP)

- (a) The supply and installation of reinforced concrete sewer pipe shall be measured and paid for on a linear basis at the contract unit price listed below:

Items of Work: Concrete LDS Sewer

1200 mm I.D.

- (b) The length to be paid for shall be the total number of linear meters acceptably supplied and installed complete with approved joints, grouting, construction of transitions and necessary hardware, measured horizontally, at grade, above the centre line of the pipe, as computed by measurement made by the Contract Administrator.
- (c) Payment for excavation, pipe removal, pipe foundation, bedding and backfill shall be included in the price per metre of Supply and Installation of RCP.

E14.4.3 Supply and Installation of Concrete Transition Coupling Collar

- (a) Supply and installation of the concrete transition coupling collar and accessories will be measured and paid for at the Contract Lump Sum Price for "Concrete Transition Coupling Collar", executed in accordance with this Specification, the Drawings and as accepted by the Contract Administrator.
- (b) Backfilling with Cement Stabilized fill within the existing Concrete Caisson shall be incidental to Concrete Transition Coupling Collar.

E14.4.4 Supply and Installation of Inlet Grating

- (a) Supply and installation of the Inlet grating and accessories will be measured and paid for at the Contract Lump Sum Price for "Inlet Grating", executed in accordance with this Specification and accepted by the Contract Administrator.

E15. CONCRETE PIPE REPAIRS

E15.1 Description

Provisional Concrete pipe repairs include internal repairs to 1200 mm and 2700 mm diameter LDS pipes by man entry techniques. The Repairs shall include miscellaneous spall and crack repairs. Concrete Pipe Repair Works shall be carried out at the locations field directed by the Contract Administrator based on the results of the maintenance inspection carried out as described in D19. As required, the Contractor will review the repairs and method of repairs with the Contract Administrator prior to starting the Work.

E15.2 Materials

E15.2.1 Equipment

E15.2.2 All equipment, implements, tools and facilities used shall be of a size and type as required to complete the Work in a reasonable time as 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.

E15.2.3 Concrete

E15.2.4 Patching of smaller repairs to concrete sewers (25 mm – 75 mm thickness) shall be with a sulphate resistant, non-shrink, cementitious mortar, Sika grout 212 SR or approved equal in accordance with B7.

E15.2.5 Bonding Agents

(a) Bonding agent shall be Sika Latex R or an approved equal in accordance with B7.

E15.2.6 Water Stop

E15.2.7 Water stop shall be Hydrotite or an approved equal in accordance with B7.

E15.2.8 Other Requirements

- (a) Water shall be potable water, which shall be imported to the Site.
- (b) All materials shall be delivered to the Site in undamaged, unopened containers bearing the supplier's original labels.
- (c) WHMIS labels on all containers shall conform to Canadian regulations, including English and French risk phrases, proper chemical name, shipping class, packing group and UN number.
- (d) MSDS for all materials shall be used which are manufactured from or contain toluene diisocyanate (TDI), toluene, acetone or methyl ethyl ketone.
- (e) No materials shall be used which are flammable or which display shipping Class 3 red warning labels.
- (f) The Contractor shall keep all materials from freezing as per the Manufacturer's Specifications.

E15.3 Construction Methods

E15.3.1 Hazard Assessment and Safe Work Plan

(a) Before concrete repairs take place within the sewer, the Contractor shall assess the hazards and prepare a safe work plan in accordance with D11.

E15.3.2 Equipment Set Up

- (a) In accordance with the safe work plan for the repair, the Contractor shall set up the required safety equipment and controls to safely perform the Work.
- (b) Specialized equipment to perform the repair Work, such as lights, pressure washers, drills and chipping hammers shall in no way adversely affect the operation of the safety equipment required to perform the Work.
- (c) Subsequent to completion of the repairs the Contractor shall remove all equipment from the sewers and manholes.

E15.3.3 Sewer Repairs

- (a) Surface Repairs
 - (i) Identify all spalled areas scheduled for repair as identified by the Contract Administrator.
 - (ii) Saw cut the perimeter of the patch to a minimum of 13 mm outside the limits of the spalled/deteriorated area designated for repair.
 - (iii) Chip and remove the delaminated concrete until sound concrete is encountered to provide a solid bond.
 - (iv) Remove a minimum of 25 mm of concrete from around all encountered rebar to provide a solid bonding area.
 - (v) Repair overhead and sidewall patches using a non-shrink, sulphate resistant mortar; Emaco S88 SR (or approved equivalent in accordance with B7) if depth of patch is 50 mm or less. The approved product shall be prepared and installed according to the manufacturer's instructions.
 - (vi) For patches 50 mm to 100 mm deep, use a non-shrink, cementitious grout; Sika 212 SR (or approved equivalent in accordance with B7). This procedure shall require that the repair area be formed and the approved product be prepared and pumped into place as per the manufacturer's instructions.
- (a) Crack Repairs
 - (i) Identify all cracks scheduled for repair as identified by the Contract Administrator.
 - (ii) Remove any loose material from concrete surface adjacent to cracks by wire brushing a 50 to 75 mm wide strip along the cracks, and vacuuming all dust from the surface.
 - (iii) Install surface ports for injection along the cracks at spacing ranging from 100 to 300 mm depending on the width of the crack. The base plate of each entry port shall be adhered onto the concrete surface using Kemko 022, Sikadur 33 or approved equivalent in accordance with B7. The ports shall be coated with the same material over the top of the base plate to assure a good seal and stability of the port during the injection process.
 - (iv) Surface seal material with paste adhesive Kemko 022, Sikadur 33 (or approved equivalent in accordance with B7). Paste shall be applied to the face of the crack between injection ports to build a confinement area for the liquid epoxy resin.
 - (v) After curing of the surface seal, a two-component epoxy resin/hardener suitable for the structural repair of cracks and delaminations in concrete; Kemko 038, Sikadur 52 (or approved equivalent in accordance with B7) shall be injected into the crack starting at the lowest injection port. The injection will continue at the same port until there is an appearance of epoxy resin at the next port adjacent to the entry port being pumped. The injection epoxy resin shall be selected based on the thickness of the crack (for hairline cracks Kemko 068 or Sikadur 55 will be used).
 - (vi) When epoxy adhesive travel is indicated by appearance at the next adjacent port, injection can be discontinued on the entry port being pumped and epoxy injection shall be transferred to the next adjacent port where epoxy adhesive has appeared. The first entry port must be plugged. The epoxy injection on any intermediate entry port being pumped shall not be discontinued unless the injection pressure reaches 150-160 psi or directed by the Contract Administrator. The above steps will be repeated until cracks are completely filled along their length.
 - (vii) As soon as the crack is full and all injection ports are blocked, the pump shall be run for several seconds to create a pressure of 100 psi in the crack that will be maintained for one (1) minute. Once the epoxy adhesive in the crack is pressurized and no leaks are observed, the pump shall be disconnected from the port and the injection port shall be plugged.
 - (viii) The above steps shall be repeated for all cracks or set of cracks that are connected, until all cracks are injected.
 - (ix) For every day that injection work is performed, an Injection Report shall be completed to document type of injection equipment, location, quantity of materials, and amount of crack length injected each day.

- (x) After all injection work is completed and cured, the crack seal shall be removed (after 12 hours) by grinding to obtain a smooth concrete surface.
- (xi) Cleanup work area and demobilize.

E15.3.4 Cleanup

E15.3.5 All waste shall be cleaned from the Site and no waste from the concrete repairs is to enter the downstream LDS pipe.

E15.3.6 Deficiencies

E15.3.7 If deficiencies are found in the repaired section the Contractor shall bear all costs of correcting the deficiencies including the cost of re-inspection to confirm that the deficiencies are rectified in accordance with these Specifications.

E15.4 Basis of Measurement and Payment

E15.4.1 Miscellaneous Concrete Repairs

- (a) Surface repairs will be measured on a square meter area basis and paid for at the Provisional Contract Unit Price for "Concrete Pipe Surface Repairs". The area to be paid shall be the total square meters of pipe surface repaired in accordance with this Specification, accepted and measured by the Contract Administrator.
- (b) Crack repairs will be measured on a linear meter basis and paid for at the Provisional Contract Unit Price for "Concrete Pipe Crack Repairs". The area to be paid shall be the total length of crack repair in accordance with this Specification, accepted and measured by the Contract Administrator.

E16. SEWER INSPECTION

E16.1 Description

E16.1.1 This Specification shall amend and supplement Standard Specifications CW 2145.

E16.1.2 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.

E16.2 Construction Methods

E16.2.1 Sewer Condition Coding

E16.2.2 Sewer pipes shall be coded according to the Standard Specifications CW 2145.

E16.3 Measurement and Payment

E16.3.1 Amend Section 4.4 of Specification CW 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.

E16.3.2 Delete Section 4.6 of Specification CW 2145.

E16.3.3 Sewer Inspection 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 herein described and as shown on the Drawings and Details and all other items incidental to the Work included in this Specification.

- (a) **Items of Work:** Sewer Inspection
- (b) 2740 mm I.D. SPCSP

(c) 1200 mm I.D. RCP

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 No rockfill will be permitted to be placed without providing the source and the supplier to the Contract Administrator. Inspection of the source will be performed by the Contract Administrator prior to written acceptance of the product.

E17.2.3 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.

E17.2.4 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.

E17.2.5 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

E17.2.6 Rockfill riprap 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
400	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 Snow and ice shall be removed from the side slopes in accordance with these Specifications.
- E17.6.2 As indicated on the Drawings, portions of the excavation for riprap placement at the outlet (east end of the SRB) and at the inlet (south side of the SRB) shall be sub-cut from the finished design grades.
- E17.6.3 Riprap shall be placed over the geotextile membrane at the location of the backfilled outfall and inlet excavations as shown on the Drawings.
- E17.6.4 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.
- E17.6.5 Sufficient levelling shall be done to produce a neat and uniform surface, conforming to the shape and dimensions shown on the Drawings.
- E17.6.6 The allowable fill tolerances shall be within ± 50 mm of the grades and thickness shown on the Drawings, provided positive downslope grading is achieved.
- E17.6.7 Provide a smooth uniform surface from the existing grade and new riprap when placing outside edges or transitions, as accepted by the Contract Administrator.

E17.7 Quality Control

- E17.7.1 Inspection
- E17.7.2 All workmanship and all materials furnished and supplied under this Special Provision are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production 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 or approval that may have been previously given.
- E17.7.3 Access
- E17.7.4 The Contract Administrator shall be afforded full access for the inspection and control testing of materials at the Site to determine whether the material is being selected and placed in accordance with this Specification.

E17.8 Measurement and Payment

- E17.8.1 Rockfill Riprap
- E17.8.2 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.
- E17.8.3 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. GROUTED RIPRAP

E18.1 Description

- E18.1.1 This Specification shall amend and supplement Standard Specification CW 3615.

E18.2 Materials

E18.2.1 Riprap

- (a) Rock for riprap shall consist of hard, dense, durable rock. The rock shall be angular crushed limestone, resistant to the action of air and water and suitable in all other respects for the purpose intended.
- (b) The stones shall range in size from 100 mm to 400 mm in diameter with 75% by count between 250 mm and 400 mm and 25% by count between 100 mm and 250 mm.
- (c) Crushed limestone when subjected to the Los Angeles abrasion test shall have a loss of not more than thirty-two percent (32%).
- (d) Crushed limestone when subjected to the Magnesium Sulphate Soundness test shall have a loss of not more than thirteen percent (13%).
- (e) The sample material shall be crushed to 37.5 mm maximum aggregate size and tested in accordance with ASTM C131 – Resistance to Degradation of Small size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine and ASTM C88 – Soundness of Aggregates by Use of Magnesium Sulphate.
- (f) The rock for riprap shall be approved by the Contract Administrator prior to riprap installation.

E18.2.2 Geotextile

- (a) Geotextile shall be as indicated by this Specification.

E18.2.3 Grout

- (a) Grout shall be as per CW 3615.

E18.3 Construction Methods

E18.3.1 Riprap

- (a) Installation of 400 mm grouted riprap shall be as per Clause 9.3 of CW 3615. Total depth of concrete and riprap to be as shown on the drawings.
- (b) Depth of sub-cut excavation to be the same as the depth of riprap to ensure a smooth transition from the invert of the outlet pipe to the SRB bottom.
- (c) Riprap shall not be dropped onto the geotextile from a height greater than 300 mm.
- (d) Any geotextile damaged during placement of the riprap shall be replaced as directed by the Contract Administrator at the Contractors expense.

E18.4 Method of Measurement and Payment

E18.4.1 Grouted Riprap

(a) As per Clauses 12.2 and 13.2 of CW 3615.

E19. SEPARATION GEOTEXTILE FABRIC

E19.1 Description

E19.1.1 This Specification shall cover the supply and placement of the separation geotextile fabric below riprap and various other areas as required within the Specifications.

E19.2 Materials

E19.2.1 Each geotextile roll to be used shall be tagged to provide product identification for inventory and quality control purposes.

E19.2.2 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.

E19.2.3 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 ⁻¹
Flow Rate	ASTM D4491	60 L/sec/m ²

E19.2.4 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 in accordance with B7.

E19.3 Construction Methods

E19.3.1 Geotextiles shall consist of non-woven fabric.

E19.3.2 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.

E19.3.3 Snow and ice shall be cleared from the exposed soils of the outfall pipe trench prior to placement of geotextile.

E19.3.4 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.

E19.3.5 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.

E19.3.6 A minimum of 300 mm of material shall be placed over the fabric prior to equipment passage.

E19.3.7 Riprap shall be placed on the geotextile in such a manner that the geotextile is not damaged, torn, excessively stretched, or punctured.

E19.3.8 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.

E19.4 Measurement and Payment

E19.4.1 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 "Separation Geotextile Fabric". 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.

E19.4.2 Overlap at all joints shall be considered a single layer of geotextile for measure and payment purposes.

E19.4.3 Geotextile used for repairs will be excluded from the quantity paid.

E20. CAST-IN-PLACE CONCRETE CONSTRUCTION

E20.1 Description

E20.1.1 This Specification will cover construction of cast-in-place concrete and shall supplement, revise and amend CW 2160.

E20.2 Materials

E20.2.1 Concrete Mix Design

The Contractor shall be responsible for the design and performance of all concrete mixes supplied under this Specification. Concrete shall be supplied in accordance with the requirements of CSA A23.1-09, with the minimum properties as provided below:

(a) Concrete Chamber Construction

(i)	Class of Exposure	S-2
(ii)	Maximum Size of Aggregate	19 mm
(iii)	Cement Type	Type HS
(iv)	Minimum Compressive Strength at 7 Days	20 MPa
(v)	Minimum Compressive Strength at 56 Days	32 MPa
(vi)	Slump/Flow	80 mm +/- 20 mm
(vii)	Air Content	6.5% +/- 1.5%

(b) Lean Mix Concrete (working base)

(i)	Cement Type	Type HS
(ii)	Maximum Water/Cementing Materials Ratio	0.49
(iii)	Minimum Compressive Strength at 28 Days	15 MPa
(iv)	Slump/Flow	80 mm
(v)	Air Content	nil

(c) Flowable cement-stabilized backfill

(i)	Cement Type	Type GU
(ii)	Maximum Compressive Strength at 28 Days	3 MPa
(iii)	Slump/Flow	80 mm
(iv)	Air Content	nil

- E20.2.2 Provide a "Mix Design Statement" for each type of concrete to be used certifying constituent materials and mixing proportions to the Contract Administrator at least 2 weeks prior to delivery of Concrete to the Site. Supply reasonable evidence to the Contract Administrator that the mix proportions selected will produce concrete meeting the specified strength, workability and yield.
- E20.2.3 Admixtures
- (a) All admixtures shall be compatible.
 - (b) Air entraining agent shall meet ASTM C260.
 - (c) Chemical water reducing admixtures shall meet ASTM C494.
- E20.2.4 Grout
- (a) Grout shall be Sika Grout 212 SR or approved equivalent in accordance with B7.
 - (b) Hydraulic cement for form hole patching shall be
- E20.2.5 Reinforcing Steel
- (a) Bar accessories:
 - To be made of a non-corroding material
 - Shall not stain, blemish or spall the concrete surface for the life of the concrete
 - Shall be approved by the Contract Administrator
 - Bar chairs shall be PVC.
- E20.2.6 Bonding Agent shall be Sika Latex R, Acryl 60 or approved equivalent in accordance with B7.
- E20.2.7 Shop Drawings:
- (a) Provide shop drawings in accordance with E4 of this Specification.
 - (b) Submit shop drawings for reinforcing steel a minimum of two (2) weeks prior to the fabrication of any reinforcing steel.
- E20.3 Construction Methods
- E20.3.1 Construction Method Submission
- (a) No Work shall commence on construction of cast-in-place concrete until after the Contract Administrator's review of the Contractor's Construction Method submission.
 - (b) The Contractor shall prepare for the Contract Administrators review a Construction Method submission detailing:
 - (i) Construction sequence to be followed including all methods to be employed.
 - (ii) Specialized equipment to be used.
 - (iii) Any design revisions proposed to accommodate the Contractor's proposed construction method.
 - (c) The Contractor shall respond to any concerns that may be raised by the Contract Administrator after review of Construction Method submission.
- E20.3.2 Cast-in-place Concrete Chamber 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 reinforcement steel in lengths to best suit the spacing of walers so that reinforcing bars will not be bent or malformed in order to remove the walers.

E20.3.3 Cast-in-place Concrete Piles

- (a) The Contractor shall be responsible to verify the existence of all underground services in the piling area whether shown or not. Expose all services close to the piling as required.
- (b) Reinforce all piles as detailed on the Drawings. Concrete shall be in accordance with CW 2160, except as supplemented, revised or amended in this Specification and as indicated in the construction notes on the Drawings.
- (c) Vibrate the top 5.0 m of concrete in all piles.
- (d) Piles should not be more than 50 mm out of position laterally at the top and not more than 2% out of plumb.
- (e) Augering of cast-in-place piles shall be completed under the supervision of the Geotechnical Engineer-of-Record or designate to record subsurface conditions are consistent with test hole condition.

E20.3.4 Backfill

- (a) Place and compact backfill material as indicated in the drawings and 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.

E20.3.5 Grout

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

E20.4 Measurement and Payment

E20.4.1 Construction of the cast-in-place concrete will be paid for at the Contract Lump Sum Price for "Items of Work." Said price shall be payment in full for supplying all materials and performing all operations herein described and as shown on the Drawings and Details and all other items incidental to the Work included in this Specification.

- (a) **Items of Work:** Cast-in-Place Construction
- (b) Inlet Headwall
- (c) Inlet Control Chamber Floor Slab
- (d) Inlet Control Chamber Walls
- (e) Inlet Control Chamber Roof Slab

E21. COLD WEATHER REQUIREMENTS

E21.1 Description

- (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 required as specified herein.
- (b) All freshly placed concrete shall be protected from the elements and from defacements due to construction operations.

E21.2 Construction Methods

- (a) 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 formwork, 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 they propose to employ.

E21.3 Measurement and Payment

- E21.3.1 Cold weather requirements shall be considered incidental to the construction of cast-in-place concrete and no measurement or payment will be made for this item.

E22. METAL FABRICATIONS

E22.1 Description

E22.1.1 General

- (a) This Specification shall cover the supply, fabrication, transportation, handling, delivery and placement of metal fabrications.

E22.2 Materials

- E22.2.1 All material shall be of a type acceptable to the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.
- E22.2.2 Material intended for use in the various assemblies shall be new, straight, and clean with sharply defined profiles.
- E22.2.3 Steel Sections and Plates: to CAN/CSA G40.20/G40.21, Grade 300 W, except W, HP AND HSS sections, which shall be Grade 350 W.
- E22.2.4 Steel Pipe: to ASTM A53/A53M, seamless, galvanized, as specified by item.
- E22.2.5 Welding materials: to CSA W59.
- E22.2.6 Hot dipped galvanized steel repair material: Gal-Viz galvanizing solder or approved alternate in accordance with B7.
- E22.2.7 Stud Anchors: to ASTM A108, Grade 1020.
- E22.2.8 Aluminum: Aluminum Association 'Specifications for Aluminum Structures'. Aluminum material for plates shall be Type 6061-T651. Aluminum plate shall have an approved raised oval or multi-grip pattern.
- E22.2.9 Nylon electrochemical isolation sleeves shall be "Nyltite" – headed sleeves as manufactured by Spaenaur of Kitchener, Ontario, or approved equal.

E22.2.10 Anchor bolts and fasteners: ASTM A276, Type 316 stainless steel, of ample section to safely withstand the forces created by operation of the equipment or the load to which they may be subjected.

E22.2.11 Paint: For park canopy duplex system: Devran 201 epoxy prime coat and Devthane 379 acrylic polyurethane top coat, or approved equivalent in accordance with B7. Finish colour: charcoal grey.

E22.3 Construction Methods

E22.3.1 Submittals

- (a) The Contractor shall submit the qualifications of the fabricator and welders to the Contract Administrator for acceptance. Submit shop drawings in accordance with E4 clearly indicating material, core thickness, finishes, connections, joints, methods of anchorage, number of anchors, supports, reinforcement, details and accessories. Indicate field measurements on shop drawings.

E22.3.2 Fabrications

- (a) Fabricate Work square, true, straight and accurate to required size, with joints close fitted and properly secured. Assemble Work in such a way that no disfigurements show in the finished Work, or impair the strength.
- (b) Confirm measurements for all fabrications before fabricating.
- (c) Cut aluminum plate with edges straight and true, as far as practical; maintain the continuity of the pattern at abutting edges.
- (d) Pieces shall be of the sizes indicated on the Drawings and shall not be built up from scrap pieces. Confirm sizes with field measurements.
- (e) Where possible, fit Work and shop assemble, ready for erection.
- (f) Remove and grind smooth burrs, filings, sharp protrusions, and projections from metal fabrications to prevent possible injury. Correct any dangerous or potential harmful installations as directed by the Contract Administrator.
- (g) Angle frames shall be of the same material as the cover plate (except for existing frames designated on the drawings for re-use), and cover plates shall be hinged and be supplied with lifting handles, as shown on the Drawings. Exterior covers shall be supplied with a hasp for a padlock.
- (h) All steel welding shall conform to CSA Standard W.59. Fabricator shall be fully approved by the Canadian Welding Bureau, in conformance with CSA Standard W.47.1. Welding shall be done by currently licensed welders only.
- (i) All aluminum welding shall be in accordance with the requirements of CSA W59.2. The fabricator shall be fully certified in conformance with CSA Standard W47.2. All welding shall be done in a licensed welding shop, and no field welding will be permitted unless approved in writing, in advance, by the Contract Administrator.
- (j) Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- (k) Seal exterior steel fabrications to provide corrosion protection in accordance with CAN3-S16.1.
- (l) Use self-tapping shake-proof flat-headed screws on items requiring assembly by screws.

E22.3.3 Steel Coating Systems

- (a) Duplex Coating System for Park Canopy Structural Steel
- (b) Surface preparation to SSPC-SP8 (pickling);
- (c) Hot Dip Galvanized to CAN/CSA G164;

- (d) Pre-coating surface preparation to SSPC-SP7 (brush off blasting). Ensure blasting does not damage galvanized coating by using abrasive media with a Mohs hardness rating of five or less and a particle size between 200 and 500 micrometers;
- (e) One prime coat of Devran 201 epoxy polyamide, 75 microns per coat dry film thickness;
- (f) One finish coat of Devthane 379 acrylic polyurethane, 75 microns per coat dry film thickness. Colour directed by Contract Administrator selected from the manufacturer's standard colour range.
- (g) Recoating and curing times shall be as per coating manufacturers recommendations.
- (h) Galvanized Coating for Inlet Headwall Fabrications
- (i) Surface preparation to SSPC-SP8 (pickling);
- (j) Hot Dip Galvanizing to CAN/CSA G164.
- (k) Coating touch ups
- (l) Paint touch-ups shall be made with system to match the shop applied paint.
- (m) Galvanized coating field touch-ups shall be with gal-viz galvanizing solder.

E22.3.4 Erection

- (a) Do steel welding Work in accordance with CSA W59 and aluminum welding Work in accordance with CSA W59.2
- (b) Erect metal Work in accordance with reviewed shop drawings, square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- (c) Provide suitable means of anchorage acceptable to Contract Administrator such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles where not specifically indicated on the Drawings.
- (d) Provide components for building in accordance with shop drawings and schedule.
- (e) Make field connections with bolts to CAN/CSA-S16, or weld.
- (f) Touch-up rivets, bolts and burnt or scratched surfaces that are to receive paint finish, with zinc primer after completion of erection.
- (g) Repair damaged galvanized surfaces and field welds with self-fluxing, low temperature, zinc-based alloy rods in accordance with ASTM A780, Repair of Damaged Hot Dip Galvanizing Coatings. The general procedure shall be to allow a small amount of the repair alloy to flow then spread by brushing briskly with a wire brush. Brushing shall be sufficient to obtain a bright finish. Repeat process three times to ensure a proper thickness is achieved. Temperatures shall be kept below 177°C (350°F) at all times. All heating of structural steel Work shall be done in the presence of the Contract Administrator.
- (h) Install access hatch frames square and level at the locations show on the Drawings. Embed anchors in concrete as shown on the Drawings. Install covers and adjust hardware to proper function.
- (i) All aluminum surfaces in contact with concrete shall be isolated with two coats of alkali resistant bituminous paint meeting the requirements of CGSB 31-GP-3M.
- (j) Install electrochemical isolation gaskets and sleeves to electrically isolate dissimilar metals as indicated on the drawings.

E22.4 Measurement and Payment

- E22.4.1 Supply, fabrication, transportation, handling, delivery and placement of metal fabrications will be paid for at the Contract Lump Sum Price for "Items of Work." Said price shall be payment in full for supplying all materials and performing all operations herein described and as shown on the Drawings and Details and all other items incidental to the Work included in this Specification.

- E22.4.2 Items of Work:
- E22.4.3 Metal Fabrications (Outfall)
 - (a) Pipe Sleeves and Steel Plate Fasteners
- E22.4.4 Metal Fabrications (Inlet)
 - (a) (i) Miscellaneous Metals
 - (b) (ii) Hand Rails and Pipe Sleeves

E23. CAST IRON SLIDE GATE

E23.1 Description

E23.2 This Specification shall cover the supply, delivery, installation and testing of the cast iron slide gate, embedded wall thimble, mechanical lift operator, stems, wall brackets and mechanical accessories.

E23.3 Submittals

- E23.3.1 Submit shop drawings of cast iron slide gates, wall thimbles, mechanical lift operators, stems, wall brackets, and accessories in accordance with E4.
- E23.3.2 Submit Operating and Maintenance Manuals in accordance with E4.
- E23.3.3 Provide one (1) digital searchable PDF copies of all the manufacturer's brochures and technical literature detailing correct installation procedure and recommend operating and maintenance instructions. Manuals shall be bound with the project title and gate description identified on the front cover. One set of manuals shall be provided for each size of gate. Final payment for slide gates will not be made until the above information has been provided to the Contract Administrator.
- E23.3.4 Provide the following information to the Contract Administrator prior to the delivery of slide gate and operator assemblies in accordance with E4.
 - (a) A certified copy of the Chemical and Physical Analysis on all materials used in the manufacture of the slide gate, wall thimbles, stems, operator and accessories or certification that the materials used are in strict accordance with this Specification.
 - (b) Copies of the test reports for Performance and Leakage tests. Included on the report shall be the signature of the official who is responsible for the gate assembly and testing.

E23.4 General Design

- (a) Specification Standard: AWWA C560-14
- (b) Mounting: Type F wall thimble.
- (c) Seating Head: Maximum design seating head for all gates will be from horizontal centerline of the gate to the top of the control chamber roof unless noted otherwise in the drawings.
- (d) Unseating Head: Maximum design unseating head for all gates will be from horizontal centerline of the gate to the top of the control chamber weir wall.
- (e) Operator and Lift: Enclosed rising stem gear lift with pedestal. Operator to be finished with a 50 millimetre x 50 millimetre square nut suitable for attachment of an electric portable drill for opening. Operator shall turn counterclockwise to open.
- (f) Stem Cover: Gear lift to be complete with stem cover with acrylic window with gradations in 152 mm (6") increments for the entire range of gate operation.
- (g) Stem: The stainless steel stem shall be designed so the slenderness ratio (L/r) does not exceed 150.
- (h) Stem Guides: Adjustable in both horizontal and vertical directions.

- (i) Gate Opening Size: 610 mm x 610 mm (24" x 24")
- (j) Acceptable Leakage as per AWWA C560-14.
- (k) Butyl rubber mastic shall be used to form a seal between the frame and thimble.
- (l) Frame and gate shall be painted with two coats of Intergard FP, Amerlock 2 Epoxy Coating or approved equivalent in accordance with B6. Coatings shall be 150 µm per coat dry film thickness.
- (m) The size of fasteners shall be as indicated in the project drawings. Quantity and spacing shall be as recommended by the gate manufacturer.
- (n) The sluice gate shall be as manufactured by Hydro Gate, Rodney Hunt, Waterman or approved equivalent in accordance with B6.
- (o) Field touch-up chips and scratches of the cast-iron gate coating shall be completed with a polyamide epoxy coating to match the shop applied coating system. Touch ups shall be of minimum thickness to match shop applied coating.

E23.5 Materials

- (a) Frame, Slide, guides and yoke ASTM A48 Cast Iron (Class 30), ASTM A126 Cast Iron (Class B)
- (b) Seating Faces ASTM B21 Naval Bronze, Alloy 482 or ASTM B98, Alloy 655
- (c) Wall Thimble ASTM A48 Cast Iron (Class 30) or ASTM A126 Cast Iron (Class B)
- (d) Wedges ASTM B584 Manganese Bronze, Alloy 865
- (e) Wedge Blocks ASTM A48 Cast Iron (Class 30) or ASTM A126 Cast Iron (Class B)
- (f) Fasteners & Anchors ASTM A276 Type 304 Stainless Steel
- (g) Stem ASTM A276 Type 304 Stainless Steel
- (h) Stem Couplings ASTM A276 Type 304 Stainless Steel
- (i) Stem Guide ASTM A48 Cast Iron (Class 30) or ASTM A126 Cast Iron (Class B) with Bronze bushings
- (j) Operator Pedestal ASTM A48 Cast Iron (Class 30) or ASTM A126 Cast Iron (Class B) or Steel
- (k) Stem Cover Aluminum or Galvanized Steel.
- (l) Shop Drawings
 - (i) Submit shop drawings of cast iron slide gates, mechanical lift operators, stems, wall brackets and accessories in accordance with E4 of this Specification.
- (m) Delivery and Shipping
 - (i) The Contract Administrator will examine the slide gate assemblies, frames, stems, operators and accessories upon delivery and will reject any equipment that is found to be damaged to the extent that, in the Contract Administrator's opinion, it cannot be put to the use for which it was intended. The Contractor shall arrange with the gate supplier to repair any superficially damaged equipment to the satisfaction of the Contract Administrator.
 - (ii) It shall be the responsibility of the Contractor to negotiate any claims for damage with the carrier and to make arrangements to have any rejected equipment replaced as soon as possible at no extra expense to the City.

E23.6 Construction Methods

E23.6.1 Installation of Cast Iron Slide Gate

- (a) Install cast iron slide gate, mechanical lift operator, stem, wall brackets and accessories, new anchor bolts and rehabilitation of existing wall thimbles as shown on the drawings and in accordance with the manufacturer's recommendations.

- (b) Make arrangements to have a qualified field representative of the slide gate supplier/manufacturer inspect the installation during and after completion and provide a Certificate of Satisfactory Installation to the Contract Administrator.

E23.6.2 Shop Testing

- (a) The fully assembled gate shall be shop inspected, adjusted and tested for operation and leakage at the design head before shipping.

E23.6.3 Field Testing

- (a) Perform leakage tests in the Contract Administrator's presence once slide gates have been installed to ensure compliance with the allowable leakage rate indicated in AWWA C560-14.
- (b) Arrange for a qualified field representative of the slide gate supplier/manufacturer to be present during field testing.
- (c) The leakage test will be performed in an unseating configuration by installing a 1200 mm diameter plug on the downstream concrete pipe and filling the weir box with water to within 100mm of the overflow elevation.
- (d) The leakage test for seating head cannot be performed in the control chamber.
- (e) Water used for testing purposes must be chlorine free. Potable drinking water shall be de-chlorinated if used for testing purposes.
- (f) The Contractor will be responsible to arrange delivery by tanker truck, or supply water from a hydrant into the chamber for testing purposes.
- (g) If a gate fails the field leakage test, the Contractor shall undertake adjustments, replacements or other modifications recommended by the slide gate supplier/manufacturer's field representative and repeat the test. The sequence shall be repeated until the gate passes the allowable leakage rate.

E23.7 Measurement and Payment

E23.7.1 Supply, fabrication, transportation, handling, delivery, placement and testing of cast iron slide gate will be paid for at the Contract Lump Sum Price for "Cast Iron Slide Gate." Said price shall be payment in full for supplying all materials and performing all operations herein described and as shown on the Drawings and Details and all other items incidental to the Work included in this Specification.

- (a) 70% of the Cast Iron Slide Gate will be paid upon supply and installation in accordance with the above specifications;
- (b) The remaining 30% of the Cast Iron Slide Gate will be paid upon successful testing (as described herein)

E24. SHADE CANOPY

E24.1 Description

This Specification shall cover the supply, delivery, and installation of the shade canopy park structures and associated foundation works.

E24.1.1 Submittals

- (a) Submit steel fabrication shop drawings of the shade canopy structures in accordance with E4.

E24.2 Materials

E24.2.1 Concrete: As listed on the Drawings, and in accordance with E20

E24.2.2 Steel: as listed on the Drawings

E24.2.3 Corrugated Steel Decking: To ASTM A653M and ASTM AZ275.

E24.2.4 Wood purlins and insets: Western Red Cedar - No. 2 or better structural grade.

E24.3 Construction Methods

E24.3.1 General construction notes are listed on the Structural Drawing LD-8230.

E24.3.2 Installation of Foundations

(a) Drill cast-in-place concrete piles in the presence of a representative of the Contract Administrator to verify subsurface ground conditions prior to casting of the piles. Failure to do so will require exploratory holes in the vicinity of the piles, for which all costs shall be borne by the Contractor.

(b) Pile reinforcing steel and other appurtenances shall be inspected by the Contract Administrator prior to casting of concrete.

E24.3.3 Fabrication and Installation of Canopy Structure

(a) Steel components of the canopy structure are to be fabricated in a shop environment. The canopy is to be delivered to site painted and ready for installation of wood purlins and wood insets.

(b) Concrete cast-in-place piles should be allowed to gain 70% strength prior to installation of the canopy structure.

(c) Minimize field handling of the canopy structure to the greatest extent possible to avoid damage of the architectural coating system. Touch ups shall be made by the Contractor prior to installation of any wood details.

E24.4 Measurement and Payment

E24.4.1 The shade canopy structures will be measured on a unit basis and paid for at the Contract Unit Price for "Shade Canopy". 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.

E25. ACCESS GATE

E25.1 Description

(a) This Specification shall cover the installation of access gates for the maintenance entrances to the Stormwater Retention Basin.

(b) The installation of each access gate includes the following:

(c) Supply and Installation of two new wood fence posts

(d) Supply and installation of concrete for bedding of fence posts.

(e) Supply, fabrication, and installation of all materials related to the gate.

E25.2 Construction Methods

E25.3 Install new access gates in the locations and to the dimensions shown on the Drawings.

E25.4 Ensure all utilities are clear before drilling for the installation of the metal and wood fence posts.

E25.5 Measurement and Payment

E25.5.1 The new Access Gates will be measured on a unit basis and paid for at the Contract Unit Price for "Access Gate". 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.

E26. PROTECTION OF EXISTING TREES

E26.1 Description

A select number of existing mature trees were not removed from the Parker SRB lands when the vegetation was removed. These select trees are to be protected during construction and incorporated into the final design. These trees are located along the west and east limits of the SRB lands and will be identified by the Contract Administrator during construction.

- E26.2 The Contractor shall take the following precautionary steps to prevent damage from construction activities:
- (a) All trees will have a 3 m radius protective zone calculated from the circumference at the base of the trunk which will remain free of digging, trenching, grade changes, stock piling of materials and soil compaction, unless otherwise agreed to by the City and Contract Administrator throughout the duration of the Contract. Protective fencing around these areas is required.
 - (b) Trees within and immediately adjacent to proposed construction and those identified to be at risk by the Contract Administrator are to be strapped with 25 x 100 x 2400 mm wood planks, or suitably protected as approved by the Contract Administrator. Do not use nails or other fasteners that penetrate the tree trunk. The width and length of strapping may be reduced to suit the tree being protected as approved by the Contract Administrator.
 - (c) Excavation shall be performed in a manner that minimizes damage to the existing root systems. Where possible, excavation shall be carried out such that the edge of the excavation shall be a minimum of 1.5 times the diameter (measured in inches) where 1 inch diameter equals 1 foot measured from the outside edge of the trunk of the tree at 6 inches above grade. Where roots must be cut to facilitate excavation, they shall be pruned neatly at the face of excavation. They must be properly trimmed with sharp tools to prevent crushing or being pulled by construction equipment. No paint is required. All exposed roots must be mulched until the excavated area is filled with clean earth to avoid exposure to sunlight and desiccation.
 - (d) Operation of equipment within the dripline of the trees shall be kept to the minimum required to perform the Work required. Equipment shall not be parked, repaired, refuelled; construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines of trees. The dripline of a tree shall be considered to be the ground surface directly beneath the tips of its outermost branches. The Contractor shall ensure that the operations do not cause flooding or sediment deposition on areas where trees are located.
 - (e) Work on-Site shall be carried out in such a manner so as to minimize damage to existing tree branches. Where damage to branches does occur, they shall be neatly pruned.
 - (f) Repair, replace and maintain tree protection materials during construction until the Project completion.
 - (g) Carefully remove safety fencing and strapping material without harming the tree as soon as the construction and restoration Work is complete.

E26.3 All damage to existing trees caused by the Contractor's activities shall be repaired to the requirements and satisfaction of the Contract Administrator and the City Forester or his designate.

E26.4 The work described above for Protection of Existing Trees will be considered Incidental to Site Development and Restoration.

E27. 6 MM DOWN SURFACE COURSE FOR GRANULAR PATHWAY

E27.1 Description

E27.1.1 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work as shown on the Drawings and as hereinafter specified, including, but not necessarily confined to the following:

- (a) Supply and Installation of 6 mm granular surface course materials for pathways as indicated on the Drawings;

E27.2 Materials

E27.2.1 All materials supplied under this Specification shall be of a type approved by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.

E27.2.2 Compacted Granular Surface Course for Crushed Limestone Pathway

- (a) Granular surface course material for the pathway shall consist of 25.4 mm of crusher fines/ toppings crushed limestone.

E27.3 Construction Methods

E27.3.1 Construction method shall conform to Specification CW 3110 "Sub-Grade, Sub-Base and Base Course Construction".

E27.3.2 Contractor shall visit the Site and verify all data and dimensions and report any errors, omissions or discrepancies to the Contract Administrator prior to any installation.

E27.3.3 Contractor to layout pathways. Contractor shall be responsible for interpretation of grades and protection of stakes. Layout to be approved by Contract Administrator prior to construction.

E27.3.4 Granular Surface Course

- (a) Place granular surface course material to the lines and grades as shown on Drawings;
- (b) Compact material to a minimum of 95% Standard Proctor Density.

E27.4 Measurement and Payment

E27.4.1 Crushed Granular surface course shall be measured on a volume basis at the contract unit price for "6 mm Down Surface Course". The total unit to be paid for shall be the total number of cubic meter installed in accordance with this Specification and the Construction Drawings, and as acceptable to the Contract Administrator.

E28. GABION RETAINING WALL AND FIELD STONE RIP RAP

E28.1 Description

E28.1.1 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work as shown on the Drawings and as hereinafter specified including, but not necessarily confined to the following:

- (a) Supply and Installation of gabion baskets.
- (b) Supply and Installation of fieldstone rip-rap.

E28.2 Materials and Construction Methods

E28.2.1 Gabion Baskets

New 1 m x 0.5 m x 0.5 m rock filled gabions are to be provided along one side of the mown path as shown in plan on drawing on the Landscape Drawings (L300-L304).

E28.2.2 Fieldstone Rip Rap

Clean Riprap ranging in size from 300mm to 450 mm as shown on the Landscape Drawings.

E28.3 Measurement and Payment

E28.3.1 Gabion Baskets

The supply and installation of the Gabion Baskets shall be measured on a lineal meter basis at the contract unit price for "Gabion Retaining Wall". The price shall be payment in full for supplying all labour, equipment and materials, and performing all operations herein described, as listed on the Construction Drawings and all other items incidental to the Work included in this Specification and acceptable to the Contract Administrator.

E28.3.2 Fieldstone Rip Rap

- (a) The supply and placement of Fieldstone riprap shall be measured on a weight basis and paid for at the Contract Unit Price for "Fieldstone 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.
- (b) 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.

E29. SITE FURNITURE

E29.1 General

E29.1.1 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work as shown on the Drawings and as hereinafter specified, including, but not necessarily confined to the following:

- (a) Delivery and Installation of Benches;
- (b) Delivery and Installation of Waste Receptacles;

E29.2 Materials

E29.2.1 All materials supplied under this Specification shall be of a type approved by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.

E29.2.2 Backed Bench shall be supplied by the City of Winnipeg FOB Central manufacturing facility at no cost to the Contractor. Bench shall be Tache Style Backed Bench Composite with Arms, as per SCD-121A, Product #52501085, Black Powder Coated, or substitute approved in accordance with B7.

E29.2.3 Waste Receptacle shall be supplied by the City of Winnipeg FOB Central manufacturing facility at no cost to the Contractor. Waste Receptacle shall be Metal Slat Type, Black Finish, as per SCD-119, Product #52501063BLK(metal slat WR) and Product #52501058 (Wire Basket), or substitute approved in accordance with B7.

E29.2.4 Contact for Benches and Waste Receptacles:
Aaron Lennon @ 204-986-5505
Supervisor of Central Repair/Manufacturing Facility
City of Winnipeg
Fleet Management Agency Division
Public Works Department
215 Tecumseh St
Winnipeg, MB R3E 3S4
Email: ALennon@winnipeg.ca

E29.3 Construction Methods

E29.3.1 Contractor shall obtain Benches and Waste Receptacle from the City and deliver to the jobsite.

- E29.3.2 Install as per manufacturer's instructions, City of Winnipeg Details and the attached drawings.
- E29.3.3 Waste Receptacles - Contractor to secure wire basket to metal slat enclosure with chain and lock until Total Performance review when the City shall provide its own lock and chain for each waste receptacle.
- E29.3.4 All Work is to be located and installed in accordance with the drawings using approved non-rusting, vandal resistant fasteners to ensure solid, durable, finished Work suitable for the purpose intended. Fasteners and assembly hardware shall be incidental to the Work.
- E29.3.5 All furnishings and fixtures to be installed plumb and true to correct elevations and location, as directed the Contract Administrator. The Contractor shall confirm proposed locations of all Site furnishings with Contract Administrator prior to installation.
- E29.3.6 All powder coating finishes shall meet or exceed ASTM standards for hardness, adhesion, impact and salt spray resistance.
- E29.3.7 Smooth all cut edge and weld joints prior to hot dip galvanizing and ensure that all tubing is free from burrs, cracks, defects and other imperfections
- E29.3.8 All furnishings and fixtures to be carefully handled so that no parts will be bent, broken or otherwise damaged. Hammering, which will injure or distort fixture, is prohibited.
- E29.4 Measurement and Payment
- E29.4.1 All Site Furniture will be measured on a per unit basis. The total unit to be paid for shall be the total number of units that are installed in accordance with this Specification and the Construction Drawings, and as acceptable to the Contract Administrator.
- E29.4.2 All Site Furniture will be paid for at the Contract Unit Prices for "Items of Work." Said prices shall be payment in full for performing all operations herein described and as shown on the Drawings and Details and all other items incidental to the Work included in this Specification.
- (a) Items of Work: Site Furniture
 - (b) Tache Backed Bench
 - (c) Waste Receptacle

E30. TREE PLANTING

- E30.1 General
- E30.1.1 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work as shown on the Drawings and as hereinafter specified, including, but not necessarily confined to the following:
- (a) Supply and installation of topsoil, mulch and trees at locations indicated on the Drawings as well as the area within the extension of Rockman Street R.O.W. from Heatherdale Avenue north to the future SWRT corridor.
- E30.1.2 Reference
- (a) Install trees in accordance with the Canadian Standards for Nursery Stock Current Edition, published by the Canadian Nursery Trades Association, except where specified otherwise.
- E30.1.3 Source Quality Control
- (a) All plant material shall be randomly inspected at the source upon request of the Contract Administrator.

- (b) Trees are to be grown in nurseries under proper cultural practices as recommended by the Canadian Nursery Trades Association.
- (c) Only those trees that have been grown for at least the four (4) previous years in local Manitoba nurseries located in an Agriculture Canada Plant Hardiness Zone designation of 2(a or b) or 3(a or b) and within a 250 kilometre radius of Winnipeg, will be accepted. Trees that have grown in plant hardiness zones 1 and 4 or greater will be rejected.

E30.1.4 Maintenance

- (a) The Contractor shall be responsible for the maintenance of the trees for a period of two (2) years from the date of Total Performance. Any areas planted after September 15th, the maintenance period will commence on May 15th of the following year or such date as mutually agreed upon by all parties.
- (b) Water to ensure soil moisture conditions for optimum growth and health of plant material. Ensure watering techniques do not cause erosion.
- (c) Reform damaged watering saucers.
- (d) Remove weeds bi-monthly.
- (e) Replace or re-spread damaged, missing or disturbed mulch.
- (f) For non-mulched areas, cultivate monthly to keep top layer of soil friable.
- (g) If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Contract Administrator prior to application.
- (h) Apply fertilizer as directed by manufacturer's Specifications.
- (i) Remove dead, broken or hazardous branches from plant material.
- (j) Keep trunk protection and tree supports in proper repair and adjustment.
- (k) Remove trunk protection, tree supports and level watering saucers at end of warranty period.
- (l) Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.
- (m) Submit monthly written reports to Contract Administrator identifying:
 - (i) Maintenance work carried out.
 - (ii) Development and condition of plant material.
 - (iii) Preventative or corrective measures required which are outside Contractor's responsibility.

E30.1.5 Warranty

- (a) The Contractor shall, at his/her expense, warrant the Work against any and all defects or deficiencies resulting from insect infestation, disease and mechanical damage due to improper handling, installation or maintenance, for a period of two (2) years from the date of the Total Performance. Nursery stock damaged by vandalism or reasons beyond the control of the Contractor shall be replaced by the client.
- (b) End-of-Warranty inspection will be conducted by the Contract Administrator.
- (c) The Contract Administrator reserves the right to request material replacement or extend the Contractor's Maintenance responsibilities for an additional one (1) year if, at the end of the Warranty Period, leaf development and growth are not sufficient to ensure future survival of the plant material.

E30.1.6 Replacements

- (a) During the Maintenance Period, the Contractor shall remove from Site any plant material that has died or failed to grow satisfactorily as determined by the Contract Administrator and replace as per Specifications within a maximum ten (10) day period from notification.

- (b) Defective plants shall be replaced within three (3) days of notification to the Contractor.
- (c) The Contractor shall extend Maintenance and Warranty on replacement tree for a period equal to the original Maintenance and Warranty Periods.
- (d) The Contractor shall continue such replacement, Maintenance and Warranty until tree is acceptable.

E30.2 Materials

E30.2.1 Planting Soil

- (a) Planting Soil shall consist of black top soil, a fertile friable natural loam containing by volume not less than 4% and no more than 25% of organic matter for clay loams, and not less than 2% and no more than 25% for sandy loams, with an acidity value ranging from pH 6.0 to 8.0 and capable of sustaining vigorous plant growth. Topsoil is to be free of any mixture of subsoil, clay lumps and free of stones and other extraneous matter. It is not to contain couch or crab grass rhizomes.

E30.2.2 Mulch

- (a) Enviro Mulch shall be Charcoal Black Colour, free of leaves, branches and other extraneous matter. The recommended mulch shall consist of chips not less than 15 mm not larger than 75 mm in size and not more than 20 mm thick.
- (b) Contact for Enviro Mulch:
St. Boniface Pallet Company
220 Panet Road
Winnipeg. MB R2J 0S3

Telephone No. (204) 233-0383
Facsimile No. (204) 233-6633
Email: info@stbpallet.com

E30.2.3 Miscellaneous Materials

- (a) Water shall be potable and free of minerals which may be detrimental to plant growth.
- (b) Stakes shall be metal T-Bar, steel, 40 x 40 x 5 x 2440 mm.
- (c) ArborTie flat woven polyester guying
- (d) Fertilizer shall be a slow release formulation of low nitrogen and high phosphorus e.g. 10-50-12. Apply quantities at rates stated by product manufacturer.
- (e) Root Ball Burlap shall be 150 g Hessian burlap, biodegradable.
- (f) Wire Baskets shall be horticultural accepted product designed to carry the weight and to contain a burlap-covered root ball. Minimum diameter basket size is to conform to the same minimum diameter of the tree root ball for the respective minimum tree caliper sizes.

E30.2.4 Plant Material

- (a) All nursery stock supplied shall be Canadian Prairie nursery grown, and of species and sizes indicated in the plant list on the drawings. Its quality shall be in accordance with the "Guide Specification for Nursery Stock of the Canadian Nursery Trades Association".
- (b) Any nursery stock dug from native stands, wood lots, orchards, or neglected nurseries and which have not received proper cultural maintenance as advocated by the Canadian Nursery Trades Association shall be designated as "collected plants". The use of "collected plants" will not be permitted unless specified below.
- (c) Nomenclature of specified nursery stock shall conform to the International Code of Nomenclature for Cultivated Plants and shall be in accordance with the approved

scientific names given in the latest edition of Standardized Plant Names. The names of varieties not named therein are generally in conformity with the names accepted in the nursery trade.

- (d) Plants larger than specified may be used if approved by the Contract Administrator. The use of such plants shall not increase the Contract price.
- (e) Plants shall be free of disease, insect infestation, rodent damage, or environmental stress.
- (f) Trees
 - (i) Trees are to be characteristically developed for their species and structurally sound, well branched, healthy and vigorous and densely foliated when in leaf. The tree is to have a healthy, well developed, fibrous root system which may be verified through a testing procedure that destructively samples one or more randomly selected root balls.
 - (ii) Trees are to have been root pruned regularly, but not later than one growing season prior to arrival on Site. The Contractor may be required to furnish documentation to the client on their root-pruning program. Trees in excess of 75 mm caliper are to have been half root pruned during each of two successive growing seasons, the latter at least, one growing season prior to arrival on Site.
 - (iii) All parts of the trees, especially the lower branches, are to be moist and show live, green cambium tissue when cut.
 - (iv) Trees are to have only one, sturdy, reasonably straight and vertical trunk, and a well-balanced crown with fully developed leader.
 - (v) Trees are to be free of disease, insect infestation, rodent damage, sun scald, frost cracks, abrasions, unhealed scars, scars exceeding five (5) cm in diameter, major forks or crooks in the trunk, broken branches, or angled leaders. Trees having the above defects will not be accepted by the Contract Administrator.
 - (vi) Trees having a leader which has developed at a sharp angle to the trunk as a result of pruning or trunk damage will not be accepted.
 - (vii) Trees exhibiting suppressed, weakly developed branches due to competition from other closely spaced trees in the nursery will not be accepted. Trees exhibiting dead branches will not be accepted.
 - (viii) Any tree that has come out of dormant stage and is too far advanced will not be accepted unless prior approval obtained. Approval is required for any tree which has been held in cold storage.
 - (ix) Balled and burlapped trees in excess of a three (3) m height must have been dug with large firm ball. Roots in root balls must be comprised of 75% fibrous and feeder root systems. Secure root balls with burlap, heavy twine and rope. For trees 75 mm or more in caliper, wrap ball in double layer of burlap and drum lace with minimum 10 mm diameter rope. Protect root balls against sudden changes in temperature and exposure to heavy rainfall.
 - (x) Tree spade dug trees are to be dug with mechanized digging equipment with hydraulic spade. Lift root ball from hole, place in wire basket designed for purpose and lined with burlap. Tie basket to ball with heavy rope. Take care not to injure trunk of tree with wire basket ties or rope.
 - (xi) Use of collected or native trees is not permitted.

E30.2.5 Tree Quantity and Size

- (a) Trees are to be planted at the quantities and caliper listed on the Plant Lists which are shown on the drawings. Any variation from the specified quantity is to be clearly identified on the Schedule of Prices. Any variations to species, size or caliper of specified trees will require a request for approval from the Contract Administrator.
- (b) Any changes in planting locations will be determined on-Site by the Contract Administrator.

- (c) The Contractor shall supply trees as indicated in the Schedule of Prices and Plant Lists.
- (d) Trees are to conform to the measurements specified in the on drawing Plant Lists, except that trees larger than specified may be used if approved by the Contract Administrator.
- (e) Trees are to be measured when the branches are in their normal position. Height dimensions specified are to refer to the main body of the tree and not from branch tip to root base. Where trees have been measured by caliper or diameter, reference is to be made to the diameter of the trunk measured 15 cm above the ground as the tree stands in the nursery prior to lifting. Caliper of tree shall be appropriately designed on a permanently fixed tag on one of the branches.

E30.2.6 Shipment and Pre-Planting Care

- (a) Coordinate shipping of trees and excavation of holes to ensure minimum time lapse between digging and planting.
- (b) Tie branches of trees securely, and protect trees against abrasion, exposure and extreme temperature change during transit. Avoid binding of trees with rope or wire which would damage bark, break branches or destroy natural shape of tree. Give full support to root ball of trees during lifting.
- (c) Cover tree foliage with tarpaulin, and protect bare roots by means of dampened straw, peat moss, saw dust or other acceptable material to prevent loss of moisture during transit and storage.
- (d) Remove broken and damaged roots with sharp pruning shears. Make clean cuts, and cover cuts over 10 mm diameter with a tree wound dressing.
- (e) Keep roots moist and protected from sun and wind. Heel-in trees which cannot be planted immediately in shaded areas and water well.

E30.3 Construction Methods

E30.3.1 Workmanship

- (a) All areas and locations provided for planting shall be staked out or painted on Site by the Contractor according to layout shown on the Drawings. Excavation shall not proceed until the layout has been inspected and approved by the Contract Administrator. Excavation shall not be undertaken until all underground utilities have been located and protected.
- (b) Coordinate operations. Keep Site clean and planting holes drained. Immediately remove soil or debris spilled onto street pavement, grass or sidewalk.

E30.3.2 Planting Time

- (a) Plant deciduous trees during dormant period before buds have broken. Trees noted for spring planting only, must be planted in dormant period.
- (b) Plant only under conditions that are conducive to health and physical conditions of trees.
- (c) Provide planting schedule to Contract Administrator. Extending planting operations over long period using limited crew will not be accepted.
- (d) The Contractor must obtain all above and below ground clearances from all the utilities as well as the appropriate District Operations Branch in a timely manner so as not to jeopardize the schedule of the complete tree planting Contract.

E30.3.3 Excavation

- (a) Tree Pit to be dug with back hoe.
- (b) Excavate tree pits as indicated by stakes or paint marks.
- (c) Protect bottom of excavations against freezing.

- (d) Remove water which enters excavations prior to planting. Ensure source of water is not ground water and notify Contract Administrator.
- (e) Tree pit depth shall be such that the top of the root ball is even with the existing grade, and the root flare to be at or slightly above the finished grade.
- (f) Upon excavation of the planting bed, the excavation shall be backfilled with a topsoil mixture to a depth to permit adequate installation and stabilization of the plant material. Topsoil shall be placed in accordance with City of Winnipeg Standard Construction Specification CW 3540 to a 300 mm depth

E30.3.4 Installation

- (a) Planting shall be done during periods of suitable weather conditions and in accordance with locally accepted practice.
- (b) Trees are to be planted within forty eight (48) hours of excavation from the nursery.
- (c) No tree pit is to be left open at the end of the Contractor's Work Day. Planting program is to be planned to ensure that all approved trees delivered to the Site at designated planting locations are installed and thoroughly watered the same day as delivery.
- (d) With balled and burlapped root balls and root balls in wire baskets, burlap shall be loosened and cut away from the top 1/3 without disturbing root ball. Wire shall be cut away and removed from the top 1/3 of the root ball. Burlap or rope shall not be pulled from under root ball. Non-biodegradable wrapping shall be removed.
- (e) After inserting the tree and tamping the root system with topsoil in layer of 150mm, water shall be poured in until the pit is thoroughly soaked. Filling of the hole shall then be completed and the fill-in soil shall be packed firmly around the roots, leaving a concave surface for convenient watering. After filling, the planting shall be watered at frequent intervals.
- (f) Each tree is to have an earth saucer at its base having a diameter as large as the excavation with a 10 cm lip formed at the perimeter of the saucer to retain water.
- (g) All nursery stock shall be set plumb in the centre of pits and at levels as shown on the planting details after settlement has taken place.
- (h) Each tree must be planted such that the trunk flare is visible at the top of the root ball. Trees where the trunk flare is not visible shall be considered a deficiency and payment for the planting will not be received until the deficiency is addressed. Do not cover the top of the root ball with soil.
- (i) Nursery stock shall be faced to give the best appearance or relationship to adjacent structure and to the approval of the City of Winnipeg representative. Trees shall be placed equal to depth they were originally growing in nursery.

E30.3.5 Supply and Installation of Mulch

- (a) Contractor to supply and install mulch in tree pit, planters and in areas as indicated in the Drawings.
- (b) Mulch supplied shall cover entire planting area to a consistent depth of 50 mm – 100 mm and must not be placed within eight (8) cm (3in.) of the trunks of trees.
- (c) Mulch to be removed and disposed of when native seeding occurs.

E30.3.6 Fertilizing

- (a) When planting is completed, give surface of planting saucer dressing of fertilizer meeting the requirements of Specification. Mix fertilizer thoroughly with top layer of planting soil and water in well.

E30.3.7 Trunk Protection

- (a) Install trunk protection on trees as indicated.
- (b) Install trunk protection prior to installation of tree supports when used.

E30.3.8 Pruning

- (a) The Contractor shall provide a licensed Manitoba Certified Arborist for each work crew or work site.
- (b) Employ clean sharp tools and make cuts flush with branch collars. Remove dead and injured branches.

E30.3.9 Watering

- (a) Trees are to be watered during the planting procedure as described previously, and once a week thereafter, or more frequently if required, during the growing season.
- (b) A complete record is to be kept of each series of waterings for all planted trees noting: (1) location, and (2) date of watering. This record shall be sent bi-weekly to the Contract Administrator
- (c) Apply 40 litres of water per 25 mm caliper per application using deep root feeder or low/pressure nozzle and hose. The water stream must not gouge out a hole in the soil and mulch.

E30.4 Measurement and Payment

E30.4.1 Installation of trees shall be measured on a per unit basis. The amount to be paid for shall be the total number of trees supplied and installed in accordance with this Specification and the Construction Drawings, and as acceptable to the Contract Administrator.

E30.4.2 Payment for Installation of trees shall be paid for at the Contract Unit Prices for the "Items of Work" listed below. This price shall be payment in full for supplying all labour, equipment and materials, and performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E30.4.3 Items of Work:

- (a) Deciduous Trees
- (b) Two year Plant Maintenance

E31. WETLAND VEGETATION

E31.1 General

E31.1.1 The work to be done by the Contractor under this Specification shall include the supply, installation, labour, equipment, tools and all other things necessary for and incidental to the satisfactory performance and completion of all work shown in the drawings and as hereinafter specified, including, but not necessarily confined to the following;

- (a) Harvesting plant material from propagule donor sites
- (b) Site preparation and trench excavation
- (c) Installation of wetland vegetation
- (d) Establishment of wetland vegetation
- (e) Seeding
- (f) Weed control
- (g) Erosion control
- (h) Wildlife deterrence

E31.1.2 The Contractor shall ensure coordination with other Site works including upland native grass plantings.

E31.1.3 Submittals

- (a) Detailed work schedule
- (b) Seed analysis reports for proposed seed lots

- (c) Weed control plan
- (d) Herbicide applicator's license
- (e) Erosion control monitoring reports (monthly)
- (f) Report on plant material condition (monthly during wetland vegetation establishment period)

E31.2 Materials

E31.2.1 Wetland Plant Material

- (a) Revegetation shall be bulk propagules sourced from approved donor sites.
- (b) Seed shall be provided by the Contract Administrator.

E31.2.2 Growth Media

- (a) 'B' horizon growth media salvaged from Site.

E31.2.3 Erosion Control

- (a) As shown on drawings.

E31.2.4 Goose Deterrence

- (a) Goose deterrence shall be 13 mm diameter Rebar posts 1800 mm long, 6 m O.C., Stucco Wire Panel, 1.2 m high, includes baling wire knitted through top of panel, or approved equal to be approved at the discretion of the Contract Administrator.

E31.3 Construction Methods

E31.3.1 Wetland Bulk Propagule Material Excavation

- (a) List of bulk propagule donor sites;
 - (i) Site 1 - Idle land at Waverley Street and Perimeter Highway, SW quadrant.
 - (ii) Site 2 - Fermor Avenue, south side between Beavermill Boulevard and Lakewood Boulevard.
- (b) Each donor site should be identified using a colour or numeric code corresponding with a planting trench/location on-Site.
- (c) All permits and notifications for road-side work from Authorities having jurisdiction shall be provided by the contractor.
- (d) All underground utilities shall be located prior to excavation;
 - (i) The Contractor is responsible for repair of any damage to underground utilities that occur during the course of construction.
- (e) Contractor shall notify the Contract Administrator 48 hours prior to excavation to arrange an on-Site meeting at the donor site(s). No work shall be undertaken until approval has been provided by the Contract Administrator.
- (f) Bulk propagules shall be excavated and installed in frozen conditions unless stipulated otherwise at the discretion of the Contract Administrator.
- (g) A minimum of 80% of excavated bulk propagules shall be in blocks/wads no less than 300 mm in diameter. Excavated propagule shall be in blocks/wads no greater than 1250 mm in diameter.
 - (i) Propagules to be excavated to a depth of 300 mm.
- (h) Due care must be taken to minimize disturbance of adjacent vegetation.
- (i) All reasonable measures shall be taken by The Contractor to protect bulk propagules from exposure to extreme freezing temperatures or root desiccation during excavation, transportation and storage;
 - (i) The timing of bulk propagule excavation, hauling and storage shall be undertaken at the discretion of the Contract Administrator.

- (j) Bulk propagules shall be installed in trenches immediately upon arrival at the project Site.
- (k) Bulk Propagules not installed immediately shall be stored in a 'bunker' to shelter them from wind and extreme cold temperatures. An appropriate 'bunker' site shall be approved by the Contract Administrator before propagules are brought to Site;
 - (i) If excavated propagules are stored in a 'bunker' for more than 72 hours, the top layer(s) shall be discarded. The amount of excavated propagule to discard shall be at the discretion of the Contract Administrator.
- (l) Restoration of Donor Sites;
 - (i) Restoration to include all access routes and areas disturbed by excavation.
 - (ii) Excavated areas shall be backfilled with uncompacted clean clay fill.
 - (iii) Contractor to restore ditches to pre-excavation condition along length of ditch within the extent of the construction zone, to the satisfaction of the Contract Administrator.
 - (iv) Regraded ditch side slope not to exceed 3:1 slope, on roadside ditching side slopes not to exceed 4:1 slope.
 - (v) All excavated areas to be tapered to a maximum slope of 3:1 to avoid steep vertical drop-offs.
 - (vi) Project warranty period applies to restoration of donor sites.

E31.3.2 Wetland Planting Trench Construction

- (a) Contractor to notify the Contract Administrator in writing, of any conditions encountered on-Site which may adversely affect wetland vegetation performance.
- (b) Wetland planting trenches are of two types;
 - (i) Continuous shoreline trench: a continuous 'V'-cut planting trench centered at the Normal Water Line contour as indicated in the drawings.
 - (ii) Emergent trenches: intermittent 'V'-cut trench below normal water level as indicated in the drawings.
- (c) Wetland planting trench locations shall be staked by the Contractor for approval by the Contract Administrator prior to wetland plant material excavation;
 - (i) Marking stakes shall be a minimum of 1.2 m height. The Contractor is responsible for maintaining stakes for the duration of construction.
 - (ii) Planting trench locations should be staked and colour/numerically coded to correspond with donor sites as directed by the Contract Administrator.
- (d) Wetland planting trenches shall be lined with 'B' horizon growth medium (salvaged from Site from locations approved by the Contract Administrator; and stockpiled within the Parker Lands at locations approved by the Contract Administrator). prior to placement of bulk propagules, as indicated in the drawings.
- (e) 'B' horizon growth media placement shall be undertaken at a time when hauling and placement equipment can be operated without rutting side slopes and the wetland planting area.

E31.3.3 Wetland Bulk Propagule Planting

- (a) Bulk propagule planting shall occur while propagules are in a dormant state.
- (b) Incoming bulk propagules shall be installed into corresponding colour/ numerically coded trenches.
- (c) Trenches must remain free of snow and any other debris that would interfere with bulk propagule planting (including significant siltation) until planting occurs.
- (d) 70% of bulk propagules are to be installed root-side-down in planting trenches.
- (e) Press bulk propagules into place, to minimize void spaces between propagule roots and the surrounding soil, to the satisfaction of the Contract Administrator.

E31.3.4 Erosion Control

- (a) Contractor shall inspect all planted areas regularly and evaluate potential erosion risks.
- (b) Measures required to prevent, mitigate or repair erosion, shall be prescribed by the Contract Administrator.

E31.3.5 Wildlife Deterrence

- (a) Goose deterrent fencing shall be installed after planting and as soon as soil conditions allow. Fencing will be need to be re-moved and re-installed seasonally.
- (b) Goose nests shall have their eggs addled, immediately upon discovery. A permit will be required to undertake this work.

E31.3.6 Water Manipulation

- (a) Wetland plant establishment shall be facilitated through appropriately timed water level manipulation (flood-up and draw down).
- (b) Wetland water levels to be manipulated through control outlet structure with a minimum of 450 mm water draw down capability.
- (c) The Contractor is responsible for manipulating water levels in accordance with directions from the Contract Administrator.
- (d) Water levels to be monitored and manipulated by the Contractor after rainfall, as needed, to ensure desired levels as indicated by the Contract Administrator.

E31.3.7 Weed Control

- (a) Herbicide is to be applied in accordance with the manufacturer's instructions and the Manitoba Agriculture Guide to Crop Protection and Herbicide Recommendations for Landscape Applicators, latest editions.
- (b) Properly timed and executed weed control measures shall be undertaken by the Contractor to control and eliminate noxious weeds including, but not limited to, Canada thistle (*Cirsium arvense*), Dandelion (*Taraxacum officinale*), Purple loosestrife (*Lythrum salicaria*), Reed-canary grass (*Phalaris arundinacea*) and Smooth brome (*Bromus inermis*);
 - (i) Noxious weeds are not permitted to establish on the wetland areas or on soil stockpiles.
 - (ii) Anticipated weed control measures shall be detailed in the Contract Administrator approved Weed Control Plan. Any deviation from the Weed Control Plan shall be proposed to, and approved by the Contract Administrator with sufficient lead time to ensure weed control treatment efficacy is not impacted.

E31.3.8 Seeding

- (a) Broadcast seeding shall be at locations shown on drawing.

E31.3.9 Replacement of Wetland Plant Material

- (a) Replace wetland plant material which does not meet specified requirements during planting and establishment period.
- (b) Replacement wetland plant material shall be sourced and installed in accordance with the drawings and Specifications within one (1) year of notification of deficiency.

E31.4 Acceptance

E31.4.1 At least 80% of the continuous trench shall exhibit robust shoot emergence of wetland plant material by the end of the first full growing season

- (a) Any contiguous segment of the continuous trench greater than five (5) m in length that shows no signs of desirable growth at the end of the first full growing season shall receive remedial work, as directed and accepted by the Contract Administrator.

- (b) Remedial work will include replacement of wetland plant material, as described in E31.3.9, or re-enforcement seeding using appropriate wetland plant seed.
- (c) All remedial work to be approved by the Contract Administrator at the end of the second growing season.

E31.4.2 At least 75% of all emergent trenches must have produced no less than three separate healthy shoots originating from transplanted material by the end of the 1st full growing season.

E31.5 Measurement and Payment

E31.5.1 Supply, installation and establishment of wetland plant material will be measured on a linear metre basis. The area to be paid for shall be the total number of linear meters installed in accordance with this Specification and accepted by Contract Administrator.

E31.5.2 Quantities of units are based on the proposed design drawings as supplied by the Contract Administrator.

E31.5.3 Payment

- (a) The Wetland Material Planting will be paid for at the lump sum unit price for item "Wetland Planting" on Form B: Prices and measured as specified herein. The prices shall be payment of 60% for the work upon completion of plant installation and accepted by Contract Administrator.
- (b) The remaining 40% of the value of the contract shall be paid to The Contractor at the end of the second year growing season and as accepted by contract Administrator.

E32. NATIVE GRASS PLANTING

E32.1 General

E32.1.1 The work to be done by the Contractor under this Specification shall include the supply, installation, labour, equipment, tools and all other things necessary for and incidental to the satisfactory performance and completion of all work shown in the drawings and as hereinafter specified, including, but not necessarily confined to the following:

- (a) Site preparation (Growth Media Preparation)
- (b) Weed control
- (c) Erosion Control
- (d) Supply and install topsoil
- (e) Install seed (seed mixes materials and planting rate information will be supplied by Contract Administrator)
 - (i) Seed mixes will consist of pre-mixed, grass based native seed mixes with forb seed component. Three (3) mixes will be seeded;
 - ◆ Medium height mix (Mix A)
 - ◆ Tall height mix (Mix B)
 - ◆ Lower slope mix (Mix C)
- (f) Supply and install rooted specimens in Flower Patches

E32.1.2 The Contractor shall ensure coordination with other Site works including wetland vegetation planting.

E32.1.3 The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification. All materials shall be subject to inspection and testing by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for inspection and testing purposes.

E32.1.4 Submittals

- (a) Detailed work schedule

- (b) Integrated weed and erosion control plan
- (c) Native seeding establishment plan
- (d) Herbicide applicator's license
- (e) Monthly written report of plant material condition during establishment period
- (f) Soil analysis report from accredited soil testing lab. Testing parameters to be supplied by the Contract Administrator

E32.2 Equipment

E32.2.1 The Contractor shall use a Truax Seed Drill, or approved equivalent in accordance with B7, for activities related to this Specification.

E32.3 Materials

E32.3.1 Topsoil

- (a) Topsoil shall consist of 60% organic matter, 30% Topsoil (clay textured), and 10% sand. Soil shall be free of roots and stones over 30 mm in diameter or subsoil clay lumps over 30 mm in diameter.
- (b) Salinity ratings shall be less than 1.0 mmhos/cm. The pH range shall be between 6.5 and 7.5.
- (c) Topsoil shall be free of residual chemical properties originating from past herbicide applications or other forms of contamination which can potentially negatively affect the growth and successful establishment of planted material as specified.
- (d) Topsoil shall not contain the roots of Quack grass (*Agropyron repens*), Smooth Brome (*Bromus inermus*), Canada thistle (*Cirsium arvense*), Sweet clover (*Melilotus officinale*, *M. alba*), Dandelion (*Taraxascum officinale*) roots or other noxious weeds.

E32.3.2 Topsoil Testing

- (a) The Contractor shall inform the Contract Administrator of the proposed topsoil source. The Contract Administrator reserves the right to reject topsoil not conforming to the requirements of this Specification.
- (b) The Contractor will submit soil samples for review and approval by the Contract Administrator. Topsoil will be subject to tests for nitrate, phosphate, potassium, sulphate, pH, E.C. (salinity) and volume of organic matter by a testing laboratory designated by the Contract Administrator.

E32.3.3 Erosion Control

- (a) Common oats cover crop
- (b) Erosion control blanket shall be made of 100% coconut fibre with double photodegradable netting.

E32.3.4 Seed

- (a) Seed mixes will consist of pre-mixed, grass-based native seed mixes with a forb seed component.
- (b) Seed mixes will be developed on a pure live seed per m² basis.
- (c) The Contractor will order seed mixes supplied by The Contract Administrator, pick up and deliver them to the work site. The seed will be packaged in 25 kilogram labelled bags. The Contractor must supply all equipment and labour required to transport seed.
- (d) Storage for seed shall be in cool dry location. The Contractor shall provide secure, weather and rodent proof storage for the seed prior to planting.
- (e) Any seed lost or damaged while stored shall be replaced by The Contractor and will be considered incidental to the contract.

E32.3.5 Rooted Flower Specimens

- (a) Species and sizes indicated on plant list on the drawings. Quality shall be in accordance with the 'Guide Specification for Nursery Stock in Canadian Nursery Trades Association'.
- (b) All nursery stock supplied shall be locally grown and sourced.
- (c) The Contractor shall pick up, haul, store and install rooted plant material.

E32.4 Method of Construction

E32.4.1 Growth Media Preparation

E32.4.2 Subsoil

- (a) The subsoil shall be graded in accordance with Specifications, the Construction Drawings.
- (b) The subsoil grade on seeded areas shall be disked (fractured) to a minimum depth of 300 mm but not more than 450 mm, prior to topsoil placement to the satisfaction of the Contract Administrator.

E32.4.3 Topsoil

- (a) Prior to any work, the Contract Administration shall conduct on-site field. Topsoil shall be placed in a manner as to avoid compaction of disked subsoils.
- (b) Topsoil shall be incorporated evenly into disked subsoils to a maximum depth of 100 to 150 mm.
 - (i) The Contractor shall take care not to bury topsoil when incorporating into disked subsoils
- (c) Spring topsoil placement, incorporation and seedbed grooming/conditioning must be completed no later than June 8. Topsoil placement after June 8 shall be at the direction of the Contract Administrator.
- (d) The Contract Administrator shall review and approve all growth media preparation activities prior to seeding.

E32.4.4 Fine Grading

- (a) Topsoil and Finish Grading shall be as shown on the drawings.
- (b) The Contractor shall fine grade Topsoil, to eliminate rough spots, ruts or other similar low areas to ensure positive drainage and to facilitate consistent seed placement and seed rate during planting.
- (c) The incorporated Topsoil shall be rolled or harrow/packed in order to consolidate soil material and leave the surface smooth, firm and level to the satisfaction of the Contract Administrator.
- (d) All seeded areas are to be free of woody debris and rocks. The Contract Administrator shall advise the contractor of any debris clean-up requirements.

E32.4.5 Erosion Control

- (a) Cover crops shall be seeded for erosion control purposes during the pre-native planting preparation period. Cover crop shall be employed at all times prior to permanent cover planting to minimize the exposure of soils to erosion.
 - (i) Common oats to be seeded immediately after topsoil placement and seedbed preparation and no later than June 8.
- (b) Cover crop will be seeded at a rate of 40 lbs acre or at the direction of the Contract Administrator.
- (c) Erosion control crop planted in spring or summer, must be managed to prevent excessive built-up of plant stock (trash) which could interfere with proper native seeding depth and seed-soil-contact.

- (d) The Contractor shall evaluate all seeded areas for potential soil erosion risks during the life of The Project and take appropriate mitigation measures.
- (e) Rutting or damage caused during seeding operation shall be repaired at the Contractor's cost to the satisfaction of the Contract Administrator.
- (f) Any erosion control blanketing shall be biodegradable, shall be permeable to cover crop and native grass/forb seedlings and shall be approved at the discretion of the Contract Administrator (as per E10).

E32.4.6 Weed Control

- (a) Properly timed weed control shall be undertaken in the seeded areas to facilitate grass seedling establishment. Two (2) to three (3) herbicide applications per year will be undertaken during pre-plant Site preparation and during the post native grass planting maintenance and establishment periods.
- (b) Products, timing and rates will be supplied by a certified herbicide applicator with experience in weed control in native revegetation projects.
- (c) Weed control prescriptions shall be reviewed by the Contract Administrator prior to any weed control work.
- (d) Herbicide application shall be undertaken in accordance with GR 130.8.2.3.10 Environmental Protection Specifications.
- (e) Herbicide is to be applied in accordance with the manufacturer's instructions and the Manitoba Agriculture Guide to Crop Protection and Herbicide Recommendations for Landscape Applicators, latest editions.
- (f) Glyphosate cannot be used at any time following Native Seeding.
- (g) The Contractor shall not spray broad-leaf herbicide in areas seeded to native grass cover prior to native seedlings reaching the 2-3 leaf stage. Determination of 2-3 leaf stage shall be by the Contract Administrator. No herbicide application shall be undertaken without consent of the Contract Administrator.
- (h) Weed control techniques must eliminate spray drift to protect adjacent non-target plantings, flowers in flower patches, adjacent habitat and adjacent property.
- (i) The Contractor shall undertake all reasonable and permissible means of restricting seed-rain of invasive or otherwise problematic weed species from areas immediately adjacent to the Site for the duration of the Work.

E32.4.7 Weed Control in Flower Patches

- (a) Broadcast spraying shall not be permitted in planting patches.
- (b) Weeds may be removed manually or by limited spot-sprayed with herbicide in flower patches. Manual techniques need to be approved by the Contract Administrator.
- (c) Appropriate herbicides may be applied by hand or small sprayer.
- (d) Glyphosate shall not be used at any time in flower patches after grasses have been seeded unless otherwise directed by the Contract Administrator.

E32.4.8 Seeding

- (a) Prior to seeding permanent native grass cover, the seeding area shall be free of 1^o and 2^o noxious perennial grassy and broadleaf weeds listed in the Manitoba Noxious Weed Act C.C.S.M. c. N110.
- (a) Prior to seeding permanent native grass cover seeding areas shall be free of weedy perennial species that may not be listed as noxious weeds but which will become invasive within the planting over time, including but not limited to, Quackgrass, Smooth brome, Sweet clover and Dandelion.
- (b) Annual weeds including green and yellow foxtail (*Setaria* spp.), Barnyard grass (*Echinochloa crus galli*) if present to be controlled to within levels that will not compromise short term or long term native grass stand establishment. Post native

grass planting control of these species, and species with similar tendencies in native plantings, shall be at the direction of the Contract Administrator.

- (c) Seeding to be undertaken between May 20 and June 15 unless otherwise specified by The Contract Administrator.
- (d) Following seeding, The Contractor shall return to the Contract Administrator the shipment tags from each bag of seed planted on-Site.
- (e) Drill seeding shall be undertaken using a Truax, two or three box native seed drill with seed box agitators, on-row packers and depth bands, capable of uniformly applying the specified mixes to a depth of 5.0 - 12.0 mm (0.25" – 0.5").
- (f) A 1.8 – 2.4 m (6.0 – 8.0') three point hitch-mounted Truax native seed drill is preferred, or alternatively a low lbs/ft² configuration capable of delivering native seed at a consistently at the proper rate and depth as per seeding Specifications.
- (g) The Truax seed drill must be equipped with trash plows to prevent light debris from interfering with seed placement during native drill seeding.
- (h) The Contract Administrator shall supply all seeding rates for Native Seed Mixes and shall be provided on a bulk seeds per 1/10 square meter (approximately / ft²) basis.
- (i) Any supplementary broad-cast seeding shall be at the direction of The Contract Administrator. Broadcast seeding requires the same seedbed conditions outlined in Site preparation.
- (j) Broadcast seeding is preceded by one (1) or more harrow passes and is then followed by a second harrow pass once seed has been spread at a broadcast rate specified by The Contract Administrator.
- (k) An industrial fertilizer applicator may be used for broadcast seeding to facilitate consistency of seed flow. A manual broadcast seeder may be used for small areas requiring manual seeding.
- (l) Contour seeding must be employed to discourage down slope erosion on sloped areas.
- (m) While on-Site, seed requiring short-term storage shall be stored by the contractor and in communication with the contract administrator, in a secure, dry and rodent-free environment either at or below ambient outdoor temperatures.

E32.4.9 Planting Rooted Specimens in Flower Patches

- (a) Rooted specimens shall be planted in the first spring after seeding native grass/forb mixes have been seeded.
- (b) Specimens shall be planted prior to June 15 unless specified otherwise by the Contract Administrator
- (c) Planting density shall be approximately four (4) rooted specimens per square meter in each planting patch

E32.5 Acceptance

- (a) A minimum of 6 - 8 grass seedlings with permanent roots (4-leaf stage) have been documented per 0.1 square meter, by the end of the first growing season.

E32.6 Measurement and Payment

E32.6.1 Supply, placement and establishment of upland native grass will be measured on an area basis. The area to be paid for shall be the total number of square meters installed in accordance with this Specification and accepted by Contract Administrator.

E32.6.2 Quantities of units are based on the proposed design drawings as supplied by the Contract Administrator.

E32.6.3 Payment

- (a) Placement of seed, seed bed preparation and related Work specified herein will be measured on an Lump Sum basis and paid for at the Contract Unit Price for “Native Grass Planting” The payment shall be for all works and ancillary work in accordance with this Specification, accepted and measured by the Contract Administrator.
Payment schedule as follows:
- (i) Upon installation of Erosion crop as approved and accepted by the Contract Administrator: 40%
 - (ii) End of pre-plant weed control crop as approved and accepted by the Contract Administrator: 10%
 - (iii) End of first year native seeding crop as approved and accepted by the Contract Administrator: 40%
 - (iv) End of maintenance period as approved and accepted by the Contract Administrator: 10%

E33. INSTALLATION OF TURF PAVERS

E33.1 General

E33.2 Description

E33.2.1 This Specification shall cover the installation of turf pavers within the Site.

E33.3 References

E33.3.1 CAN3-A231.2, Precast Concrete Pavers

E33.4 Materials

- (a) Concrete turf pavers to be Turfstone Pavers by Barkman Concrete, or approved equivalent in accordance with B7 to match existing.
- (b) Sub-base and base course shall be in accordance with CW 3110.
- (c) Non-woven separation geotextile fabric
- (d) Grass Seed Mixture shall be in accordance with CW 3520

E33.5 Construction Methods

- (a) Subgrade preparation shall be in accordance with CW 3110.
- (b) Install Turfstone Pavers as shown on the Drawings and in accordance with CW 3330. The Contractor shall ensure the manufacturer’s installation instructions are consistent with this Specification.
- (c) Fill paver voids with seeded topsoil, sod plugs, or a mixture of both to approximately 25 mm below the top of the paver surface. The sod or topsoil mix must be fertilized and kept moist during root establishment (minimum of 3 weeks).

E33.6 Measurement and Payment

E33.6.1 Supply, placement and maintenance of the Turfstone Paver Installation will be measured on an area basis and will be paid for under the item “Supply and Installation of Turf Pavers”. The area to be paid for shall be the total number of square metres placed and maintained in accordance with this Specification and accepted by the Contract Administrator. No payment will be made for Turfstone Pavers placed outside of the limits of placement as directed by the Contract Administrator.

E34. FILLING OF STORMWATER RETENTION BASIN WITH WATER

E34.1 General

E34.2 Description

- E34.2.1 This Specification shall cover the initial filling of the stormwater retention basin with river water subsequent to completion of the SRB excavation, including the outfall, inlet and inlet control chambers. It is critical that the SRB be initially filled with water as soon as possible to mitigate short term slope instabilities, risks resulting from higher spring groundwater level, and to activate the wetland planting installed just below the normal water level..
- E34.2.2 This Specification shall also cover the re-filling of the stormwater retention basin with river water subsequent to annual drawdown of the SRB water level for the first two growing seasons after the SRB is completed.
- E34.2.3 The SRB will be filled with river water from the Red River.
- E34.3 Construction Methods
- E34.3.1 The work to be done by the Contractor under this Specification shall include the supply, installation, labour, equipment, tools and all other things necessary for and incidental to the satisfactory performance and completion of all work shown in the drawings and as hereinafter specified, including, but not necessarily confined to the following:
- E34.3.2 Initial filling of the SRB with river water
- E34.3.3 Lowering of SRB water level for vegetation establishment (~0.45 m)
- E34.3.4 Re-filling of the SRB with river water
- E34.4 The Contractor shall first ensure that all components of the SRB that will be affected by water when it is initially filled up are complete and ready for inundation with water. The Contract Administrator shall confirm when the Contractor will be allowed to start filling the SRB with water.
- E34.5 The Contractor, in cooperation with City crews, shall temporarily close the Byng gate chamber positive gate. The Contractor shall pump river water from the river (or from the downstream chamber of the Byng Outfall gate chamber, if river levels are high enough) into the upstream gate chamber and existing 1200 mm LDS pipe. The contractor shall allow this water to back up in the upstream LDS piping to the new inlet control chamber. Asbuilt drawing of the Byng gate chamber can be found in Appendix B.
- (a) A list of key elevations is provided below:
- (i) SRB Bottom Elevation – 225.00 m
 - (ii) Weir Elevation in SRB Inlet Control Structure/ SRB NWL – 227.00 m
 - (iii) 1200 mm LDS invert at downstream of SRB Inlet Control Structure – 224.95 m +/-
 - (iv) Gate Chamber Invert – EI 222.47 +/- m
- E34.6 The Contractor shall pump water from the river (below river ice if required) and into the upstream side of the Byng gate chamber. Note that the Contractor must comply with all requirements from Transport Canada including the Navigation Protection Act.
- E34.7 Once the existing LDS piping backs up to the new inlet control chamber the Contractor shall then pump water from the downstream side of the flow control weir over to the upstream side of the weir until the SRB is filled up to the NWL or the top of the weir.
- E34.8 A fish screen shall be affixed to the intake piping to protect against introduction of aquatic species into the SRB.
- E34.9 When the SRB is filled up to the NWL the Contractor shall remove all pumping equipment and slowly open the positive gate at the Byng gate chamber to release the water in the piping back into the river at the schedule defined below, or as directed by the Contract Administrator:
- (a) Open the 2550 mm positive gate to provide a 0.15m opening
 - (b) Once the water level in the downstream manhole is at 75% of the 1200 mm pipe height , open the 2550 mm positive gate to provide a 0.3 mm opening.

- (c) Once the water level in the downstream manhole is at 50% of the 1200 mm pipe height , completely open the 2550 mm positive gate.

E34.10 The Contractor shall lower the SRB water level to 450 mm below the NWL in the first two (2) summers to allow for enhanced establishment of vegetation along the shoreline of the SRB. Lowering of the SRB water level shall be done using the new inlet control chamber slide gate. Depending on the amount of precipitation following the first water level lowering of that season the Contractor may be required to utilize the slide gate multiple times to keep the water level at 450 mm below the NWL.

E34.11 the Contractor shall then raise the SRB water level back to the NWL as per methods described above (once per year for two years).

E34.12 Measurement and Payment

E34.13 Filling of Stormwater Retention Basin with Water will be measured and paid for at the Contract Lump Sum Price for "Filling of SRB with River Water", which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification.

- (a) 70% of the cost will be paid out for the initial fill of the SRB
- (b) 15% of the cost will be paid out for each of the two subsequent years where the water level is topped up to the weir elevation.

E35. INSTALTION OF GROUNDWATER MONITORING WELLS AND MONITORING

E35.1 General

E35.2 Description

E35.2.1 This Specification shall cover the installation of 125 mm monitoring wells and 25 mm diameter standpipe piezometers to monitor the groundwater levels within the bedrock and till strata at two locations within the Site. The monitoring wells will be initially installed under this specification for the purpose of monitoring but will be installed such that they may be used as depressurization pumping wells should the contractor require them for this purpose. As part of the installation of the monitoring wells, the Contractor must apply for a temporary authorization Groundwater Exploration Permit from the Province of Manitoba so the wells are ready to be used as pumping wells to depressurize the groundwater (if required),

E35.3 Background

E35.3.1 A hydrogeological investigation of the Site was undertaken by KGS Group as part of a joint geotechnical and environmental report. The report is available in Appendix A.

- (a) An existing standpipe piezometer (TH15-05) was installed previously at the east end of the SRB and is still active.

E35.4 The Contractor shall apply for a temporary authorization Groundwater Exploration Permit from the Province of Manitoba so the 125 mm diameter monitoring wells may be used for groundwater depressurization pumping wells (if required),

E35.5 Construction Methods

E35.6 Contract Administrator's geotechnical representatives to be contacted 2 weeks in advance of drilling so they may verify the location of the test holes and so they may arrange to be on site during drilling.

E35.7 The Contractor shall install two (2) 125 mm diameter monitoring wells installed in the bedrock and two (2) 25 mm diameter standpipe piezometers installed in the till. The monitoring well(s) and standpipe piezometers shall be installed outside of the SRB excavation footprint at the approximate location indicated on the Drawings and as described below:

- (a) One monitoring well (TH18-MW1) and one standpipe (TH18-S1) to be located within 3 meters of the proposed inlet control chamber shoring (or as close as possible);
- (b) One pumping well (TH18-MW2) and one standpipe (TH18-S2) to be located in the northeast corner of the SRB along the north property line, approximately in-line with west limit of the grouted riprap.

E35.8 25 mm diameter standpipe piezometer

- (a) Shall be drilled 0.9 m into the silt till.
- (b) 25 mm diameter schedule 40 PVC pipe with a 300 mm Casagrande piezometer tip shall be installed 100 mm above the base of the test hole.
- (c) A 600 mm silica sand pack shall be installed from the base of the test hole, completely covering the Casagrande piezometer till, and be saturated prior to the installation of the bentonite seal.
- (d) A 600 mm bentonite seal shall be placed above the sand pack.
- (e) The remainder of the test hole shall be backfilled with a low permeability backfill.

E35.9 125 mm diameter monitoring well

- (a) shall be drilled 6 m into the bedrock.
- (b) Well casing socketed into the bedrock a maximum of 0.5 m unless otherwise determined by the Contract Administrator.
- (c) Well casing annular space will be continuously grouted from the bedrock surface to the ground surface.
- (d) Well Development within the open hole bedrock portion of the well shall be developed by airlift surging as required to ensure a clean water source.

E35.10 New and existing monitoring wells and standpipe piezometers are to be protected by the Contractor for the duration of the Work.

E35.11 The Contractor shall monitor the groundwater level (GWL) at 125 mm diameter monitoring wells and the 25 mm standpipe piezometers to ensure that the potential for basal heave of the foundation excavations is within the acceptable factor of safety identified in the Parker SRB Geotechnical and Environmental Investigation report in Appendix A.

- (a) The Contractor is required to monitor the groundwater levels in all monitoring wells in accordance with the following monitoring schedule:
 - (i) One reading 1 week after installation (to occur prior to commencement of construction).
 - (ii) When excavation extends to the depth of the groundwater level observed in (i) - once every week.
 - (iii) When excavation is below the groundwater level observed in (i), and the calculated FOS to resist basal heave is above the threshold identified in the Geotechnical Report (i.e. Monitoring to ensure GWL are below threshold that requires depressurization); or if excavation is ongoing beyond the date listed in Critical Date 1 – minimum one reading per day.
 - (iv) If monitoring active depressurization to determine impact of pumping on GWL – minimum twice per day.

E35.12 Measurement and Payment

E35.13 The installation of the two monitoring wells, two standpipe piezometers, and ongoing monitoring during construction will be measured and paid for at the Contract Lump Sum Price for "Groundwater Instrumentation and Monitoring", which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification.

- (a) 80% of the price will be paid subsequent to the installation of the monitoring wells and standpipe piezometers;
- (b) The remaining 20% of the unit price will be paid subsequent to the completion of the Excavation works.

E36. DISPOSAL OF CONTAMINATED SOILS

E36.1 General

E36.1.1 Description

- (a) This specification shall cover the disposal of contaminated materials excavated from within the Site.

E36.1.2 Criteria for Classification of Contaminated Material

- (a) If excavated materials are found to have concentrations of contaminants that are above the acceptable CCME Industrial standards, as per soil testing requirements in E12, then this material must be disposed of at suitable treatment facility.

E36.1.3 Suitable Soil Treatment Facilities

- (a) Suitable soil treatment facilities include the Miller Environmental Treatment & Processing Facility (St. Jean Baptiste, Manitoba), the Mid-Canada Environmental Landfill (Ile des Chenes, Manitoba), or an approved equal as confirmed by the Contract Administrator in accordance with B7

E36.1.4 Contaminated materials are to be separated from other soils and hauled to a suitable treatment facility. If stockpiles are not removed in a timely manner then they must be covered with poly sheeting to mitigate erosion and transmission of contaminants into other areas of the Site.

E36.2 Measurement and Payment

E36.2.1 Disposal of Contaminated Materials will be measured on a volumetric basis and will be paid for under the item "Disposal of Contaminated Materials". The volume to be paid for shall be the total number of cubic metres transported from the Site and disposed of at a suitable landfill in accordance with this Specification and accepted by the Contract Administrator.

- (a) Costs for excavation of contaminated soils will be incidental to Common Excavation

E37. DEPRESSURIZATION FOR CONSTRUCTION OF STRUCTURES

E37.1 General

E37.1.1 Description

E37.1.2 This specification covers the provision for drawdown and depressurization of the bedrock groundwater pressures, if necessary, due to elevated groundwater levels (GWLs), to facilitate the construction of the Inlet Control Chamber and the Grouted Riprap that is embedded in the SRB bottom elevation (at the outfall outlet).

E37.1.3 Background/ Requirements

- (a) In 2015 a standpipe piezometer (TH15-05) was installed into the till at the east end of the SRB (see Drawings for exact location). The groundwater levels at this location were monitored over the past 2 years (see Geotechnical Report in Appendix A)
- (b) Additional groundwater data was monitored from pneumatic piezometers installed in the till as part of a separate project on the north side of the CN Rail line and extending to Taylor Avenue. This data is also provided within the Geotechnical Report in Appendix A)

- (c) Elevations defining the need for groundwater depressurization are listed within the Geotechnical Report.
- (d) The Contractor should be aware that the GWL varies seasonally.
- (e) The Work is scheduled to take place when the GWL is typically at a seasonal low (between October and the beginning of March).
- (f) The Contractor is responsible to evaluate data provided within the Geotechnical Report and determine what if any depressurization needs will be required to protect against basal heave of the foundation for the inlet structure and the grouted riprap during construction.
 - (i) Costs of any depressurization requirements (as described herein) from Commencement of Construction to Critical Date 1 shall be listed on Form B Prices for Depressurization Requirements.
 - (ii) If the Contractor fails to meet the Critical Date 1 for excavation and does not begin to fill the SRB with river water, there is an elevated risk that the GWLs may rise and reduce the FOS further. This risk is on the Contractor and any depressurization requirements beyond Critical Date 1 are the responsibility of the Contractor.

E37.2 Construction Methods

E37.3 The depressurization system shall control ground water levels and pressures and protect against excavation basal heave/blowout.

- (a) The depressurization system shall include at minimum use of the installed 125 mm diameter monitoring wells and all associated appurtenant equipment or an alternate approved design in accordance with B7 and as approved by the Contract Administrator.
- (b) Once required, the depressurization system shall operate continuously to achieve the required Factor of Safety for the work being undertaken.
- (c) The Contractor shall be responsible for any permits necessary for operation of their depressurization system.

E37.4 If determined that depressurization is required, the Contractor shall submit a Groundwater Management Plan designed and sealed by a Professional Engineer or Professional Geologist registered to practice in the Province of Manitoba for review by the Contract Administrator including:

- (a) An evaluation of static groundwater conditions and required drawdown elevations for successful completion of the foundation excavations.
- (b) Permissible groundwater levels (pressures) at various stages of excavation and backfill to prevent uplift of soil layers and to prevent any other disturbance to the in-situ foundation soils due to any excess groundwater pressures.
- (c) Confirmation of the elevation to which the excavation may proceed before the well system commences operation.
- (d) Confirmation of the extent to which SRB and inlet chamber construction and backfill must be completed before the depressurization well system can cease operation.
- (e) Number of wells, including location, size, pumps and installation details. Note that required pump flow rate for each well will vary from 10gpm to 75 gpm.
- (f) Schedule of monitoring, maintenance, manpower estimates, and for interpreting of ground water levels throughout the duration of the Work.

E37.5 Measurement and Payment

E37.5.1 Groundwater Depressurization (if required)

- (a) The groundwater depressurization requirements (if required) shall be paid at the lump sum unit price for "GWL Depressurization Requirements"

- (b) The price shall include setup of the depressurization system (if required), daily operation of the depressurization system(s) (as required), pumps, electrical supply and hook-up, outlet hoses, flowmeter to measure discharge, generator, fuel, permits, staffing, and any other appurtenances associated with the set-up of the depressurization system.
- (c) Depressurization installation will only be paid for where groundwater levels indicate that depressurization is required, in accordance with this specification, the geotechnical report and as approved by the Contract Administrator.

E38. PROVISIONAL ITEMS

- E38.1 The Provisional Items listed on Form B: Prices are part of the Contract.
- E38.2 The Contractor shall not perform Work included in the Provisional Items without prior authorization from the Contract Administrator. All Work included in the Provisional Items will be carried out within the construction areas shown on the Drawings.
- E38.3 Notwithstanding GC:7, the City reserves the right to diminish all or any portion of the items of work listed in the Provisional Items and no claim shall be made for damages on the grounds of loss of anticipated profit or for any other reason.

E39. ENVIRONMENTAL PROTECTION PLAN

- E39.1 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.
- E39.2 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
 - (i) Canadian Environmental Assessment Act (CEAA) c.37
 - (ii) Transportation of Dangerous Goods Act and Regulations c.34
 - (iii) The Fisheries Act
 - (iv) Navigable Waters Protection Act
 - (b) Provincial
 - (i) The Dangerous Goods Handling and Transportation Act D12
 - (ii) The Endangered Species Act E111
 - (iii) The Environment Act c.E125
 - (iv) The Fire Prevention Act F80
 - (v) The Manitoba Heritage Resources Act H39.1
 - (vi) The Manitoba Noxious Weeds Act N110
 - (vii) The Manitoba Nuisance Act N120
 - (viii) The Public Health Act c.P210
 - (ix) The Workplace Safety and Health Act W210
 - (x) And current applicable associated regulations.
 - (xi) (Note: Provincial regulations updated as of September 1999)
 - (c) Municipal
 - (i) The City of Winnipeg By-law No. 1/2008
 - (ii) And any other applicable Acts, Regulations, and By-Laws.
- E39.3 The Contractor is advised that the following environmental protection measures apply to the Work.

- (a) **Materials Handling and Storage**
- (i) Construction materials and debris shall be prevented from entering the Red River via the 1200 mm diameter land drainage system pipe on the downstream side of the proposed inlet chamber. In the event that materials and/or debris inadvertently enter the watercourse via the 1200 mm diameter land drainage pipe, the Contractor shall be required to remove the material and restore the watercourse to its original condition.
 - (ii) Construction materials and debris shall also be prevented from accumulating on local roadways and sidewalks when tracked out of the Site by trucks hauling excavated materials.
 - (iii) It is highly recommended that the Contractor provide on-Site measures to mitigate the tracking of sediment off-Site and therefore reduce the amount of street cleaning required. These measures may take the form of a truck wheel wash (automated or manually operated) or other measures as approved by the Contract Administrator.
- (b) **Fuel Handling and Storage**
- (i) 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.
 - (ii) 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.
 - (iii) 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.
 - (iv) The Contractor shall ensure that all fuel storage containers are inspected daily for leaks and spillage.
 - (v) Products transferred from the fuel storage area(s) to specific Work Sites shall not exceed the daily usage requirement.
 - (vi) 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.
 - (vii) Refuelling of mobile equipment and vehicles shall take place at least 100 metres from a watercourse or the upstream end of the 1200 mm pipe downstream of the proposed inlet chamber.
 - (viii) 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.
 - (ix) 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**
- (i) The construction area shall be kept clean and orderly at all times during and at completion of construction.
 - (ii) 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.
 - (iii) 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).
 - (iv) Indiscriminate dumping, littering, or abandonment shall not take place.
 - (v) No on-Site burning of waste is permitted.
 - (vi) Waste storage areas shall not be located so as to block natural drainage.
 - (vii) Run-off from a waste storage area shall not be allowed to cause siltation of a watercourse.

- (viii) 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.
- (ix) 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
 - (i) Dangerous goods/hazardous wastes are identified by, and shall be handled according to, The Dangerous Goods Handling and Transportation Act and Regulations.
 - (ii) The Contractor shall be familiar with The Dangerous Goods Handling and Transportation Act and Regulations.
 - (iii) 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.
 - (iv) Different waste streams shall not be mixed.
 - (v) Disposal of dangerous goods/hazardous wastes shall be at approved hazardous waste facilities.
 - (vi) Liquid hydrocarbons shall not be stored or disposed of in earthen pits on-Site.
 - (vii) 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.
 - (viii) Used oil filters shall be drained, placed in suitable storage containers, and buried or incinerated at approved hazardous waste treatment and disposal facilities.
 - (ix) Dangerous goods/hazardous waste storage areas shall be located at least 100 metres away from the high water line and be dyked.
 - (x) Dangerous goods/hazardous waste storage areas shall not be located so as to block natural drainage.
 - (xi) Run-off from a dangerous goods/hazardous waste storage area shall not be allowed to cause siltation of a watercourse.
 - (xii) 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
 - (i) The Contractor shall ensure that due care and caution is taken to prevent spills.
 - (ii) 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.
 - (iii) 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.
 - (iv) 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:
 - (i) 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)
 - (ii) Attend to public safety:
 - ◆ stop traffic, roadblock/cordon off the immediate danger area
 - ◆ eliminate ignition sources

- ◆ initiate evacuation procedures if necessary
- (iii) 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
- (iv) 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.
- (v) 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.
- (vi) 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.
- (vii) 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.
- (viii) City emergency response, 9-1-1, shall be used if other means are not available.
- (ix) 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

- (i) 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.
- (ii) 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.
- (iii) 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.
- (iv) Herbicides and pesticides shall not be used adjacent to any surface watercourses.
- (v) All landowners adjacent to the area of application of herbicides or pesticides shall be notified prior to the Work.
- (vi) Trees or shrubs shall not be felled into watercourses.

E39.4 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.

E39.5 Method of Measurement and Payment

E39.6 Adherence to the laws that govern the requirements for Environmental Protection is considered incidental to Contract