THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 841-2017

THE SEINE RIVERBANK STABILIZATION AT THE BRANCH 1 AQUEDUCT

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 THE SEINE RIVERBANK STABILIZATION AT THE BRANCH 1 AQUEDUCT

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, November 07, 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, two Site meetings will be held on October 24 and 26, 2017 at 10:00 am to review the Site Works. The meeting will be at the site located adjacent to the intersection of Rue Notre Dame and Rue Maisonneuve. Attendance is strongly recommended.

B3.2 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 D3.1.

B4.2 If the Bidder finds errors, discrepancies or omissions in the Bid Opportunity, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.

B4.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator to all Bidders by issuing an addendum.

B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator only to the Bidder who made the enquiry.

B4.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B4 unless that response or interpretation is provided by the Contract Administrator in writing.

B5. 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 B11 (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 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.

B18.3.1 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. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall generally consist of rockfill riprap placement, rockfill column shear key construction, re-vegetation, abandon outfall, road asphalt overlay, and related works.

D2.2 The major components of the Work are as follows:

(a) Site preparation, access development and general site clean-up;

(b) Supply and placement of rockfill riprap and temporary berm;

(c) Construction of rockfill column shear key along the riverbank;

(d) Re-vegetation and

(e) Abandon outfall and road asphalt overlay.

D3. CONTRACT ADMINISTRATOR

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

Bruno Pierre Arpin, P.Eng.
Geotechnical Engineer

Telephone No. 204 896-1209
Email Address barpin@kgsgroup.com

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

D3.3 Bid submissions must be submitted to the address in B8.8.

D4. CONTRACTOR'S SUPERVISOR

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

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

D5. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

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

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

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

(a) information provided to the Contractor by the City or acquired by the Contractor during the course of the Work;

(b) the Contract, all deliverables produced or developed; and

(c) any statement of fact or opinion regarding any aspect of the Contract.

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

D6. NOTICES

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

D6.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D6.3, D6.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the facsimile number identified in D3.1.

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

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

D6.4 Winnipeg MB R3B 1B9All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following facsimile number:

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

Facsimile No.: 204 947-9155

D6.5 Bids Submissions must not be submitted to the above facsimile numbers. Bids must be submitted in accordance with B8.

D7. FURNISHING OF DOCUMENTS

D7.1 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

D8. AUTHORITY TO CARRY ON BUSINESS

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

D9. SAFE WORK PLAN

D9.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D9.2 The Safe Work Plan 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

D10. INSURANCE

D10.1 The Contractor shall provide and maintain the following insurance coverage:

(a) Commercial general liability insurance, in the amount of at least two million dollars ($2,000,000.00) inclusive, with The City of Winnipeg added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, unlicensed motor vehicle liability, non-owned automobile liability, broad form property damage cover and products and completed operations, to remain in place at all times during the performance of the Work and throughout the warranty period;

(b) 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) An all risks property insurance policy to cover all machinery, equipment and tools that may be owned, rented, leased or borrowed to be used in conjunction with the scope of the work.

(e) Contractors Pollution Liability insurance in the amount of at least one million dollars ($1,000,000) per occurrence and one million dollars ($1,000,000) aggregate insuring against claims for :

(i) Bodily Injury

(ii) Property damage including diminution in value; and Natural Resource Damages

(iii) Clean-Up

(iv) Transported cargo and non-owned disposal sites

(v) Sudden and gradual pollution conditions including further disruption of pre-existing conditions from the services rendered by the Contractor

D10.2 Deductibles shall be borne by the Contractor.

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

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

D11. PERFORMANCE SECURITY

D11.1 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.

D11.1.1 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.

D11.2 If the bid security provided in his/her Bid was not a certified cheque or draft pursuant to B13.1(c), the Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D12. SUBCONTRACTOR LIST

D12.1 The Contractor shall provide the Contract Administrator with a complete list of the Subcontractors whom the Contractor proposes to engage (Form J: Subcontractor List) at 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.

SCHEDULE OF WORK

D13. EXPEDITED SUBMITTALS

D13.1 In order to expedite submittals with critical timeliness, the Lowest Responsive Bidder will be permitted, after receiving written approval from the Contract Administrator, to arrange for the preparation of required Submittals. The required Submittals can be found in the specification section (Part E).

D13.2 If Award is made to the Lowest Responsive Bidder, then no specific payment for the preparation of Submittals will be made.

D13.3 If no contract is awarded, then the City of Winnipeg will pay the requested Bidder up to a maximum of fifteen thousand dollars ($15,000.00) for the complete set of requested submissions noted above, for the preparation and delivery of the Submittals. Delivery of the Submittals to the City and payment of the above amounts will constitute full and final consideration of each party to the other, and neither party will have any further liability to the other with respect to this Bid Opportunity.

D14. COMMENCEMENT

D14.1 The Contractor shall not commence any Work until he/she is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.

D14.2 The Contractor shall not commence any Work on the Site until:

(a) the Contract Administrator has confirmed receipt and approval of:

(i) evidence of authority to carry on business specified in D8;

(ii) evidence of the workers compensation coverage specified in C6.15;

(iii) the twenty-four (24) hour emergency response phone number specified in D4.2;

(iv) the Safe Work Plan specified in D9;

(v) evidence of the insurance specified in D10;

(vi) the performance security specified in D11; and

(vii) the Subcontractor list specified in D12.

(b) the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.

D14.3 The Contractor shall submit a detailed construction schedule within seven (7) Working Days of receipt of the letter of intent.

D15. SUBSTANTIAL PERFORMANCE

D15.1 The Contractor shall achieve Substantial Performance by March 31, 2018.

D15.2 When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D15.3 The date on which the Work has been certified by the Contract Administrator as being substantially performed to the requirements of the Contract through the issue of a certificate of Substantial Performance is the date on which Substantial Performance has been achieved.

D16. TOTAL PERFORMANCE

D16.1 The Contractor shall achieve Total Performance by June 30, 2018.

D16.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D16.3 The date on which the Work has been certified by the Contract Administrator as being totally performed to the requirements of the Contract through the issue of a certificate of Total Performance is the date on which Total Performance has been achieved.

D17. LIQUIDATED DAMAGES

D17.1 If the Contractor fails to achieve Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Working Day for each and every Working Day following the days fixed herein for same during which such failure continues:

(a) Substantial Performance - one thousand and five hundred dollars ($1,500);

(b) Total Performance - five hundred dollars ($500);

D17.2 The amounts specified for liquidated damages in D17.1 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.

D17.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D18. SCHEDULED MAINTENANCE

D18.1 Determination of Substantial Performance and Total Performance shall be exclusive of scheduled maintenance identified herein. All scheduled maintenance shall be completed prior to the expiration of the warranty period which for the tree planting and naturalization works is for two growing seasons. 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

D19. JOB MEETINGS

D19.1 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.

D19.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

D20. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D20.1 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).

D21. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

D21.1 Further to B12.4, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety and Health Act (Manitoba). At any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require updated proof of compliance, as set out in B12.4.

MEASUREMENT AND PAYMENT

D22. PAYMENT

D22.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D23. WARRANTY

D23.1 Warranty is as stated in C13. However, for the tree plantation and naturalization works, the warranty shall be two (2) years from the total performance.

FORM H1: PERFORMANCE BOND
(See D11)

KNOW ALL MEN BY THESE PRESENTS THAT

_____
(hereinafter called the "Principal"), and

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

_____

_____ dollars ($_____.____)

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

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

BID OPPORTUNITY NO. 841-2017

THE SEINE RIVERBANK STABILIZATION AT THE BRANCH 1 AQUEDUCT

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 D11)

_____
(Date)

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

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 841-2017

THE SEINE RIVERBANK STABILIZATION AT THE BRANCH 1 AQUEDUCT

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)

FORM J: SUBCONTRACTOR LIST
(See D12)

THE SEINE RIVERBANK STABILIZATION AT THE BRANCH 1 AQUEDUCT

Name	Address

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS

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*.

E2. DRAWINGS

E2.1 Drawings are available on the City's file transfer protocol (FTP) site by request to the Contract Administrator. The following drawings are applicable to the Work:

Drawing No.	Drawing Name/Title
1-0751A-D0002-001	Cover Sheet and List of Drawings
1-0751A-C0004-001	Site Location, Access, Laydown and Work Areas
1-0751A-C0005-001	2017 Existing Site Conditions
1-0751A-C0006-001	Riverbank Stabilization Works Final Arrangement
1-0751A-C0007-001	Riverbank Stabilization Works Sections and Details
1-0751A-C0008-001	Riverbank Stabilization Works Part Plans and Details
1-0751A-C0009-001	General Construction Phasing
1-0751A-C0010-001	Rockfill Column Construction Work Sequence and Staging
1-0751A-C0011-001	Project Control and Layout Tables
1-0751A-C0012-001	Tree Restoration Plan and Details
1-0751A-D0003-001	Miscellaneous
1-0751A-C0013-001	Rue Notre Dame Road Asphalt Overlay

E3. SOILS INVESTIGATION REPORT

E3.1 Further to C3.1, geotechnical test holes have been drilled in the vicinity of the proposed Works to determine the character of the subsurface soil to facilitate the design of the Work. The information is considered accurate at the locations indicated and at the time of investigation. However, considerable variations in the soil conditions may exist between test holes and fluctuations in ground water levels can be expected seasonally. Test hole logs are included in Appendix A.

E3.2 The Contractor is responsible for any interpretation they place on the supplied information and are expected to make such additional investigation of the soil as they feel necessary to satisfy themselves.

E3.3 Any test borings or test excavations made by the Contractor shall be done in accordance with the requirements of the appropriate authority of the City of Winnipeg. The Contractor shall notify the Contract Administrator prior to starting any soil boring or test excavation.

E4. TRAFFIC CONTROL

E4.1 Further to clauses 3.6, 3.7 and 3.8 of CW 1130:

(a) Where directed by the Contract Administrator, the Contractor shall construct and maintain temporary asphalt ramps to alleviate vertical pavement obstructions such as manholes and planing drop-offs to the satisfaction of the Contract Administrator. Payment shall be in accordance with CW3410.

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

E4.2 Notwithstanding E4.1, in accordance with the MTTC, the Contract Administrator shall make arrangements with the **Traffic Services Branch of the City of Winnipeg** to place, maintain, and remove all **regulatory signs** and traffic control devices authorized and/or required by the Traffic Management Branch in the following situations:

(a) Parking restrictions,

(b) Stopping restrictions,

(c) Turn restrictions,

(d) Diamond lane removal,

(e) Full or directional closures on a Regional Street,

(f) Traffic routed across a median,

(g) Full or directional closure of a non-regional street where there is a requirement for regulatory signs (turn restrictions, bus stop relocations, etc.) to implement the closure.

(h) Approved Designated Construction Zones with a temporary posted speed limit reduction. Traffic Services will be responsible for placing all of the advance signs and 'Construction Ends' (TC-4) signs. The Contractor is still responsible for all other temporary traffic control including but not limited to barricades, barrels and tall cones.

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

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

E5. TRAFFIC MANAGEMENT

E5.1 Further to clause 3.7 of CW 1130:

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

E5.1.2 Flag persons may be necessary to maintain the flow of traffic during certain work operations.

E5.1.3 Should the Contractor be unable to maintain an existing access to a residence or business, he/she shall review the planned disruption with the business or residence and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 24 hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access.

E5.1.4 Pedestrian and ambulance/emergency vehicle access must be maintained at all times.

E5.1.5 The Contractor shall submit a traffic management plan including re-routing existing bike path to the Contract Administrator for review and approval.

E6. REFUSE AND RECYCLING COLLECTION

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

E6.2 Collection Schedule:

Rue Notre Dame from Rue La Fleche to Rue Maisonneuve.

Collection Day(s):	**Tuesday**
Collection Time:	**07:00 to 22:00**
Common Collection Area:	**Back Lane**

E7. PEDESTRIAN SAFETY

E7.1 During the project a temporary snow fence shall be installed when requested by the Contract Administrator. The Contractor shall be responsible for maintaining the snow fence in a proper working condition. No measurement for payment shall be made for this work.

E8. WATER OBTAINED FROM THE CITY

E8.1 Further to clause 3.7 of CW 1120, the Contractor shall pay for all costs, including sewer charges, associated with obtaining water from the City in accordance with the Waterworks and Sewer By-laws.

E9. SURFACE RESTORATIONS

E9.1 Further to clause 3.3 of CW 1130, when Total Performance is not achieved in the year the Contract is commenced, the Contractor shall temporarily repair any Work commenced and not completed to the satisfaction of the Contract Administrator. The Contractor shall maintain the temporary repairs in a safe condition as determined by the Contract Administrator until permanent repairs are completed. The Contractor shall bear all costs associated with temporary repairs and their maintenance.

E10. INFRASTRUCTURE SIGNS

E10.1 The Contractor shall obtain infrastructure signs from the Traffic Services Sign Shop at 421 Osborne Street. The Contractor shall mount each sign securely to a rigid backing material approved by the Contract Administrator. The Contractor shall fasten each sign to a suitable support and erect and maintain one sign at each street as directed by the Contract Administrator. When the Contract Administrator considers the Work on the street complete, the Contractor shall remove and dispose of the signs and supports. No measurement for payment will be made for performing all operations herein described and all other items incidental to the work described

E11. VERIFICATION OF WEIGHTS

E11.1 All Material which is paid for on a weight basis shall be weighed on a scale certified by Consumer & Corporate Affairs, Canada.

E11.1.1 All weight tickets shall have the gross weight and the time and date of weighing printed by an approved electro/mechanical printer coupled to the scale.

E11.1.2 The tare weight and net weight may either be hand written or machine printed. All weights, scales and procedures shall be subject to inspection and verification by the Contract Administrator. Such inspection and verification may include, but shall not be limited to:

(a) checking Contractor's scales for Consumer & Corporate Affairs certification seals;

(b) observing weighing procedures;

(c) random checking of either gross or tare weights by having such trucks or truck/trailer(s) combinations as the Contract Administrator shall select weighed at the nearest available certified scale; and

(d) checking tare weights shown on delivery tickets against a current tare.

E11.2 The Contractor shall ensure that each truck or truck/trailer(s) combination delivering Material which is paid for on a weight basis displays a tare weight not more than one (1) month old.

E11.2.1 The tare shall be obtained by weighing the truck or truck/trailer(s) combination on a certified scale and shall show:

(a) upon which scale the truck or truck/trailer(s) combination was weighed;

(b) the mechanically printed tare weight;

(c) the license number(s) of the truck and trailer(s); and

(d) the time and date of weighing.

E12. TRUCK WEIGHT LIMITS

E12.1 The City shall not pay for any portion of Material which results in the vehicle exceeding the maximum gross vehicle weight allowed under *The City of Winnipeg Traffic By-Law,* unless such vehicle is operating under special permit.

GENERAL REQUIREMENTS

E13. OFFICE FACILITIES

E13.1 The Contractor shall supply office facilities meeting the following requirements:

(a) The field office shall be for the exclusive use of the Contract Administrator.

(b) The building shall be conveniently located near the Site of the Work.

(c) The building shall have a minimum floor area of 25 square metres, two windows for cross ventilation and a door entrance with a suitable lock.

(d) The building shall be suitable for all weather use. It shall be equipped with an electric heater and air conditioner so that the room temperature can be maintained between either 16-18^{o}C or 24-25 ^{o}C.

(e) The building shall be adequately lighted with fluorescent fixtures and have a minimum of three wall outlets.

(f) The building shall be furnished with two desks, two drafting tables, table 3m X 1.2m, one stool, one four drawer legal size filing cabinet, and a minimum of 12 chairs.

(g) A portable toilet shall be located near the field office building. The toilet shall have a locking door and be for the exclusive use of the Contract Administrator and other personnel from the City.

(h) The field office building and the portable toilet shall be cleaned on a weekly basis immediately prior to each Site meeting. The Contract Administrator may request additional cleaning when deemed necessary.

E13.2 The Contractor shall be responsible for all installation and removal costs, all operating costs, and the general maintenance of the office facilities.

E13.3 The office facilities will be provided from the date of the Commencement of the Work until Total Performance.

E14. WATERWAY BY-LAW AND PERMITS

E14.1 The Contractor shall note that all Works fall within 107 metres (350 feet) of the normal summer water level of the Seine River and are therefore within the jurisdiction of the Waterway By-law. The Contract Administrator will apply and pay for the required Waterway Permits for the permanent Work. The Contract Administrator will provide a copy permits to the Contractor. The Contractor shall adhere to conditions imposed by the permit.

E14.2 The Contractor shall be responsible to apply and pay for a Waterway Permit, if required, for all temporary Works.

E14.3 Under no circumstances will stockpiling of any material be permitted within 107 metres of the regulated summer water level of the Seine River without written approval by the Contract Administrator.

E15. ENVIRONMENTAL PROTECTION PLAN

E15.1 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.

E15.2 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

(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.
  (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.

E15.3 The Contractor is advised that the following environmental protection measures apply to the Work.

(a) Materials Handling and Storage
  (i) Construction materials shall be deposited or stored on areas approved by the Contract Administrator in advance.

(ii) Construction materials and debris shall be prevented from entering the Seine River. In the event that materials and/or debris inadvertently enter the watercourse, the Contractor shall be required to remove the material and restore the watercourse to its original condition.

(b) Fuel Handling and Storage

(i) The Contractor shall obtain all necessary permits from Manitoba Sustainable Development 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) In accordance with Section 2.5 (Construction: General Guidelines) of the Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat, (DFO and DNR, 1996), the Contractor shall ensure that any temporary fuel storage areas established for construction of the project are contained by an impermeable dike and are located a minimum distance of 100 metres away from the high water line of the Seine River. Dikes shall be designed, constructed, and maintained to retain not less than 100% of the capacity of the total number of containers or 110% of the largest container, whichever is greatest. The dikes shall be constructed of clay or similar impervious material. If this type of material is not available, the dike shall be constructed of locally available material and lined with high density polyethylene (HDPE). Furthermore, the fuel storage area(s) shall be secured by a barrier such as a high fence and gate to prevent vandalism.

(v) The Contractor shall ensure that all fuel storage containers are inspected daily for leaks and spillage.

(vi) Products transferred from the fuel storage area(s) to specific Work Sites shall not exceed the daily usage requirement.

(vii) When breakdown or routine servicing or refuelling of the crane or drill rigs requires the drainage or pumping of fuels, lubricating oils or other fluids, a groundsheet of suitable material (e.g. HDPE) and size shall be spread on the ground along with containment booms and absorbent kits.

(viii) Refuelling of other mobile equipment and vehicles shall take place at least 100 metres from a watercourse.

(ix) 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.

(x) 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 Spill 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 Sustainable Development, 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:

1) Notify emergency-response co-ordinator of the accident:

- ♦ identify exact location and time of accident
- ♦ indicate injuries, if any

- request assistance as required by magnitude of accident (Manitoba Sustainable Development 24-hour Spill Response Line (204) 945-4888, Police, Fire Department, Ambulance, company backup)

2) Attend to public safety:
   - stop traffic, roadblock/cordon off the immediate danger area
   - eliminate ignition sources
   - initiate evacuation procedures if necessary
3) 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
4) 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 sorbent material or dry clay soil or sand
   - prevent spill material from entering waterways and utilities by diking
   - prevent spill material from entering manholes and other openings by covering with rubber spill mats or diking. Resume any effective action to contain, clean up, or stop the flow of the spilled product.
5) 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 Sustainable Development 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 Seine or Red rivers.

Table 1
Spills that must be reported to the Manitoba Sustainable Development as Environmental Accidents

Classification		Hazard	Reportable Quantity/Level
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	Oxidizer	1 kg or 1 L
	PG III	Oxidizer	50 kg or 50 L
5.2		Organic Peroxide	1 kg or 1 L
6.1	PG I	Acute Toxic	1 kg or 1 L
	PG II & III	Acute Toxic	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 disturbed 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.

(vii) Areas where vegetation is removed during clearing, construction, and decommissioning activities, shall be revegetated as soon as possible in accordance with the landscaping plans forming part of the Contract, or as directed by the Contract Administrator.

(g) Noise

(i) Night work and/or work on Sundays and/or Statutory Holidays or Civic Holidays shall not be allowed throughout the duration of the project without prior consent from the City and the Contract Administrator.

The Contractor must request and receive approval from the Contract Administrator at least forty-eight (48) hours in advance of any Contract Work to be undertaken on Sundays and/or Statutory Holidays or Civic Holidays and at night. It will be the Contractor's responsibility to schedule work activities to minimize potential problems and/or to employ noise-reduction measure to lower noise to an acceptable level. Time extensions will not be granted on the basis of the Contractor being ordered to limit his activities at night.

The Contractor is advised that possible noise level problems may limit his work activities on Sundays and/or Statutory Holidays or Civic Holidays and at night.

(ii) Construction activities which are approved to take place at night and/or Sundays and Statutory Holidays or Civic Holidays shall be in accordance with the Neighbourhood Liveability By-Law.

(h) Dust

(i) Dust control practices implemented by the Contractor during construction shall include regular street cleaning and dampening of construction access roads and work areas with water or approved chemicals at an adequate frequency to prevent the creation of dust.

(ii) Only water or chemicals approved by the Contract Administrator shall be used for dust control. The use of waste petroleum or petroleum by-products is not permitted.

(iii) The Contractor shall ensure that trucks which are used to haul excavated material and backfill material to and from the work site utilize tarpaulin covers during transport to prevent material from falling onto the street and creating dust.

(i) Landscaping

(i) Restoration of disturbed areas shall be performed as set out in E19.

(j) Red and Seine River Navigation Protection

(a) The Red and Seine Rivers are open to navigation from approximately mid April to mid November, annually. During this period, it will be the responsibility of the Contractor to fully ensure the safety of river users.

(b) The Contractor shall provide, install, and maintain adequate warning signs and lighting on any structure beyond the water's edge to notify boats and other craft navigating on the Red and Seine Rivers that construction is underway. These warnings shall meet the requirements of the City of Winnipeg Waterways Authority and of the Canadian Coast Guard.

(c) Prior to commencing any applicable operations over the Red and Seine Rivers, the Contractor shall provide to the Contract Administrator a copy of all necessary approvals received by the Contractor.

E16. CHANNEL PROTECTION

E16.1 The ice surface and riverbank channel shall be cleared of construction materials prior to ice break-up. The Contractor shall clean up all materials, including but not limited to: soil, snow fence, construction debris, etc. from this construction activity. All items that will have an adverse impact on the channel shall be removed. Channel Protection shall be considered incidental to the Works of this Contract and no measurement or payment will be made for this item.

E17. OPERATING CONSTRAINTS FOR WORK IN CLOSE PROXIMITY TO THE BRANCH 1 AQUEDUCT

E17.1 Description

E17.1.1 This section details operating constraints for all Work to be carried out in close proximity to the Branch 1 Aqueduct.

E17.1.2 The Branch I Aqueduct is a critical component of the City of Winnipeg Regional Water Supply System and work in close proximity to the pipeline shall be undertaken with an abundance of caution. Work around the Branch 1 Aqueduct shall be well planned and executed to ensure that the Branch 1 Aqueduct is not subjected to construction related loads, including excessive vibrations and concentrated or asymmetrical lateral loads.

E17.1.3 The Branch I Aqueduct is constructed of precast reinforced concrete pipe, vintage 1918-1919. This pipeline contains crimped copper waterstops at pipe joints that are known to occasionally fail, and have limited capacity for vibration and heavy loading.

E17.2 Submittals

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

E17.3 Protection of the Branch 1 Aqueduct

E17.3.1 Contractors working in the vicinity of the Branch 1 Aqueduct shall ensure that:

(a) Equipment shall only be permitted to cross the pipe at designated locations.

(b) Equipment shall not be permitted to operate within 5 metres of the centreline of the Aqueduct unless authorized by the Contract Administrator. The Contractor shall ensure that the limits of the pipe are clearly understood and delineated in the field.

(c) Granular material, construction material, soil or other material shall not be stockpiled on the Aqueduct or within 5 metres of the Aqueduct centerline.

(d) Construction practices shall not subject the Aqueduct to asymmetrical loading at any time.

(e) Construction practices or procedures at or near the Aqueduct shall not impart excessive vibration loads on the Aqueduct and/or cause settlement of the subgrade below the Aqueduct.

(f) Only smooth edged excavation buckets, soft excavation or hand excavation shall be used for excavation adjacent to and over the pipelines.

(g) Excavation over top or within five metres of the centreline of the Aqueduct shall be completed by means of a hydraulic excavator in accordance to restrictions above. No construction equipment on any kind shall be permitted over the pipeline.

E17.3.2 It is the Contractors' responsibility to ensure that all work crew members understand and observe the requirements of E17.1 and E17.2. Prior to commencement of on-site work, the Contractor's superintendent, foreman and heavy equipment operators shall attend an orientation meeting that shall outline restrictions for working on and around the Aqueduct. Failure to comply with these restrictions shall be grounds for removing the offending personnel from the Site.

E17.3.3 Controlled Products

(a) The Contractor shall be aware that the Branch Aqueduct is for potable water supply and no contamination by fuel, chemicals, etc. shall be permitted at any time. Fuels or chemicals shall not be stored within 30 metres of the Branch 1 Aqueduct.

E18. MOBILIZATION AND DEMOBILIZATION (MAXIMUM 5% OF TOTAL BID PRICE)

E18.1 Mobilization and demobilization will include but not be limited to start-up costs, equipment setup and removal, field office and storage facilities set-up and removal and Site cleanup.

E18.2 Mobilization and demobilization will be measured on a unit basis and paid for at the Contract Unit Price for "Mobilization and Demobilization" in accordance with this specification, accepted and measured by the Contract Administrator.

E18.3 50% of the Mobilization and Demobilization unit price will be paid on the first progress payment.

E18.4 The remaining 50% of the Mobilization and Demobilization unit price will be paid subsequent to the total completion of the Work and restoration and clean up of the Site.

E19. SITE DEVELOPMENT AND RESTORATION

E19.1 Description

E19.1.1 This Specification shall cover all aspects of the Site Development Work, including erection, maintenance and removal of safety fencing, sediment control Works, snow clearing, protection of existing infrastructure, removal of vegetation, tree removal, general access development and access maintenance, placement and removal of temporary rockfill construction berm, general site cleanup, and restoration.

E19.1.2 The Work to be done by the Contractor under this specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E19.2 Materials

E19.2.1 Equipment

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

E19.3 Construction Methods

E19.3.1 Site Access Development and Restoration

(a) The Contractor shall construct the access ramps with the line grades shown on the Drawings or as directed by the Contract Administrator to ensure the stability of the riverbank will not be negatively impacted. The maximum allowable working weight for the crane and drill rig is 250,000 kg with a respective maximum allowable ground pressure of 30 kPa. The Contractor shall ensure that his operations can be completed as per the Drawings and based on these same maximum allowable working weights and pressure, as approved by the Contract Administrator.

(b) The construction access ramp from the top bank area down to the edge of the river shall be constructed by excavating to the necessary ramp grade and temporarily stockpiling material in a designated area for re-use or disposing of off Site as approved by the Contract Administrator. Under no circumstances will the excavated material or any additional materials be placed as fill in the ramp area. If the Contractor proposes alternate access ramps to the pre-approved ramp detailed on the Drawings, detailed construction access ramp drawings must be submitted to the Contract Administrator for approval a minimum five (5) business days prior to any construction activity on Site.

(c) The Contractor shall trim and grade the resulting ground surfaces as required to the line and grades shown on the Drawings at the end of construction. Final restoration of the access ramp shall be completed in the non-frozen condition.

(d) The Contractor's site access routes should be selected to minimize tree removal. Any required tree removal shall be performed in accordance with E20.

E19.3.2 Protection of Existing Infrastructure

The Contractor shall be responsible for protection of existing infrastructure at the Site including above ground and buried infrastructure.

(a) The Contractor is responsible to obtain any required utility clearances prior to commencement of the Works. Any damaged infrastructure shall be repaired at the Contractor's expense.

(b) Manitoba Hydro gas line traverses along the site as shown on the Drawings. Contractor shall follow the Work Guideline around Gas Line included on the Drawings.

(c) The Contractor is responsible to protect the existing underdrain and outfall from damage due to construction activities. Equipment traffic over the underdrain and outfall pipe is not permitted unless written approval has been obtained by the Contract Administrator.

(d) The Contractor shall be responsible to ensure existing asphalt pathways are protected from damage due to construction activities. Any damaged asphalt pathway shall be repaired or replaced at the Contractors expense, as approved by the Contract Administrator.

E19.3.3 Frozen Waterways Permit

The Contractor is responsible for obtaining a Frozen Water Permit for permission to Work on the river ice. Contact the City of Winnipeg Planning Property and Development department.

E19.3.4 Vegetation Removal

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.

E19.3.5 Snow and Ice Removal

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

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

E19.3.6 Temporary Construction Berm

A temporary construction berm shall be constructed along the river for safe operation of the construction crane, drill rig and other construction equipment. The detail geometry of the berm is delineated on the Drawings and detail specification is included in E24.

E19.3.7 Safety Fence

The Contractor shall erect and maintain for the duration of the project a safety fence, to restrict access to the Site. The fencing shall enclose the entire Site with appropriate gates or openings that are closed at the end of each Work day. Safety fence shall also be erected parallel to the Aqueduct as shown on the drawing. Appropriate signs shall be erected to warn all recreational users of the park and the river that an open water hazard exists. This shall include but not be limited to snowmobilers and skiers. Fence construction on the riverbank shall consist of Dupont Number L70 orange plastic safety fence or approved equal with a mesh spacing of 45 mm and a minimum height of 1.2 metres supported by wood posts driven into the ground. The wood posts shall be sized and capable of maintaining the snow fence material upright, regardless of conditions. Fence construction on the river ice shall be as shown on the Drawings. Upon completion of the work, all fence materials shall be removed and disposed off-site.

E19.3.8 Environmental Regulations

(a) The Contractor shall adhere to all relevant Federal and Provincial environmental regulations.

(b) The Contractor shall plan to Work in accordance with the current environmental regulations of "Manitoba Stream Crossing Guidelines for Protection of Fish and Fish Habitat", Fisheries and Oceans, and Manitoba Natural Resources.

(c) The Contractor shall supply, in writing, prior to commencement of Work on-site, a detailed plan for sediment control on this project.

(d) The Contractor shall ensure that a sufficient supply of suitable spill kits are on-site to cleanup minor spills, should they occur. The Contractor shall supply the name, address and telephone number of a local supplier, where additional kits are available on short notice.

E19.3.9 General Site Cleanup and Restoration

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

E19.4 Method of Measurement and Payment

E19.4.1 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.

E20. TREE REMOVAL

E20.1 Description

E20.1.1 This specification shall cover the removal of existing trees and brush within the Contractor's Work area.

E20.1.2 The Work to be done by the Contractor under this specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E20.2 Materials

E20.2.1 Existing Trees to be Removed

The existing trees to be removed include, but not limited to ash, elm, cottonwood, basswood, oak, pine, maple, spruce, etc., all of which may be cut with standard chain saw equipment. The existing trees are greater than 50 mm in diameter.

E20.3 Construction Methods

E20.3.1 Prior to commencement of the Work the Contractor shall identify all trees scheduled for removal for review and acceptance by the Contract Administrator. The Contractor shall cut down only trees approved for removal by the Contract Administrator. In general, the Contractor shall start at the top of the tree and remove branches or trunks in segments not longer than 2 m. Trees are to be felled so as to land within the limits of the Works. The Contractor shall load and haul all trees, stumps, roots, logs, brush, rubbish and all other surface litter from the Site and dispose of these materials at an approved disposal Site, acceptable to the Contract Administrator.

E20.3.2 The Contractor shall take all precautions to prevent damage to structures, adjacent property and to trees and shrubs. In the event of damage, the Contractor will be held liable, and shall be required to provide appropriate restoration at his cost, to the satisfaction of the Contract Administrator.

E20.3.3 Any trees damaged during construction activities shall be examined by a bonded tree care professional and pruned as required. Damaged trees which are not viable shall be replaced by the Contractor at his own cost.

E20.4 Measurement and Payment

E20.4.1 The removal of trees and brush is considered incidental to Site Development and Restoration and no separate measurement or payment will be made for this item.

E21. PROTECTION OF EXISTING TREES

E21.1 Removal of some trees will be required at the Site as per E20. The Contractor shall take the following precautionary steps to avoid damage from construction activities to any existing trees not marked and accepted for removal within the limits of the construction area.

(a) The Contractor shall not stockpile materials and soil or park vehicles and equipment on boulevards within 2 metres of trees.

(b) All trees will have a 3m 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.

(c) 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.

(d) 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 tree pruning paint sealer is required. All exposed roots must be mulched until the excavated area is filled with clean earth to avoid exposure to sunlight and desiccation.

(e) 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.

(f) 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.

(g) American elm trees shall not be pruned between April 1st and August 1st and Siberian elm trees between April 1st and July 1st of any year under provisions of The Dutch Elm Disease Act.

(h) Repair, replace and maintain tree protection materials during construction until the Project completion.

(i) Carefully remove safety fencing and strapping material without harming the tree as soon as the construction and restoration Work is complete.

E21.2 All damage to existing trees caused by the Contractor's activities shall be repaired to the requirements and satisfaction of the Contract Administrator and the City Forester or his designate at the Contractor's expense.

E21.3 Measurement and Payment

E21.3.1 Costs for protection of trees shall be considered incidental to Site Development and no separate measurement or payment will be made for this item.

E22. SILT FENCE

E22.1 Description

E22.1.1 This specification covers the erection of temporary silt fencing, which shall be installed and maintained at the locations shown on the Drawings to control runoff and minimize the release of detrimental silt loading to watercourses.

E22.1.2 The scope of Work included in this specification is as follows:

(a) Supply and Install temporary silt fencing at the locations as indicated on the Drawings, in accordance with the detailed drawing provided, immediately upon completion of the riprap placement and prior to undertaking any other activities on the Site where silt fencing is required.

(b) Maintain the silt fencing in serviceable condition throughout the entire duration of activities at the Site where silt fencing is required, including final restoration and cleanup of the construction Site.

(c) Remove the silt fencing and restore the area where the fencing was installed, without further disturbing the area and without releasing any deleterious substances to the adjacent watercourse.

E22.1.3 The Work to be done by the Contractor under this specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E22.2 Materials

E22.2.1 Fence Posts

(a) Fence posts shall be 100 mm diameter untreated wood posts.

E22.2.2 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	80 % @ 500 hrs
Apparent Opening Size (AOS)	ASTM D 4751	0.60 mm
Flow Rate	ASTM D 4491	405 l/min/m2

Acceptable Product: “Amoco 2130 Silt Fence Fabric” or approved equal in accordance with B7.

E22.2.3 Wire Mesh

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

E22.2.4 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.

E22.3 Construction Methods

E22.3.1 Ensure that no deleterious substances are discharged into the adjacent watercourse at any time during construction activities.

E22.3.2 Silt Fence Installation

(a) Excavate 200 mm x 200 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 E22.2.4. 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).

E22.3.3 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 E22.3.2. If silt fence is found to be loose or torn, repair or replace as necessary to comply with E22.3.2.

(b) If silt deposition at the fence is 300 mm or more in depth, carefully remove and dispose of silt offsite without disturbing silt fence.

E22.3.4 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 E19 without releasing any deleterious substances to the adjacent watercourse.

E22.4 Measurement and Payment

E22.4.1 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.

E22.4.2 Removal of accumulated sediment from the silt fence is considered incidental to the Work and no separate measurement or payment will be made.

E23. ROCKFILL RIPRAP

E23.1 Description

E23.1.1 This Specification shall cover the supply and placement of rockfill riprap.

E23.1.2 The Work to be done by the Contractor under this specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E23.2 Materials

E23.2.1 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.

E23.2.2 Individual particles shall be shaped such that no dimension is greater than two times the smallest dimension. Flat, elongated, or platy particle shapes will not be accepted.

E23.2.3 Should the Contractor choose to use limestone, it shall be durable white crystalline limestone or dolomite. Softer buff to yellow dolomite or dolostone will not be accepted.

E23.2.4 The rockfill material shall meet the following requirements:

Parameter	Test Method	Specified Limit
Bulk Specific Gravity	ASTM C127	2.6 minimum
Absorption	ASTM C127	2.5 % maximum
LA Abrasion Loss	ASTM C535	32% maximum
Soundness	ASTM C88	13% maximum
Gradation	ASTM D5519	See below

E23.2.5 The 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 (millimetres)	Percent of Total Dry Weight Passing Each Sieve
450	100%
300	35-80%
100	20-60%
50	10-30%
5	0-5%

E23.3 Submittals

E23.3.1 The Contractor shall submit the proposed supplier(s) and location of quarry Sites for supply of riprap.

E23.3.2 Representative samples of the rockfill riprap shall be submitted to the Contract Administrator for approval a minimum of Seven (7) days prior to their use.

E23.4 Quarry Sites

E23.4.1 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.

E23.5 Testing and Approval

E23.5.1 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.

E23.5.2 No supply and placement of riprap will be permitted prior to the Contract Administrator receiving and reviewing representative samples of the rockfill riprap.

E23.5.3 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.

E23.5.4 The testing frequency necessary to confirm the material quality will be specified at the discretion of the Contract Administrator.

E23.6 Construction Methods

E23.6.1 Debris, snow and ice shall be removed from the riverbank in accordance with E19.3.5 prior to placement of rockfill riprap.

E23.6.2 The riverbank shall be sub-cut above Winter River Level for riprap placement, as indicated on the Drawings and directed in the field by the Contract Administrator.

E23.6.3 Excavated material shall be removed from the riverbank area immediately upon excavation and disposed of offsite. No stockpiling of excavated material on the riverbank will be allowed

E23.6.4 Rockfill riprap shall be placed to the lines and grades shown on the Drawings.

E23.6.5 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.

E23.6.6 Sufficient levelling shall be done to produce a neat and uniform surface, conforming to the shape and dimensions shown on the Drawings.

E23.6.7 The allowable fill tolerances shall be within ± 50 mm of the grades and thickness shown on the Drawings, provided positive downslope grading is achieved.

E23.6.8 Riprap shall be placed to provide a smooth uniform surface from the existing grade at outside edges or transitions, as shown on the construction Drawings and accepted by the Contract Administrator.

E23.6.9 Temporary stockpiling of riprap along the riverbank shall not be permitted, unless written approval from the Contract Administrator has been obtained. Material shall be placed to the required lines and grade shown the Drawings immediately upon delivery to the Site.

E23.7 Measurement and Payment

E23.7.1 The sub-cut for riprap placement will be measured and paid for on a volume basis. The volume to be paid for shall be the total number of cubic metres of “Sub-cut”, completed in accordance with this Specification, as measured in the field and accepted by the Contract Administrator.

E23.7.2 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.

E23.7.3 The Contractor shall provide the weight tickets to the Contract Administrator for the material supplied to the Site at the time of delivery. No payment will be made for any weight tickets which are not supplied at the time of delivery, or which are lost.

E23.7.4 Verification of weights shall be as outlined in E11.

E24. TEMPORARY ROCKFILL BERM

E24.1 Description

E24.1.1 This Specification shall cover the supply and placement of rockfill berm used to temporarily stabilize the riverbank during construction.

E24.1.2 The Work to be done by the Contractor under this specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E24.2 Materials

E24.2.1 The materials for the temporary berm will be partially the rockfill riprap and partially the rockfill for rockfill column, as delineated in the Drawings. It can be considered as the stockpile of rockfill and riprap materials. The material specification shall be consistent with the specification for riprap and rockfill column. A non-woven geotextile will be placed as a separator between the permanent riprap and the temporary berm materials. No separate payment will be made for the supply, placement and removal of rockfill and geotextile as it will be considered incidental to the Site Development and Restoration work.

E24.3 Construction Methods

E24.3.1 Debris, snow and ice shall be removed from the riverbank in accordance with E19.3.5 prior to placement of the temporary berm.

E24.3.2 Temporary berm shall be placed to the lines and grades shown on the Drawings.

E24.3.3 The geotextile separator shall be placed on top of the permanent riprap before placement of temporary berm rockfill materials.

E24.3.4 Temporary berm rockfill 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.

E24.3.5 Sufficient levelling shall be done to produce a neat and uniform surface, conforming to the shape and dimensions shown on the Drawings.

E24.3.6 The allowable fill tolerances shall be within ± 50 mm of the grades and thickness shown on the Drawings, provided positive downslope grading is achieved.

E24.3.7 Rockfill shall be placed to provide a smooth uniform surface from the existing grade at outside edges or transitions, as shown on the Drawings and accepted by the Contract Administrator.

E24.3.8 Temporary stockpiling of rockfill along the riverbank shall not be permitted, unless written approval from the Contract Administrator has been obtained. Material shall be placed to the required lines and grade shown the Drawings immediately upon delivery to the Site.

E24.4 Measurement and Payment

The supply and placement of rockfill berm will be considered incidental to the Site Development and Restoration, Rockfill Column installation and Rockfill Riprap placement since this berm will act as a temporary stockpile of rockfill materials for the Work. No separate payment will be made for the supply,placement and removal of rockfill berm and the geotextile separator.

E25. ROCKFILL COLUMN

E25.1 Description

E25.1.1 This Specification shall cover the installation of the rockfill columns, including shaft drilling, sleeving, cuttings removal, supply, placement and compaction of rockfill and clay cap backfill, and provisions for handling groundwater infiltration.

E25.1.2 The Work to be done by the Contractor under this specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified. The Drawings are based on a maximum allowable working weight for the crane and drill rig of 250,000 kg with a respective maximum allowable ground pressure of 30 kPa. The Contractor shall ensure that his operations can be completed as per the Drawings and based on these same maximum allowable working weights and pressure, as approved by the Contract Administrator.

E25.2 Materials

E25.2.1 The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification.

E25.2.2 The temporary construction berm shall be used as a stockpile of rockfill materials. It will eventually be used for rockfill column construction as delineated in the Drawings.

E25.2.3 Rockfill Backfill

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

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

(c) Should the Contractor choose to use limestone, it shall be durable white crystalline limestone that has proven freeze-thaw durability based on the material requirements given below. Softer buff to yellow dolomite or dolostone will not be accepted.

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

(e) 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 C535	32% maximum
Soundness	ASTM C88	13% maximum
Gradation	ASTM D5519	See below

(f) The rockfill shall be well graded having a full range and even distribution of sizes and shall conform to the following gradation:

Canadian Metric Sieve Size (millimeters)	Percent of Total Dry Weight Passing Each Sieve
150	100%
75	40-70%
25	0-5%

E25.2.4 Clay Cap

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

E25.3 Equipment

E25.3.1 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.

E25.3.2 The Contractor shall use vibratory equipment that can be directly inserted into the rockfill column to densify the rockfill backfill throughout the entire depth of the rockfill column.

E25.4 Submittals

The Contractor shall submit the following to the Contract Administrator, in accordance with this Specification:

- The Contractor shall submit their proposed construction methodology for rockfill columns, including equipment capabilities and sequencing requirements to the Contract Administrator a minimum of seven (7) days prior to the start of construction. The Contractor shall demonstrate that the rockfill columns can be constructed successfully based on the proposed methodology. The Contractor will not begin installation of the rockfill columns other than those utilized for rockfill column compaction tests until the Contract Administrator has reviewed the construction methodology, equipment capabilities and sequencing requirements and has provided written approval to proceed.

- The Contractor shall submit the names of the proposed supplier(s) and location of quarry sites for supply of rockfill backfill to be utilized on the project a minimum of fourteen (14) days prior to the production. The Contractor shall be responsible for demonstrating that the material is of adequate quality and volume to meet the material specifications and project requirements.

E25.5 Testing and Approval

E25.5.1 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.

E25.5.2 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 shear key rockfill.

E25.5.3 No supply and placement of column rockfill will be permitted prior to the Contract Administrator reviewing the source.

E25.5.4 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 rockfill backfill that will be used, subject to the acceptance of the Contract Administrator.

E25.5.5 The testing frequency necessary to confirm the material quality will be specified at the discretion of the Contract Administrator.

E25.6 Construction Methods

E25.6.1 Construction Sequencing

(a) Construction of rockfill columns shall not proceed until the Contractor has demonstrated his construction procedures by successfully completing the Vibratory Compaction Testing Program as specified in the Provision for Rockfill Column Vibratory Compaction Testing Program

(b) The Contractor shall complete the backfilling of each rockfill column prior to commencing the excavation of the adjacent rockfill column.

E25.6.1 Excavation

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

(b) The rockfill column shafts shall be excavated by drill rig augers to a minimum 1.0 m into the competent till layer and as approved by the Contract Administrator.

(c) The Contractor shall not commence drilling until the rockfill to backfill the shaft, is on-site. The construction of the rockfill columns shall be a continuous operation with backfilling immediately following excavation.

(d) The Contractor shall complete backfilling of each rockfill column before commencing to excavate adjacent rockfill columns.

(e) No excavations shall be permitted to be left open overnight for any length of time as placement of rockfill shall follow excavation immediately.

(f) Any deleterious or sloughed material shall be removed from the rockfill column shaft prior to backfilling.

(g) The Contractor shall be responsible to contain and direct any displaced surface water or groundwater such that it will not affect other construction work, cause sediment to enter any water course, or cause excessive erosion of the native riverbank soils. The control of surface water and groundwater shall be the responsibility of the Contractor and shall be considered incidental to the Work.

(h) Excavated material shall be removed from the riverbank area immediately upon excavation and disposed of offsite. Stockpiling of excavated material on the riverbank area will not be permitted. If the material is determined to be suitable as clay backfill, by the Contract Administrator, the Contractor may temporarily stockpile the material in an area approved by the Contract Administrator.

(i) It shall be the responsibility of the Contractor to dispose of all material designated as unsuitable backfill by the Contract Administrator off site, in a location determined by the Contractor. The unsuitable backfill shall become the property of the Contractor.

(j) It shall be the responsibility of the Contractor to stockpile the material designated by the Contract Administrator as suitable excess clay backfill in the location designated by the Contract Administrator. The suitable excess clay backfill material shall be the property of the City of Winnipeg.

(k) No additional payment will be made for disposing of the unsuitable material and stockpiling the excess material off site as this will be considered incidental to the unit price for “Rockfill Column Shaft Drilling.”

E25.6.2 Backfilling and Compaction

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

(b) Stockpiling of rockfill material on the riverbank is not permitted except at locations where rockfill columns are installed and subject to the approval of the Contract Administrator.

(c) Excavated rockfill columns shafts shall be backfilled immediately following excavation. No hole shall remain without backfill overnight, or for a period beyond two (2) hours.

(d) Backfilling and compacting of rockfill shall follow the protocol established in the Rockfill Column Vibratory Compaction Testing Program. Deviations from the accepted compaction procedures shall not be permitted without prior written approval from the Contract Administrator.

E25.6.3 Rockfill Column Sleeving

(a) Shafts shall be sleeved immediately after excavation to advance and maintain an open hole during the excavating, backfilling and compacting procedures. Sleeving shall be done in accordance with the Drawings. The Contractor shall be paid for sleeving approved by the Contract Administrator.

(b) The sleeves shall be a length suitable to extend from ground surface down to a minimum of 1.0 metres into the underlying competent till material, as approved by the Contract Administrator.

E25.6.4 Clay Cap

(a) The impervious clay cap shall be placed in lifts not exceeding 200 millimetres, and compacted to a minimum of 95% of the Standard Proctor Maximum Dry Density.

(b) Care shall be taken to ensure that an effective seal results between the wall of the shaft excavation and the clay material placed to protect against water infiltration into the shaft, as approved by the Contract Administrator.

(c) The impervious clay cap at the top of the rockfill columns shall consist of a high plasticity clay material, with a liquid limit in excess of 50%.

(d) 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.

E25.7 Measurement and Payment

E25.7.1 Rockfill Column Shaft Drilling

The drilling of shafts for the rockfill columns will be measured on a length basis. The length to be paid for shall be the total number of vertical metres of shaft drilled in the native soil, measured from the ground surface at the base of the respective work platform at the time of the rockfill column installation carried out in accordance with this specification, acceptable to the Contract Administrator, as computed from measurements made by the Contract Administrator. No additional payment will be made for hauling of excavated material from the site, as this is considered incidental to the Work.

Drilling of the rockfill column shafts will be paid for at the Contract Unit Price for “Shaft Drilling ”, measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described, and all other items incidental to the Work included in this Specification.

E25.7.2 Rockfill Backfill

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

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

E25.7.3 Sleeving

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

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

E25.7.4 Clay Cap

The placement and compaction of the clay cap material shall be measured on a volume basis. The volume to be paid shall be the total number of cubic meters placed in

accordance with this Specification and computed from measured area, multiplied by the fixed depth.

The placement and compaction of the Clay Cap will be paid for at the Contract Unit Price for "Clay Cap", measured as specified herein, which price shall be payment in full for performing all operations and providing all other items incidental to the Work included in this Specification.

E26. STRUCTURAL INSPECTION AND VIBRATION MONITORING

E26.1 Description

E26.1.1 This Specification shall cover the structural inspection and vibration monitoring adjacent to the Aqueduct and nearby buildings.

E26.2 Pre-Construction Structural Inspection

Prior to mobilizing equipment to the site and constructing the site access, a structural inspection will be carried out on nearby buildings that could potentially be impacted due to vibrations during construction. The inspections will be performed by the Contract Administrator to produce non-disputable records that shall consist of written condition assessments documenting locations of existing structural deficiencies including cracking, supplemented by photographs or video footage, and shall be documented to establish the existing conditions of the buildings. The inspection focus area includes five properties along Rue Notre Dame (420,424, 428, 430, and 434).

E26.3 Vibration Monitoring

A minimum of two vibration monitoring devices will be deployed and monitored by the Contract Administrator prior to and during construction to continuously record the vibration frequency and Peak Particle Velocity (PPV) for construction vibrations at all times adjacent to the Aqueduct and the residences closest to the site. This information will be provided to the Contractor with the intention that induced vibrations occurring within the Aqueduct and residences should be maintained below a threshold value of 6 mm/s and 12 mm/s PPV, respectively. Any detrimental effects of excessive vibrations may be quantified as a result of the vibration monitoring program.

Vibration monitoring data will be made available to the Contractor in a timely manner with the intention that the Contractor will ensure that every effort is made to avoid damage to adjacent infrastructure and residences due to construction vibrations. The Contractor shall immediately cease construction, modify the construction methodology and implement mitigation measures to address the occurrence of vibrations that exceed the threshold value at the direction of the Contract Administrator to reduce the impacts of construction related vibrations within the zone(s) of influence.

E26.4 Post Construction Vibration Monitoring

Following completion of the Work, a final structural inspection will be performed by the Contract Administrator. The Contractor shall be responsible for any damages incidental to the Work, as determined by the results of the structural inspections and vibration monitoring program.

E26.5 Additional Submittals

At the Contract Administrator's request and as deemed necessary due to the Contractor's method of construction or operation, the Contractor shall provide additional submittals to the Contract Administrator before proceeding with the various phases of the work. The additional submittals shall be provided by the Contractor for the Contract Administrator's review and comment.

E26.6 Measurement and Payment

No measurement or additional payment shall be made for the work described in this specification for Structural Inspections and Vibration Monitoring as this is considered incidental to the Contract.

E27. ROCKFILL COLUMN VIBRATORY COMPACTION TESTING PROGRAM

E27.1 Description

E27.1.1 This Specification shall cover the Vibratory Compaction Testing Program to demonstrate that the means, procedures, and equipment, proposed by the Contractor, will achieve the specified density of the rockfill backfill in the rockfill columns.

E27.1.2 As a result of the Vibratory Compaction Testing Program, the Contractor shall establish the following:

(a) The compaction equipment proposed for use

(b) The protocol for backfilling and compacting.

(c) The amount of compaction effort required to achieve the minimum specified density.

E27.2 Materials

E27.2.1 The rockfill backfill to be supplied for the Vibratory Compaction Testing Program shall be as specified in E17 – Rockfill Column.

E27.2.2 The Contractor shall supply a representative sample of rockfill backfill at least ten (10) Business Days prior to the commencement of the Vibratory Compaction Testing Program.

E27.3 Equipment

E27.3.1 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.

E27.3.2 The Contractor shall use a vibrating device that can be directly inserted into the bottom of the rockfill column. The compactive device shall have a minimum power output of 145 kw and frequency within 20 HZ and 60 HZ.

E27.3.3 Holes for the Vibratory Compaction Testing Program shall be drilled with drill rig equipment of suitable size and capacity to drill to the necessary diameter and depth and the specified penetration into the glacial till.

E27.3.4 The Contractor shall supply steel casing to sleeve the rock column shaft to maintain the specified column shafts diameter during backfilling.

E27.3.5 The Contractor shall use vibratory equipment to densify the rockfill column backfill material to ensure that a minimum density of the rockfill backfill material is 1,900 kg/m^3 and is achieved throughout the entire depth of the rock column which is estimated to result in a 15% increase in relative rockfill density.

E27.3.6 Compacting with a vibrating plate compactor, drop hammer, backhoe bucket, or other similar approaches shall not be accepted.

E27.4 Compaction Test Procedure

E27.4.1 The Compaction Testing Program shall be conducted on site within rockfill columns used for the riverbank remediation. All testing shall be carried out in the presence of the Contract Administrator.

E27.4.2 The direct insertion vibratory method compaction tests without the use of additional water shall be conducted in a minimum of three (3) consecutively successful test columns, as

identified by the Contract Administrator, drilled from ground surface to the underlying dense competent till.

E27.4.3 The diameter of the test shaft shall be the same diameter as proposed for the rockfill columns as shown on the Drawings.

E27.4.4 Each test shaft shall be completed in the following manner:

(a) Auger the rockfill column hole from ground surface down to a minimum of 1.0 meter into the underlying competent till. Under no circumstances shall workers be allowed to enter the rockfill column excavation.

(b) Install steel sleeves as shown on Drawings to maintain an open hole to the specified column shaft diameter that extends from ground surface to the underlying till.

(c) Fill the rockfill column hole with the rockfill as specified in the Specification for Rockfill Columns. The Contractor is to take care to ensure that all rockfill material from each truck used to fill the rockfill column is placed inside the rockfill column test shaft. The Contract Administrator will make an estimation of the uncompacted density of the rockfill material within the rockfill column test shaft, based upon the known volume of the test shaft and the weight of the rockfill within the test shaft.

(d) Vibro-compact the rockfill until a minimum rockfill density of 1,900 kg/m^3 is achieved. If it can be demonstrated that a rockfill density greater than 1,900 kg/m^3 can be achieved, the contractor shall achieve that greater density for all remaining rockfill columns as approved by the Contract Administrator.

(e) The steel sleeves are to be removed from the rockfill column test shaft.

E27.5 Acceptance of the Compaction Testing Program

E27.5.1 The Contractor may be advised that additional tests shall be performed until they have demonstrated that their compaction equipment and methods will achieve the specified level of compaction.

E27.5.2 Additional payment for either rockfill, rockfill columns shaft drilling, or sleeving will not be made to the Contractor for additional compaction tests required because of earlier failed tests.

E27.5.3 Acceptance or approval of the Compaction Testing Program shall in no way relieve the Contractor of his contractual obligation of achieving the specified design of compaction during construction.

E27.5.4 Construction of additional rock columns shall not commence until the Contractor has successfully completed the Compaction Testing Program.

E27.6 Measurement and Payment

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

E28. PROTECTION OF INSTRUMENTATION

E28.1 The Contractor shall ensure that existing instrumentation located in the test holes shown on the Drawings are protected from damage due to construction activities. The Contractor will be responsible to replace destroyed instrumentation or repair any damages at his own cost, to the satisfaction of the Contract Administrator.

E29. STRIPPING AND STORAGE OF SALVAGED TOPSOIL

E29.1 Description

E29.1.1 Where feasible, existing on-site Topsoil resources shall be stripped and stored and shall be incorporated back onto the planting site for use as Topsoil growth media.

E29.1.2 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 as hereinafter specified.

E29.1.3 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.

E29.1.4 Related Sections

(a) Growth Media Preparation

E29.1.5 Submittals

(a) Detailed Work Schedule

(b) Written communication detailing progress

E29.2 Materials

E29.2.1 Stripping of Salvaged Topsoil (A-Horizon)

(a) Where feasible, Topsoil (A-Horizon) shall be stripped and salvaged to be used as growth media during the revegetation phase of the project.

(b) The quantity and texture of salvaged material may not be sufficient for all Topsoil requirements. If Topsoil salvaging is not feasible or if salvaged Topsoil yield insufficient quantities for the requirements of the project, additional Topsoil shall be sourced commercially.

(c) Environmental impacts during construction can be reduced by: limiting Topsoil removal and stockpiling existing Topsoil on site; exposing smallest area of soil at any one time during development; requiring a waste management plan from the contractor; establishing staging areas and travel routes for construction vehicles; protecting areas and vegetation adjacent to development from construction activity and debris; enforcing specified parking for construction worker's vehicles; scheduling the installation of features capable of carrying storm run-off prior to removing any existing vegetative cover; and removing heavy sediment loads from runoff waters.

E29.3 Method of Construction

E29.3.1 Ensure that procedures are conducted in accordance with applicable Provincial and Municipal requirements.

E29.3.2 Remove and clear snow from site prior to commencement of soil stripping activities using appropriate machinery.

E29.3.3 Strip Topsoil to a depth of 100mm - 150mm where feasible and haul to a designated temporary storage location on site as indicated on drawing.

E29.3.4 Salvaged Topsoil shall be free of coarse woody material, stones and debris.

E29.3.5 The contractor shall not mix salvaged Topsoil with subsoil during any salvage operations and while salvaged Topsoil are being stored.

E29.3.6 Where feasible, store salvaged Topsoil in strategic locations to minimize the need to move heavy equipment across prepared sites (avoid re-compacting prepared subsoils).

E29.3.7 Ensure stockpiled areas do not create drainage issues to the existing site drainage patterns (i.e. no ponding or damming).

E29.4 Acceptance

(a) Salvaged Topsoil have been stripped and stored as per specification and to the acceptance of the Contract Administrator.

E29.5 Measurement and Payment

E29.5.1 The stripping and storage of salvaged Topsoil materials shall be measured on a volume basis. The volume to be paid shall be the total number of cubic meters stripped and stored in accordance with this Specification and computed from measured area, multiplied by the fixed depth.

E29.5.2 The stripping and storage of salvaged topsoil materials will be paid for at the Contract Unit Price for "Stripping and Storage of Salvaged Topsoil", measured as specified herein, which price shall be payment in full for performing all operations and providing all other items incidental to the Work included in this Specification.

E30. GROWTH MEDIA PREPARATION

E30.1 Description

E30.1.1 Subsoil scarification and Topsoil placement and incorporation shall be undertaken in 2018 within disturbed areas in the planting area. Topsoil shall consist of commercially sourced Topsoil and any Topsoil material salvaged for the construction site. Salvaged Topsoil shall offset the quantities of commercially sourced Topsoil required as per the specifications shown below and the Construction Drawing.

E30.1.2 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) Prepare Subsoils

(b) Supply and Install Topsoil

E30.1.3 Related Sections

(a) Stripping and Storage of Salvaged Topsoil

(b) Native Grass Planting

(c) Tree and Shrub Planting

(d) Willow Planting

E30.1.4 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.

E30.1.5 Submittals

(a) Detailed Work Schedule

(b) Written communication detailing progress

E30.2 Materials

E30.2.1 Topsoil

E30.2.2 This specification refers to any topsoil that is imported to the site.

(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 (*Circium arvense*), Sweet clover (*Melilotus officinale*, M. *alba*), Dandelion (*Taraxacum officinale*) roots or other noxious weeds.

(e) Topsoil, either from imported or salvaged material shall be spread to a depth of 100mm over disturbed sites and incorporated as specified below.

E30.2.3 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.

E30.3 Method of Construction

E30.3.1 Growth Media Preparation

E30.3.2 Subsoil

(a) The Subsoil shall be graded in accordance with Specifications and the Construction Drawings.

(b) The Subsoil on all planting areas shall be disked (fractured) to an approximate depth of 150 - 200mm prior to topsoil placement to the satisfaction of the Contract Administrator.

Topsoil

(c) This specification includes any salvaged Topsoil to be combined with any commercially sourced Topsoil. Salvaged soils may have weed seed and roots.

(d) 100 - 150mm of topsoil shall be incorporated into fractured Subsoils

(e) Topsoil shall be incorporated evenly into disked Subsoils to a depth of 100 - 150mm

(f) Topsoil shall be placed in a manner as to best avoid re-compaction of disked Subsoils.

(g) The Contractor shall take care not to bury topsoil when incorporating into disked Subsoils.

1) If feasible The Contractor shall incorporate Topsoil during late winter as part of riverbank stabilization work in March 2018. If not feasible, Topsoil shall be incorporated by June 1, 2018.

(h) The Contract Administrator shall review and approve all growth media preparation activities.

E30.3.3 Fine Grading

(a) Seedbed grooming/conditioning must be completed no later than June 1.

(b) Topsoil and Finish Grading shall be as shown on the drawings.

(c) The Contractor shall fine grade Topsoil, to eliminate rough spots, ruts or other similar low areas to ensure positive drainage prior to seeding in order to facilitate consistent seed placement and seed rate during planting.

(d) The incorporated Topsoil may require rolling or harrow/packing in order to consolidate soil material and leave the surface smooth, firm and level to the satisfaction of the Contract Administrator.

(e) 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.

E30.4 Acceptance

(a) Acceptance shall be at the discretion of the Contract Administrator as per specification

E30.5 Measurement and Payment

E30.5.1 Fracturing of Subsoils, supply, placement and incorporation of Topsoil 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.

E30.5.2 The growth media preparation will be paid for at the Contract Unit Price for "Growth Media Preparation", measured as specified herein, which price shall be payment in full for performing all operations and providing all other items incidental to the Work included in this Specification.

E31. WILLOW PLANTING

E31.1 Description

E31.1.1 Willow Cuttings will be planted into Zone 1 as shown in the Drawing, in a dormant condition either during later winter-early spring 2018 during the major construction mobilization or in the fall of 2018. Time of willow installation will be dictated by prevailing site planting conditions and will be left to the discretion of the Contract Administrator

E31.1.2 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.

E31.1.3 Submittals

(a) Detailed work schedule

(b) Monthly written report of plant material condition during establishment period

E31.1.4 Related Sections

(a) Weed Control.

(b) Topsoil stripping

E31.1.5 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) Supply and install topsoil.

E31.2 Materials

E31.2.1 Topsoil

E31.2.2 This specification refers to any topsoil placed into Willow Planting Divots

(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 (*Circium arvense*), Sweet clover (*Melilotus officinale*, M. *alba*), Dandelion (*Taraxascum officinale*) roots or other noxious weeds.

E31.2.3 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.

E31.2.4 Willow Cuttings

(a) Source Sandbar willow (*Salix exigua*) locally from donor site conditions that best approximate install site conditions.

(b) Willows must be sourced and installed while in a dormant state.

(c) Willow Cuttings shall be cut to a length of 1500mm.

(d) Willow Cuttings shall be approximately 20 – 40mm in diameter.

(e) Cut ends of Willow Cuttings must be sealed with pruning paint immediately following removal from the Donor Site to prevent desiccation.

E31.2.5 Storage of Plant Material

(a) After harvesting cuttings, avoid storing cuttings if feasible. Cuttings may lose viability with increasing duration of storage time.

(b) If cuttings must be stored, store in temperatures of roughly -3^{o}C to -5^{o}C in moist conditions until installation time.

(c) If cuttings must be stored, do not leave cutting exposed to the weather elements or to damage by animals during storage.

(d) The Contractor shall not damage any parts of individual cuttings including bark during storage.

E31.3 Method of Construction

E31.3.1 Willow Plantings

(a) Spring Willows installation is to occur as early as approximately March 2018 if the site conditions allow (or while the site is accessible). Or Willows shall be kept in a dormant state and installed at the earliest possible opportunity no later than mid May 2018.

(b) Fall Dormant planting may be undertaken if the site is not accessible in Early Spring. Timing of Willow installation shall be at the discretion of the Contract Administrator.

(c) Create willow installation ‘divots’ that are roughly 1220mm – 1500mm (roughly 4 – 5 feet) deep and approximately 100mm (4 inches) wide as shown on the Construction Drawings.

(d) The divot shall be created using a ‘stinger’ which is a long narrow metal probe capable of pushing to a depth of 1220mm – 1500mm (roughly 4 – 5 feet) deep and approximately 100mm (4 inches) wide.

(e) Divots must be spaced at intervals of 300mm – 450mm as shown on the drawing within Zone 1 as shown in the Construction Drawing.

E31.3.2 Willow Installation

(a) Prior to willow placement into the divot, make a fresh cut at the bottom (larger) end of the cutting immediately prior to placement into the divot. Make the cut at roughly a 45^{o} angle. Only make this cut if the cutting is going into a divot immediately (within ½ hour). Do not respray this fresh cut at the bottom of the cuttings.

(b) Willow Cuttings are to be installed into the divot leaving roughly 4 – 6 inches of the cutting above ground.

(c) Place two (2) cuttings, bottom end first, into each divot. Ensure that both cuttings are at least 1250mm (roughly 4 feet) into the divot. This may or may not require minor 'tamping or twisting' to settle the cuttings to an appropriate. The Contractor shall not damage any parts of individual cuttings including bark during installation.

(d) Backfill topsoil into the divot after willows have been placed in the divot. Ensure that there are no voids in the Topsoil as it is back filled to the top of the divot. Topsoil should be friable (not clumpy) and easily placed evenly throughout into the divot with no air voids. 'Shaking the installed Willow Cuttings can help settle dirt to appropriate depths and minimize air voids.

(e) Leave 100mm – 150mm of the cutting showing above grade. Trim off any material exceeding 150mm above grade and reseal with pruning paint. Spray pruning paint on cut surfaces to create a seal to prevent desiccation. Do not apply pruning paint to the sides of the cutting except where the bark has been slightly damaged.

(f) Significantly damaged Willow Cuttings must be discarded and replaced with material in acceptable condition.

(g) Do not damage exposed ends of Willow Cuttings following installation.

E31.4 Acceptance

(a) A minimum of 75% of planted cuttings are to show healthy normal growth by the end of the first full growing season. This shall be determined at the discretion of the Contract Administrator.

E31.5 Measurement and Payment

(a) Installation of Willow Planting and any related Work specified herein will be measured on a Unit basis and paid for at the Contract Unit Price per unit for "Willow Planting" in accordance with this Specification, accepted and measured by the Contract Administrator. Payment schedule as follows:

(b) Upon installation of the Willow Plantings as approved and accepted by the Contract Administrator: 50%

(c) End of first year of establishment as approved and accepted by the Contract Administrator: 50%

E32. WEED CONTROL

E32.1 Description

E32.1.1 Weed Control will be undertaken in all Revegetation Zones as per The Drawing. Weed Control shall be undertaken throughout 2018 and 2019. Up to Three (3) weed control mobilizations may be undertaken per year.

E32.1.2 The work to be done by the Contractor under this Specification and 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) Control of weeds

E32.1.3 Related Sections

(a) Native Grass Planting

(b) Tree and Shrub Planting

E32.1.4 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.

E32.1.5 Submittals

(a) Detailed work schedule

(b) Overall Weed Control strategy and integrated Weed Control plan

(c) Herbicide applicator's license

(d) Monthly written report of Weed Control activities with comment on Weed Control efficacy

(e) Site preparation (Growth Media Preparation)

E32.1.6 Weed control

(b) Properly timed Weed Control shall be undertaken in all planting areas to facilitate plant establishment. Two to three herbicide applications per year may be required during pre-plant site preparation in 2018 and during the post planting maintenance and establishment period in 2019.

(c) Weed Control activities shall be part of an overall strategy and properly timed to maximize efficacy and minimize need for excessive spraying.

(d) The Contractor shall take reasonable steps to prevent noxious weeds or otherwise persistent and invasive weeds from establishing immediately adjacent to the project revegetation area.

(e) Products, timing and rates will be supplied by a certified herbicide applicator with experience in Weed Control in native revegetation projects.

(f) Weed Control must be coordinated with growth and development of the temporary erosion control cover crop in 2018.

(g) Weed Control prescriptions shall be reviewed by The Contract Administrator prior to any Weed Control work. The Contractor must notify the Contract Administrator of upcoming Weed Control activities by at least 24 hours in advance.

(h) Herbicide application shall be undertaken in accordance with GR 130.8.2.3.10 Environmental Protection Specifications.

(i) 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.

(j) Glyphosate cannot be used at any time following Native Seeding.

(k) 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 made by the Contract Administrator. No herbicide application shall be undertaken without consent of the Contract Administrator.

(l) Weed Control techniques must eliminate spray drift to protect adjacent non-target plantings, trees and shrubs in Planting Patches, adjacent habitat and adjacent property.

(m) The Contractor shall undertake all reasonable and permissible means of restricting seed-rain of invasive or otherwise problematic weed species from areas immediately adjacent The Project for the duration of The Project.

E32.1.7 Weed Control Within Tree, Shrub and Willow Plantings

(a) Broadcast spraying shall not be permitted in tree planting patches and in Willow Plantings.

(b) Weeds may be removed manually or by limited spot-sprayed with herbicide. 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 after grasses have been seeded unless otherwise directed by the Contract Administrator.

E32.2 Acceptance

(a) Acceptance shall be at the discretion of the Contract Administrator following timely inspections by the Contract Administrator.

(b) Weeds subject to approved control measures must display the symptoms and signs of impact that is expected of any approved control measure and in a timely fashion.

(c) Timely execution of weed control measures, as directed by the Contract Administrator, is a requirement for Acceptance.

E32.3 Measurement and Payment

E32.3.1 Measurement and payment for the weed control shall be on a per application basis and paid for at the Contract Unit Price per unit for "Weed Control" in accordance with this Specification, accepted and measured by the Contract Administrator. following acceptance.

E33. PLANTING OF TREES AND SHRUBS

E33.1 Description

E33.1.1 Tree and Shrubs will be planted in 2018 in Planting Zone 2 – Lower Bank, and Planting Zone 3 – Upper Bank, as per the Drawing. Plantings will consist of 'Patches' of trees and shrubs in various container sizes.

E33.1.2 The Work to be undertaken 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 herein specified.

E33.1.3 Work shall include, but not necessarily confined to, the relocation, supply and installation of trees and shrubs as indicated on the drawings.

E33.1.4 Related Sections

(a) Weed control

(b) Native Grass Plantings

(c) Topsoil Stripping

E33.1.5 Reference

(a) All plants shall be supplied and installed as per the Canadian Standards for Nursery Stock Current Edition, published by the Canadian Nursery Trades Association, except where specified otherwise.

E33.1.6 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.

E33.1.7 Maintenance

(a) The Contractor shall be responsible for the maintenance of the trees and shrubs 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 as per overall weed control strategy.

(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 weekly written reports to Contract Administrator identifying:

1) Maintenance work carried out.
2) Development and condition of plant material.
3) Preventative or corrective measures required which are outside Contractor's responsibility.

E33.1.8 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 for 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 two (2) years if, at the end of the Warranty Period, leaf development and growth are not sufficient to ensure future survival of the plant material.

E33.1.9 Replacements

(a) During the Warranty 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 trees shall be replaced within three (3) days of notification to the Contractor, unless otherwise agreed to by the City and Contract Administrator.

(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.

E33.2 Materials

E33.2.1 Planting Soil and Mulch

(a) As per Planting Preparation.

(b) Imported soils shall be used to backfill tree and shrub plantings

E33.2.2 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, 40x40x5x2440mm.

(c) ARBORTILE® by Deep Root Canada Corp., or equivalent approved by the Contract Administrator

(d) Guying Collar shall be plastic tube, 13mm diameter, nylon reinforced.

(e) Trunk Protection shall be plastic perforated spiralled strip.

(f) 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.

(g) Root Ball Burlap shall be 150 g Hessian burlap, biodegradable.

(h) 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.

E33.2.3 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:

1) 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;

2) 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 75mm 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;

3) To have all parts, especially lower branches, moist and show live, green cambium tissue when cut;

4) Single stem trees to have only one, sturdy, reasonably straight and vertical trunk, and a well-balanced crown with fully developed leader.

5) To be free of disease, insect infestation, rodent damage, sun scald, frost cracks, abrasions, unhealed scars, scars exceeding 5cm 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;

6) 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;

7) 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.

8) 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.

9) Balled and burlapped trees in excess of a 3m 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 75mm or more in caliper, wrap ball in double layer of burlap and drum lace with minimum 10mm diameter rope. Protect root balls against sudden changes in temperature and exposure to heavy rainfall.

10) 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.

11) Use of collected or native trees is not permitted.

E33.2.4 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 the Plant List shown on the Construction Drawing.

(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 15cm 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.

E33.2.5 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 10mm 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.

E33.3 Construction Methods

E33.3.1 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.

(c) Work to be coordinated with installation of fencing and planting of shrub.

E33.3.2 Planting Time

(a) Plant trees and shrubs as early as May 15 2018 but no later than June 1, 2018 depending when Topsoil are placed and prepared.

(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.

E33.3.3 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) Upon excavation of the planting, 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 300mm depth

E33.3.4 Installation

(a) Plantings of trees and shrubs shall be undertaken in ‘patches’ approximately as shown on the Drawings. Configuration of planting patches as shown in the Drawings is approximate and shall be subject to input and final approval by the Contract Administrator.

(b) Planting shall be done during periods of suitable weather conditions and in accordance with locally accepted practice.

(c) Trees are to be planted within forty eight (48) hours of excavation from the nursery.

(d) 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.

(e) 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.

(f) To avoid future root girdling, The Contractor shall ensure that roots are not coiled around the root ball. After removal from the container, if it is seen that roots are coiled around the root ball, roots must be loosened and spread out in a more natural form before planting in order to establish healthy root development and root direction after planting.

(g) 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.

(h) Each tree is to have an earth saucer at its base having a diameter as large as the excavation with a 10cm lip formed at the perimeter of the saucer to retain water.

(i) 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.

(j) Nursery stock shall be faced to give the best appearance or relationship to adjacent structure and to the approval of The City or The City's representative. Trees shall be placed equal to depth they were originally growing in nursery.

(k) Tree Pit depth shall be such that the top of the root ball is even with the existing grade, taking into account that proper planting depth requires the root flare to be at or slightly above the finished grade. It is important to determine how deep the root flare is in the ball before it is placed in the planting hole. Sometimes the top of the ball may need to be raised until the root flare is at the proper planting depth and/or soil must be removed from the top of the ball.

(l) 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.

E33.3.5 Supply and Installation of Mulch

(a) Contractor to supply and install mulch in tree pit, planters and in areas as indicated in the Drawings. Mulch supplied shall cover entire planting area to a consistent depth of 100mm.

(b) Mulch must not be placed within 8cm (3in.) of tree trunks.

E33.3.6 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.

E33.3.7 Trunk Protection

(a) Install trunk protection on trees as indicated.

(b) Install trunk protection prior to installation of tree supports when used.

E33.3.8 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.

E33.3.9 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) Apply 40 litres of water per 25mm 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.

(c) 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 Scatliff+Miller+Murray Inc. - Fax: (204) 927-3443.

E33.4 Measurement and Payment

E33.4.1 Installation and maintenance of trees and shrubs shall be measured on a per unit basis. The amount to be paid for shall be the total number of trees, shrubs and perennials supplied and installed in accordance with this Specification and the Construction Drawings, and as acceptable to the Contract Administrator.

E33.4.2 Payment for Installation and maintenance of trees and shrubs shall be paid for at the Contract Unit Prices. 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.

E34. NATIVE GRASS PLANTING

E34.1 Description

E34.1.1 Native Grass planting shall be undertaken in 2019 after a year of pre-plant Weed Control in 2018. An erosion control crop shall be planted and managed in 2018 to provide green cover and erosion control while the site is under Weed Control.

E34.1.2 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) Supply and install seed (seed mixes and planting rate information will be supplied by Contract Administrator)

E34.1.3 Related Sections

(a) Growth Media

(b) Weed Control

E34.1.4 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.

E34.1.5 Submittals

(a) Detailed Work Schedule

(b) Native Seeding Establishment Plan

(c) Monthly written report of plant material condition during establishment period

E34.2 Materials

E34.2.1 Erosion Control

(a) Common oats cover crop

E34.2.2 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 m^2 basis.

(c) The Contractor will order seed mixes supplied by The Contract Administrator, pick up and deliver them to the work site. 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.

E34.3 Method of Construction

E34.3.1 Erosion Control

(a) A Cover Crop shall be seeded for erosion control purposes while the site is under Weed Control in 2018.

(b) Common oats may be seeded using harrows and a small machine such as an All Terrane Vehicle (ATV)

(c) Common oats to be seeded immediately after Topsoil placement and fine grading (seedbed preparation) in 2018 no later than June 1.

(d) The Cover crop will be seeded at a rate of 40 - 50lbs per acre or at the direction of the Contract Administrator.

(e) The Cover Crop must be managed to prevent excessive built-up of plant stock (trash) which could interfere with proper native seeding depth and seed to soil contact.

(f) The Contractor shall evaluate all seeded areas for potential soil erosion risks during the life of The Project and take appropriate mitigation measures.

(g) Rutting or damage caused during seeding operation shall be repaired at the Contractor's cost to the satisfaction of the Contract Administrator.

E34.3.2 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 and to the satisfaction of the Contract Administrator.

(b) Prior to seeding permanent Native Grass cover seeding areas shall be free of weedy perennial species to the satisfaction of the Contract Administrator. This includes species that may not be listed as noxious weeds but which are known to become invasive within the planting over time, including Smooth brome, Sweet clover and Dandelion, or which may interfere with the successful establishment of the planting.

(c) 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.

(d) Seeding is to be completed in 2019 by no later than June 10, unless otherwise specified by The Contract Administrator.

(e) Following seeding, The Contractor shall provide the shipment tags from any bag of seed planted on site, to the Contract Administrator.

(f) Drill seeding shall be undertaken using a Truax native seed drill in 2019. Harrow broadcasting shall be kept to a minimum.

(g) The Truax drill must have with seed box agitators, on-row packers and depth bands, capable of uniformly applying the specified mixes to a depth of 5.0-12.0mm (0.25" – 0.5").

(h) The Truax seed drill must be capable of deploying trash plows if required to prevent light debris from interfering with seed placement during native drill seeding.

(i) Harrow-Broadcast seeding is acceptable within tree and shrub planting patches not accessible to the Truax seed drill.

(j) 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 / ft^2) basis.

(k) Expect required seed quantities for the Harrow-Broadcast method to be 2 times the amount required for drill seeding.

(l) Any supplementary broad-cast seeding shall be at the direction of The Contract Administrator. Broadcast seeding and drill seeding require approximately the same seedbed condition.

(m) Broadcast seeding is preceded by 1 or more harrow passes and is then followed by a 2^{nd} harrow pass once seed has been spread at the harrow-broadcast seeding rate specified by The Contract Administrator.

(n) An industrial fertilizer applicator may be used for broadcast seeding to facilitate consistency of seed flow. A manual broadcast seeder may be used for broadcast seeding.

(o) Where feasible, contour seeding must be employed to discourage down slope erosion on sloped areas.

(p) 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 air temperatures.

E34.4 Acceptance

(a) A minimum of 6-8 Native Grass seedlings with permanent roots (grasses at minimum 4-leaf stage) have been documented per 1/10 square meter by the end of the first growing season.

E34.5 Measurement and Payment

E34.5.1 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.

E34.5.2 Supply, placement and establishment of upland Native Grass will be paid for at the Contract Unit Price for "Native Grass Planting", measured as specified herein.

(a) Payment schedule as follows:

1) Upon installation of Erosion crop as approved and accepted by the Contract Administrator: 10%

2) Native seeding installation as approved and accepted by the Contract Administrator: 40%

3) End of establishment period as approved and accepted by the Contract Administrator: 50%

PART F

APPENDICES

APPENDIX A

SOIL LOGS

KGS GROUP

SUMMARY LOG

REFERENCE NO.

HOLE NO. **SI17-02**

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT Seine River Aqueduct
SITE Seine River Aqueduct
LOCATION Mid Bank in Bush
DRILLING METHOD Track Mounted Rig B54X

JOB NO. 17-0107-008
GROUND ELEV. 227.51 m
TOP OF CASING ELEV. 228.54 m
WATER ELEV.
DATE DRILLED 9/19/2017
UTM (m) N 635,621
E 5,528,893

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆ / PL MC LL / %
227	1	5		**Silty Clay** - Black, dry to damp, stiff, high plasticity. - Trace coarse grained sand, trace fine grained gravel at 0.3 m.				S01			
226	2							S02			
225	3	10		- Brown, firm below 2.3 m.	VW	3.0 3.1		S03			
224	4							S04			
223.0		15						S05			
222.9	5			**Clayey Silt** - Tan, moist, loose to compact, intermediate to low plasticity.							
222.2								S06			
222	6	20		**Silty Clay** - Brown, moist, firm, high plasticity.	VW	6.0 6.2		S07			
221	7							S08			
220	8	25									
219	9	30		- Mottled grey & brown below 9.1 m.	VW	9.1 9.2		S09			
218	10							S10			
217	11	35		- Grey, trace fine-grained gravel below 10.7 m.				S11			
216	12	40									
215	13			- Soft below 12.5 m.				S12			
214.4				**Silt Till** - Tan to grey, wet, compact to very dense, with fine to coarse grained sand, some fine to coarse grained gravel, trace cobbles, possible boulders.				S13			
214	14	45			VW	13.6 13.8		S14	44	▲ 35 ▲ 16	
213								S15			
212.1	15	50				15.4		S16		▲ 11 ▲ 50/ SPT terminated with 25 mm left in 2n	
212	16			**REFUSAL AT 15.37 m BELOW GRADE**							
211	17	55									
210	18										
209		60									

Notes:
1. Installed Slope Inclinometer casing at 14.33 m below grade with a 0.91 m stick up.
2. Installed four (4) Vibrating Wire (VW) Piezometers
   - 1702393 @ 3.05 m below grade in the upper Silty Clay
   - 1702724 @ 6.10 m below grade in the middle Silty Clay
   - 1501803 @ 9.14 m below grade in the lower Silty Clay
   - 1501804 @ 13.72 m below grade in Silt Till

SAMPLE TYPE ⊠ Auger Grab ⊠ Split Spoon

CONTRACTOR	INSPECTOR	APPROVED	DATE
Maple Leaf Drilling Ltd.	D. FLYNN	DEA	10/5/17

GEOTECHNICAL-SOIL LOG U:\FMS\17-0107-008\17-0107-008 SEINE RIVER AQUEDUCT - SEPTEMBER 18-19, 2017.GPJ

KGS GROUP

SUMMARY LOG

REFERENCE NO.

HOLE NO. **SI17-03**

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT Seine River Aqueduct
SITE Seine River Aqueduct
LOCATION Mid Bank Grassy Slope
DRILLING METHOD Track Mounted Rig B54X

JOB NO. 17-0107-008
GROUND ELEV. 227.55 m
TOP OF CASING ELEV. 228.50 m
WATER ELEV.
DATE DRILLED 9/19/2017
UTM (m) N 635,600
E 5,528,873

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆
227	1	5		**Silty Clay** - Brown, damp, stiff, high plasticity.			S01			
				- Trace coarse grained gravel, trace cobbles at 0.9 m.			S02			◆
226	2						S03			◆
225										
224.8										
224.5	3	10		**Clayey Silt** - Tan to grey, damp to moist, loose to compact, intermediate to low plasticity.			S04			
224				**Silty Clay** - Brown, moist, firm, high plasticity.			S05			◆
	4									
223		15								
	5				VW	4.9	S06			◆
222						5.0				
	6	20								
221							S07			◆
	7									
220		25		- Grey below 7.6 m.						
	8									
219							S08			◆
	9	30			VW	9.1				
218						9.3	S09			◆
	10									
217		35								
	11						S10			◆
216				- Trace coarse-grained sand and cobbles below 11.3 m.						
	12	40								
215							S11			◆
214.6										
	13			**Silt Till** - Tan to grey, moist, dense, with fine to coarse grained sand, some fine to coarse grained gravel, trace cobbles, possible boulders.			S12			◆
214.1										
213.8		45				13.7	S13		▲ 50	
	14			**REFUSAL AT 13.73 m BELOW GRADE**					SPT terminated with 137.5 mm left in	
213										
	15	50		Notes:						
212				1. Installed Slope Inclinometer casing at 13.72 m below grade with a 0.89 m stick up.						
	16			2. Installed two (2) Vibrating Wire (VW) Piezometers						
211				- 1702394 @ 4.98 m below grade in the upper Silty Clay						
	17	55		- 1702395 @ 9.25 m below grade in the lower Silty Clay						
210										
	18	60								
209										

SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △: 20 40 60

Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆: 20 40 60 80

PL MC LL

%: 20 40 60 80

SAMPLE TYPE ⊠ Auger Grab ⊠ Split Spoon

CONTRACTOR	INSPECTOR	APPROVED	DATE
Maple Leaf Drilling Ltd.	D. FLYNN	DEA	10/5/17

GEOTECHNICAL-SOIL LOG U:\FMS\17-0107-008\17-0107-008 SEINE RIVER AQUEDUCT - SEPTEMBER 18-19, 2017.GPJ

KGS GROUP

SUMMARY LOG

REFERENCE NO.

HOLE NO. **SI17-04**

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT Seine River Aqueduct
SITE Seine River Aqueduct
LOCATION Lower Bank in Bush
DRILLING METHOD Track Mounted Rig B54X

JOB NO. 17-0107-008
GROUND ELEV. 225.86 m
TOP OF CASING ELEV. 226.81 m
WATER ELEV.
DATE DRILLED 9/19/2017
UTM (m) N 635,586
E 5,528,862

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆
225	1	5		**Silty Clay** - Brown, damp, stiff, high plasticity.			S01				
224	2										
223	3	10			VW	3.0 3.1	S02				◆
222.0							S03				◆
222	4			**Clayey Silt** - Tan to grey, damp to moist, loose to compact, intermediate to low plasticity.			S04				
221.3		15									
221	5			**Silty Clay** - Brown, damp, firm, high plasticity.			S05				
220	6	20			VW	6.0 6.2					
219	7						S06				
218	8	25									
217	9	30			VW	9.1 9.2	S07				
216	10						S08				
215.0		35									
214	11			**Silt Till** - Tan to grey, damp, compact to dense, with fine to coarse grained sand, some fine to coarse grained gravel, trace cobbles, possible boulders.			S09				
213	12	40					S10			▲ 10 ▲ 10	
212	13						S11			▲ 28	
211	14	45					S12			▲ 6 ▲ 8 ▲ 10	
210.5	15	50			VW	14.6 14.7	S13				
210	16					15.4	S14			▲ 50 SPT terminated at end of 1st set	
209	17	55									
208	18	60									
207				**REFUSAL AT 15.70 m BELOW GRADE**							

Notes:
1. Installed Slope Inclinometer casing at 15.70 m below grade with a 0.91 m stick up.
2. Installed four (4) Vibrating Wire (VW) Piezometers
   - 1702404 @ 3.05 m below grade in the upper Silty Clay
   - 1702405 @ 6.10 m below grade in the middle Silty Clay
   - 1702725 @ 9.14 m below grade in the lower Silty Clay
   - 1308589 @ 14.63 m below grade in Silt Till

SAMPLE TYPE ⊠ Auger Grab ⊠ Split Spoon

CONTRACTOR	INSPECTOR	APPROVED	DATE
Maple Leaf Drilling Ltd.	K. HAMILTON	DEA	10/5/17

GEOTECHNICAL-SOIL LOG U:\FMS\17-0107-008\17-0107-008 SEINE RIVER AQUEDUCT - SEPTEMBER 18-19, 2017.GPJ

KGS GROUP

SUMMARY LOG

REFERENCE NO.

HOLE NO. **SI17-05**

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT Seine River Aqueduct
SITE Seine River Aqueduct
LOCATION Lower Bank in Bush
DRILLING METHOD Track Mounted Geoprobe 7822DT

JOB NO. 17-0107-008
GROUND ELEV. 225.22 m
TOP OF CASING ELEV. 226.20 m
WATER ELEV.
DATE DRILLED 9/18/2017
UTM (m) N 635,571
E 5,528,852

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆ / PL MC LL / %
225				**Silty Clay** - Brown, damp, firm, high plasticity.						
224	1	5					S01			
223	2				VW	2.4	S02			
						2.5				
222	3	10					S03			
221	4									
220	5	15			VW	5.4	S04			
						5.6				
219	6	20								
218	7						S05			
217	8	25		- Soft below 8.2 m.	VW	8.5	S06			
						8.6				
216	9	30		- Trace coarse grained sand, trace fine grained to coarse grained gravel below 9.1 m.						
215	10						S07			
214	11	35		- Grey, moist below 10.4 m.			S08			
213	12	40								
212	13						S09			
211.8					VW	13.3				
	14	45		**Silt Till** - Tan to grey, damp, compact to dense, with fine to coarse grained sand, some fine to coarse grained gravel, trace cobbles, possible boulders.		13.5	S10			
211						14.3				
210.3	15	50		**END OF TEST HOLE AT 14.93 m BELOW GRADE**		14.9				
210										
209	16									
208	17	55								
207	18	60								

Notes:
1. Installed Slope Inclinometer casing at 14.33 m below grade with a 0.91 m stick up.
2. Installed four (4) Vibrating Wire (VW) Piezometers
   - 1702390 @ 2.44 m below grade in the upper Silty Clay
   - 1702391 @ 5.49 m below grade in the middle Silty Clay
   - 1702392 @ 8.53 m below grade in the lower Silty Clay
   - 1503587 @ 13.41 m below grade in Silt Till

SAMPLE TYPE Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Maple Leaf Drilling Ltd.	K. HAMILTON	DEA	10/5/17

GEOTECHNICAL-SOIL LOG U:\FMS\17-0107-008\17-0107-008 SEINE RIVER AQUEDUCT - SEPTEMBER 18-19, 2017.GPJ