



THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 747-2005

ST. JOHN'S PARK – RIVERBANK REMEDIATION WORKS



TABLE OF CONTENTS

PART A - BID SUBMISSION

Form A: Bid	1
Form B: Prices	4
Form G1: Bid Bond and Agreement to Bond	6
Form G2: Irrevocable Standby Letter of Credit and Undertaking	8

PART B - BIDDING PROCEDURES

B1. Project Title	1
B2. Submission Deadline	1
B3. Site Investigation	1
B4. Enquiries	1
B5. Addenda	2
B6. Substitutes	2
B7. Bid Submission	3
B8. Bid	4
B9. Prices	4
B10. Qualification	5
B11. Bid Security	5
B12. Opening of Bids and Release of Information	6
B13. Irrevocable Bid	7
B14. Withdrawal of Bids	7
B15. Evaluation of Bids	7
B16. Award of Contract	8

PART C - GENERAL CONDITIONS

C1. General Conditions	1
------------------------	---

PART D - SUPPLEMENTAL CONDITIONS

General

D1. General Conditions	1
D2. Scope of Work	1
D3. Contract Administrator	1
D4. Contractor's Supervisor	1
D5. Notices	2
D6. Furnishing of Documents	2

Submissions

D7. Safe Work Plan	2
D8. Insurance	2
D9. Performance Security	3
D10. Detailed Work Schedule	3
D11. Security Clearance	4

Schedule of Work

D12. Commencement	4
D13. Critical Stages	5
D14. Substantial Performance	5
D15. Total Performance	5
D16. Liquidated Damages	5
D17. Scheduled Maintenance	6

Control of Work

D18. Job Meetings	6
D19. Prime Contractor – The Workplace Safety and Health Act (Manitoba)	6

Template Version: 03/20/05/001

D20. Warranty	6
D21. Safety	6
Form H1: Performance Bond	7
Form H2: Irrevocable Standby Letter of Credit	9

PART E - SPECIFICATIONS

General

E1. Applicable Specifications, Standard Details and Drawings	1
E2. Office Facilities	1
E3. GEOTECHNICAL INFORMATION	2
E4. Verification of truck Weights	2
E5. Truck Weight Limits	2
E6. Site Development and Restoration	3
E7. Geotextile	5
E8. Rockfill Riprap	6
E9. Rockfill Columns	8
E10. Rockfill Trench Shear key	12
E11. Channel Protection	16
E12. Common Excavation	16
E13. SILT FENCE	16
E14. Topsoil and Seeding	18
E15. Environmental Protection Plan	19
E16. Tree and Shrub Planting	25

PART B - BIDDING PROCEDURES

B1. PROJECT TITLE

B1.1 ST. JOHN'S PARK – RIVERBANK REMEDIATION WORKS

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, January 20, 2006.

B2.2 Bid Submissions 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 GC:3.1, the Contract Administrator or an authorized representative will be available at the Site from 10:00 a.m. to 12:00 p.m. at St. John's Park (Anderson Avenue and St. Cross Street) on January 16, 2006 to provide Bidders access to the Site. A test pitting program in the vicinity of the trench shear key will be undertaken as part of the Site meeting. Bidders are strongly advised to attend meeting.

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 judgement 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 judgement of the Contract Administrator, do not require a correction to or a clarification of the Bid Opportunity will be provided by the Contract Administrator only to the Bidder who made the enquiry.

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

B5. ADDENDA

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

B5.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.

B5.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet Site at <http://www.winnipeg.ca/matmgt>.

B5.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Branch internet Site for addenda shortly before submitting his Bid.

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

B6. SUBSTITUTES

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

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

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

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

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

- B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B6.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, only to the Bidder who requested approval of the substitute.
- B6.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely responsible for disseminating information regarding the approval to any person or persons he wishes to inform.
- B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative shall base his Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B15.
- B6.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B7. BID SUBMISSION

- B7.1 The Bid Submission consists of the following components:
- (a) Form A: Bid;
 - (b) Form B: Prices;
 - (c) Form G1: Bid Bond and Agreement to Bond, or Form G2: Irrevocable Standby Letter of Credit and Undertaking, or a certified cheque or draft;
- B7.2 All components of the Bid Submission 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 in ink, to constitute a responsive Bid.
- B7.3 The Bid Submission shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder’s name and address.
- B7.3.1 Samples or other components of the Bid Submission 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 Submission.
- B7.4 Bid Submissions submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B7.5 Bid Submissions shall be submitted to:
- The City of Winnipeg
Corporate Finance Department
Materials Management Branch
185 King Street, Main Floor
Winnipeg MB R3B 1J1

B8. BID

- B8.1 The Bidder shall complete Form A: Bid, making all required entries.
- B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, his name shall be inserted;
 - (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
 - (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
 - (d) if the Bidder is carrying on business under a name other than his own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.
- B8.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.
- B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.
- B8.4 Paragraph 12 of Form A: Bid shall be signed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, it shall be signed by the Bidder;
 - (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
 - (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, should be affixed;
 - (d) if the Bidder is carrying on business under a name other than his own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.
- B8.4.1 The name and official capacity of all individuals signing Form A: Bid shall be printed below such signatures.
- B8.4.2 All signatures shall be original and shall be witnessed except where a corporate seal has been affixed.
- B8.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid Submission and the Contract, when awarded, shall be both joint and several.

B9. PRICES

- B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices, except that the Bidder shall state a price for only one (1) of either Items 5,6,7 or 8, the lowest Total Bid shall be accepted.
- B9.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.
- B9.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed by the Contractor, to be measured as specified in the applicable Specifications.

B10. QUALIFICATION

B10.1 The Bidder shall:

- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba;
- (b) be responsible and not be suspended, debarred or in default of any obligation to the City;
- (c) be financially capable of carrying out the terms of the Contract;
- (d) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract;
- (e) have successfully carried out Work, similar in nature, scope and value of the Work;
- (f) employ only SubContractors who:
 - (i) are responsible and not suspended, debarred or in default of any obligation 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 Branch internet Site at <http://www.winnipeg.ca/matmgt>); and
 - (ii) have successfully carried out Work similar in nature, scope and value to the portion of the Work proposed to be subcontracted to them, and are fully capable of performing the Work required to be done in accordance with the terms of the Contract;
- (g) have a written Workplace safety and health program in accordance with The Workplace Safety and Health Act (Manitoba);

B10.2 The Bidder shall, within three (3) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder has a Workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

- (a) a valid COR certification number under the Certificate of Recognition (COR) Program - Option 1 administered by the Manitoba Heavy Construction Association's Safety, Health and Environment Program; or
- (b) a valid COR certification number under the Certificate of Recognition (COR) Program administered by the Manitoba Construction Safety Association; or
- (c) 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 Branch internet Site at <http://www.winnipeg.ca/matmgt>.)

B10.3 The Bidder shall be prepared to submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed SubContractor.

B10.4 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B11. BID SECURITY

B11.1 The Bidder shall provide bid security in the form of:

- (a) a bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in

- Manitoba, in the form included in the Bid Submission (Form G1: Bid Bond and Agreement to Bond); or
- (b) an irrevocable standby letter of credit, in the amount of at least ten percent (10%) of the Total Bid Price, and undertaking issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form included in the Bid Submission (Form G2: Irrevocable Standby Letter of Credit and Undertaking); or
 - (c) a certified cheque or draft payable to "The City of Winnipeg", in the amount of at least fifty percent (50%) of the Total Bid Price, drawn on a bank or other financial institution registered to conduct business in Manitoba.
- B11.1.1 If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.
- B11.2 The bid security of the successful Bidder and the next two lowest evaluated responsive and responsible Bidders will be released by the City when a Contract for the Work has been duly executed by the successful Bidder and the performance security furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.
- B11.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B11.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.
- B11.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.
- B11.3 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Bid Opportunity.

B12. OPENING OF BIDS AND RELEASE OF INFORMATION

- B12.1 Bid Submissions will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Branch, or in such other office as may be designated by the Manager of Materials.
- B12.1.1 Bidders or their representatives may attend.
- B12.1.2 Bid Submissions determined by the Manager of Materials, or his designate, to not include the bid security specified in B11 will not be read out.
- B12.2 After the public opening, the names of the Bidders and their Total Bid Prices as read out (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 Branch internet Site at <http://www.winnipeg.ca/matmgt>.
- B12.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract Amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet Site at <http://www.winnipeg.ca/matmgt>.
- B12.4 The Bidder is advised that any information contained in any Bid Submission may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B13. IRREVOCABLE BID

- B13.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.
- B13.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly executed and the performance security furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid.

B14. WITHDRAWAL OF BIDS

- B14.1 A Bidder may withdraw his Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.
- B14.1.1 Notwithstanding GC:23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.
- B14.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid, and only such person, has authority to give notice of withdrawal.
- B14.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials shall:
- (a) retain the Bid Submission until after the Submission Deadline has elapsed;
 - (b) open the Bid Submission to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid; and
 - (c) if the notice has been given by any one of the persons specified in B14.1.3(b), declare the Bid withdrawn.
- B14.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B13.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

B15. EVALUATION OF BIDS

- B15.1 Award of the Contract shall be based on the following bid evaluation criteria:
- (a) compliance by the Bidder with the requirements of the Bid Opportunity (pass/fail);
 - (b) qualifications of the Bidder and the SubContractors, if any, pursuant to B10 (pass/fail);
 - (c) Total Bid Price;
 - (d) economic analysis of any approved alternative pursuant to B6.
- B15.2 Further to B15.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid Submission 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 if the interests of the City so require.

- B15.3 Further to B15.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid Submission or in other information required to be submitted, that he is responsible and qualified.
- B15.4 Further to B15.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices, except that the Bidder shall state a price for **only one (1) of either Items 5, 6, 7 or 8**. If the Bidder bids on more than one (1) of Items 5, 6, 7 or 8 the lowest Total Bid shall be accepted.
- B15.4.1 If there is any discrepancy between the Total Bid Price written in figures, the Total Bid Price written in words and the sum of the quantities multiplied by the unit prices for each item, the sum of the quantities multiplied by the unit prices for each item shall take precedence.

B16. AWARD OF CONTRACT

- B16.1 The City will give notice of the award of the Contract by way of a letter of intent, or will give notice that no award will be made.
- B16.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.
- B16.2.1 Without limiting the generality of B16.2, the City will have no obligation to award a Contract where:
- (a) the prices exceed the available City funds for the Work;
 - (b) the prices are materially in excess of the prices received for similar Work in the past;
 - (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;
 - (d) only one Bid is received; or
 - (e) in the judgement of the Award Authority, the interests of the City would best be served by not awarding a Contract.
- B16.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid.

PART C - GENERAL CONDITIONS

C1. GENERAL CONDITIONS

C1.1 The *General Conditions for Construction Contracts* (Revision 2000 11 09) are applicable to the Work of the Contract.

C1.1.1 The *General Conditions for Construction Contracts* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet Site at <http://www.winnipeg.ca/matmgt>.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

- D1.1 In addition to the *General Conditions for Construction Contracts*, these Supplemental Conditions are applicable to the Work of the Contract.
- D1.2 The General Conditions are amended by striking out "The City of Winnipeg Act" wherever it appears in the General Conditions and substituting "The City of Winnipeg Charter".
- D1.3 The General Conditions are amended by striking out "Tender Package" wherever it appears in the General Conditions and substituting "Bid Opportunity".
- D1.4 The General Conditions are amended by striking out "Tender Submission" wherever it appears in the General Conditions and substituting "Bid Submission".
- D1.5 The General Conditions are amended by deleting GC:6.16 and GC:6.17. The City of Winnipeg is now within the jurisdiction of the Manitoba Ombudsman pursuant to The Ombudsman Act.

D2. SCOPE OF WORK

- D2.1 The Work to be done under the Contract shall consist of trench and/or rockfill rock column shear key construction, rockfill riprap placement, excavation, access development and related Works.
- D2.2 The major components of the Work are as follows:
- (a) Site preparation, access development, general Site cleanup and restoration
 - (b) Construction of trench and rockfill column shear key along lower bank area, complete with material excavation and removal, rockfill supply and placement, and clay cap placement.
 - (c) Supply and placement of rockfill riprap along the shoreline
 - (d) Tree and shrub planting.

D3. CONTRACT ADMINISTRATOR

- D3.1 The Contract Administrator is KGS Group, represented by:
Anne-Marie Hamilton, P.Eng.
Geotechnical Engineer
3rd Floor – 865 Waverley Street
Winnipeg, Manitoba, R3T 5P4
Telephone No. (204) 896-1209
Facsimile No. (204) 896-0754
- D3.2 At the pre-construction meeting, Ms. Hamilton will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D4. CONTRACTOR'S SUPERVISOR

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

D5. NOTICES

- D5.1 Except as provided for in GC:23.2.2, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the Contractor shall be sent to the address or facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid.
- D5.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D5.3, D5.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the address or facsimile number identified in D3.1.
- D5.3 All notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following address or facsimile number:
- The City of Winnipeg
Chief Administrative Officer Secretariat
Administration Building, 3rd Floor
510 Main Street
Winnipeg MB R3B 1B9
Facsimile No.: (204) 949-1174
- D5.4 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following address or facsimile number:
- The City of Winnipeg
Corporate Services Department
Legal Services Division
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1
Facsimile No.: (204) 947-9155

D6. FURNISHING OF DOCUMENTS

- D6.1 Upon award of the Contract, the Contractor will be provided with three (3) complete sets of the Bid Opportunity. If the Contractor requires additional sets of the Bid Opportunity, they will be supplied to him at cost.

SUBMISSIONS

D7. SAFE WORK PLAN

- D7.1 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 GC:4.1 for the return of the executed Contract.
- D7.2 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 Branch internet Site at <http://www.winnipeg.ca/matmgt>.

D8. INSURANCE

- D8.1 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) all inclusive, with The City of Winnipeg being added as an additional insured, with a cross-liability clause, such liability policy to also contain a contractual liability, an unlicensed motor vehicle liability and a products and completed operations endorsement to remain in place at all times during the performance of the Work and throughout the warranty period;
- (b) automobile liability insurance for owned and non-owned automobiles used for or in connection with the Work in the amount of at least two million dollars (\$2,000,000.00) at all times during the performance of the Work and until the date of Total Performance;

D8.2 Deductibles shall be borne by the Contractor.

D8.3 The Contractor shall provide the City Solicitor with a certificate of insurance of each policy, in a form satisfactory to the City Solicitor, 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 GC:4.1 for the return of the executed Contract.

D8.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least fifteen (15) Calendar Days prior written notice to the Contract Administrator.

D9. PERFORMANCE SECURITY

D9.1 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.

D9.1.1 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.

D9.2 If the bid security provided in his Bid Submission was not a certified cheque or draft pursuant to B11.1(c), the Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site but in no event later than the date specified in GC:4.1 for the return of the executed Contract.

D10. DETAILED WORK SCHEDULE

D10.1 The Contractor shall provide the Contract Administrator with a detailed Work schedule at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in GC:4.1 for the return of the executed Contract.

D10.2 The detailed Work schedule shall consist of:

- (a) a Gantt chart for the Work based on the terms of Work listed on Form B of the tender submission.

D10.3 Further to D10.2(a), the Gantt chart shall show the time on a weekly basis, required to carry out the Work of each specification division.

D11. SECURITY CLEARANCE

D11.1 Each individual proposed to perform the following portions of the Work:

(a) Bank stabilization activities on private property.

shall be required to obtain a Criminal Record Search Certificate from the police service having jurisdiction at his place of residence.

D11.2 Prior to the commencement of any Work, and during the term of the Contract if additional or replacement individuals are proposed to perform Work, the Contractor shall supply the Contract Administrator with a Criminal Record Search Certificate obtained not earlier than one (1) year prior to the Submission Deadline, or a certified true copy thereof, for each individual proposed to perform Work within City facilities or on private property.

D11.3 Any individual for whom a Criminal Record Search Certificate is not provided, or for whom a Criminal Record Search Certificate indicates any convictions or pending charges related to property offences or crimes against another person, will not be permitted to perform any Work on private property.

D11.4 Any Criminal Record Search Certificate obtained thereby will be deemed valid for the duration of the Contract subject to a repeated records search as hereinafter specified.

D11.5 Notwithstanding the foregoing, at any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require an updated criminal records search. Any individual who fails to provide a satisfactory Criminal Record Search Certificate as a result of a repeated criminal records search will not be permitted to continue to perform Work under the Contract within City facilities or on private property.

SCHEDULE OF WORK

D12. COMMENCEMENT

D12.1 The Contractor shall not commence any Work until he is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.

D12.2 The Contractor shall not commence any Work on the Site until:

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

- (i) evidence that the Contractor is 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;
- (ii) evidence of the Workers compensation coverage specified in GC:6.14;
- (iii) the Safe Work Plan specified in D7;
- (iv) evidence of the insurance specified in D8;
- (v) the performance security specified in D9;
- (vi) the detailed Work schedule specified in D10;
- (vii) the security clearances specified in D11; and

(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.

D12.3 The Contractor shall commence the Work on the Site within seven (7) Working Days of receipt of the letter of intent.

D13. CRITICAL STAGES

D13.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

- (a) Critical Stage 1 – Construction of rockfill column shear key in vicinity of Hart Avenue Forcemain shall be completed by prior to initiation of construction of the trench shearkey.
- (b) Critical Stage 2 – Construction of trench and / or rockfill column shear key shall be completed by March 10, 2006.
- (c) Critical Stage 3 - Placement of the riprap blanket shall be completed by March 24, 2006.

D14. SUBSTANTIAL PERFORMANCE

D14.1 The Contractor shall achieve Substantial Performance on or before March 31, 2006.

D14.2 When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D14.3 The date on which the Work has been certified by the Contract Administrator as being substantially performed to the requirements of the Contract through the issue of a certificate of Substantial Performance is the date on which Substantial Performance has been achieved.

D15. TOTAL PERFORMANCE

D15.1 The Contractor shall achieve Total Performance by July 31, 2006.

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

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

D16. LIQUIDATED DAMAGES

D16.1 If the Contractor fails to achieve Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for Substantial Performance or Total Performance, the Contractor shall pay the City the following per Business Day for each and every Business Day following the days fixed herein for Substantial Performance or Total Performance during which such failure continues.

- (a) Substantial Performance – One Thousand Dollars (\$1,000.00)
- (b) Total Performance – Five Hundred Dollars (\$500.00)

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

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

D17. SCHEDULED MAINTENANCE

D17.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

(a) Sod as specified in CW3510-R7.

D17.2 Determination of Substantial Performance and Total Performance shall be exclusive of scheduled maintenance identified herein. All scheduled maintenance shall be completed prior to the expiration of the warranty period. Where the scheduled maintenance cannot be completed during the warranty period, the warranty period shall be extended for such period of time as it takes the Contractor to complete the scheduled maintenance.

CONTROL OF WORK

D18. JOB MEETINGS

D18.1 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.

D18.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

D19. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D19.1 Further to GC:6.26, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

D20. WARRANTY

D20.1 Notwithstanding GC:13.2, the warranty period shall begin on the date of Total Performance and shall expire two (2) years thereafter unless extended pursuant to GC:13.2.1 or GC:13.2.2, in which case it shall expire when provided for thereunder.

D20.2 Notwithstanding GC:13.2 or D20.1, the Contract Administrator may permit the warranty period for a portion or portions of the Work to begin prior to the date of Total Performance if:

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

D21. SAFETY

D21.1 The Contractor shall be required to maintain a safe Site and Work environment satisfying all regulatory requirements including, but not limited to, having in place a safety program which meets or exceeds all elements required in Section 7.4 (5) of the Workplace Safety & Health Act.

FORM H1: PERFORMANCE BOND
(See D9)

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 dated the

_____ day of _____, 20____, for:

BID OPPORTUNITY NO. 747-2005

ST. JOHN'S PARK – RIVERBANK REMEDIATION WORKS

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)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

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

**FORM H2: IRREVOCABLE STANDBY LETTER OF CREDIT
(PERFORMANCE SECURITY)
(See D9)**

(Date)

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

RE: PERFORMANCE SECURITY - BID OPPORTUNITY NO. 747-2005

ST. JOHN'S PARK – RIVERBANK REMEDIATION WORKS

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

(Name of Contractor)

(Address of Contractor)

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

_____ Canadian dollars.

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

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

Partial drawings are permitted.

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

(Address)

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

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

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

(Date)

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

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

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

(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS, STANDARD DETAILS AND DRAWINGS

E1.1 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.

E1.1.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet Site at <http://www.winnipeg.ca/matmgt>.

E1.1.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.

E1.1.3 Further to GC:2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.

E1.2 The following Drawings are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
01-0107-19 01	List of Drawings / Site Location Plan
01-0107-19 02	General Site Arrangement / Plan of Remedial Works
01-0107-19 03	Sections A, B and C

E1.3 Material samples for the Contract Administrators review which require a third or subsequent resubmission will be reviewed at the Contractor's expense.

E2. OFFICE FACILITIES

E2.1 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°C or 24-25°C.
- (e) The building shall be adequately lighted with fluorescent fixtures and have a minimum of three wall outlets.
- (f) The building shall be furnished with two desks, two drafting tables, table 3m X 1.2m, one stool, one four drawer legal size filing cabinet, and a minimum of 8 chairs.
- (g) A portable toilet shall be located near the field office building. The toilet shall have a locking door and be for the exclusive use of the Contract Administrator and other personnel from the City.
- (h) The field office building and the portable toilet shall be cleaned on a weekly basis immediately prior to each Site meeting. The Contract Administrator may request additional cleaning when he deems it necessary.

E2.2 The Contractor shall be responsible for all installation and removal costs, all operating costs, and the general maintenance of the office facilities.

E2.3 The office facilities will be provided from the date of the Commencement of the Work until Substantial Performance.

E3. GEOTECHNICAL INFORMATION

E3.1 Further to GC:3.1, of the General Conditions, geotechnical test holes have been drilled in the vicinity of the proposed Works to determine the character of the subsurface soil to facilitate the design of the Work. The information is considered accurate at the locations indicated and at the time of the investigation. However, considerable variations in the soil conditions may exist between test holes and fluctuations in ground water levels can be expected seasonally. Test hole logs are included.

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

E3.3 Any test borings made by the Bidder shall be done in accordance with the requirements of the appropriate authority of the City of Winnipeg. Bidders shall notify the Contract Administrator prior to starting any soil boring operation.

E4. VERIFICATION OF TRUCK WEIGHTS

E4.1 All Material which is paid for on a weight basis shall be weighed on a scale certified by Consumer & Corporate Affairs, Canada.

E4.1.1 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. The tare weight and net weight may either be hand written or machine printed. All weights, scales and procedures shall be subject to inspection and verification by the Contract Administrator. Such inspection and verification may include, but shall not be limited to:

- (a) checking Contractor's scales for Consumer & Corporate Affairs certification seals;
- (b) observing weighing procedures;
- (c) random checking of either gross or tare weights by having such trucks or truck/trailer(s) combinations as the Contract Administrator shall select weighed at the nearest available certified scale;
- (d) checking tare weights shown on delivery tickets against a current tare.

E4.2 The Contractor shall ensure that each truck or truck/trailer(s) combination delivering Material which is paid for on a weight basis carries a tare not more than one (1) month old.

E4.2.1 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);

E5. TRUCK WEIGHT LIMITS

E5.1 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.

E6. SITE DEVELOPMENT AND RESTORATION

E6.1 Description

This Specification shall cover all aspects of the Site development and restoration Work, including equipment mobilization and demobilization, removal of debris, erection, maintenance and removal of safety fencing, sediment control Works, snow clearing, general access development, access maintenance, removal of Contract Administrator's Site trailer, and Site restoration.

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

E6.2 Equipment

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

E6.3 Mobilization/Demobilization

The mobilization and demobilization of all equipment necessary to complete the Work is covered under this specification, including installation, maintenance and removal of the Contract Administrator's Site trailer.

E6.4 Site and Construction Access

E6.4.1 The Contractor shall be responsible to develop suitable Site access. This shall include but is not limited to, temporary bridging over structures, temporary removal and reinstallation of fencing, restoration of sod, etc.

All construction access ramps from the top of bank area down to the edge of the river shall be constructed by excavating to the necessary ramp grade and disposing of the material off Site. Under no circumstances will the excavated material or any additional material be placed as fill in the ramp area. The Contractor is responsible for obtaining all required permits and permissions that are necessary for Site access, which may include a Waterways Construction Permit, and a Frozen Waterway Permit from the City of Winnipeg Police Department.

E6.4.2 The locations of the Contractor's construction access ramps shall be restored to the same condition or better than it was prior to the initiation of any Work.

E6.4.3 The Contractor shall construct a safety warning fence as directed by the Contract Administrator.

E6.5 Vegetation Removal

Some vegetation (small trees and shrubs) removal will be permitted in order to facilitate Site access. Existing vegetation shall not be removed without prior approval from the Contract Administrator. The Contractor shall load and haul any removed vegetation, and dispose of the materials off site immediately upon collection. Stockpiling shall not be permitted.

E6.6 Debris removal

The Contractor shall remove all debris from the Site to facilitate access development and construction of the Works. The debris shall include but not be limited to wood/tree debris along

the shoreline. All debris shall be disposed of off Site immediately upon collection. No stockpiling will be permitted.

E6.7 Snow and Ice Removal

E6.7.1 Snow cover shall be cleared from the riverbank prior to construction of Works. The methodology to clear the snow shall be subject to the approval of the Contract Administrator. The Contractor will also be responsible for all snow clearing along Site access points for equipment access.

E6.7.2 Ice at the shoreline of the Red River shall be broken and cleared before the placement of riprap below ice level. Care shall be taken to ensure that the ice is removed, and does not become trapped below rockfill riprap placement, as identified in E8 Rockfill Riprap of this Specification.

E6.8 Environmental Regulations

E6.8.1 Further to Section E.15 the Contractor shall adhere to all relevant Federal and Provincial environmental regulations during the entire duration of construction process.

E6.8.2 The Contractor shall plan to Work in accordance with the current environmental regulations of "Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat", Fisheries and Oceans, and Manitoba Natural Resources.

E6.8.3 The Contractor will supply, in writing, prior to commencement of Work on-site, a detailed plan for sediment control on this project.

E6.8.4 The Contractor shall ensure that a sufficient supply of suitable spill kits are on Site to clean-up minor spills, should they occur. The Contractor shall supply the name, address and phone number of a local supplier, where additional kits are available on short notice, on the Emergency Phone List specified in E15.

E6.9 Site Restoration

The Site shall be restored to a condition at least equivalent to its original condition prior to initiation of the Work, including but not limited to removal of the Contract Administrator's trailer, and removal of any temporary fencing. Landscaping repairs shall be in accordance with E14 and CW3520-R6.

E6.10 Method of Measurement

The Site development and restoration will be paid for on a lump sum basis. The Work to be paid for shall be the total Work constructed in accordance with this Specification including mobilization and demobilization, debris removal, erection, maintenance and removal of safety, sediment control Works, snow clearing, general access development, access maintenance, removal of Contract Administration's Site trailer, and Site restoration as accepted by the Contract Administrator. No measurement will be made for this Work.

E6.11 Basis of Payment

The Site development and restoration will be 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.

E7. GEOTEXTILE

E7.1 Description

E7.1.1 This Specification shall cover the supply and placement of the geotextile fabric below the rockfill riprap.

E7.2 Materials

E7.2.1 Each geotextile roll to be used shall be tagged to provide product identification for inventory and quality control purposes.

E7.2.2 Geotextile rolls shall be furnished with suitable wrapping for protection against moisture and extended exposure from the sun, and contamination from dirt, dust, and any other deleterious materials. The geotextile shall remain wrapped in a protective covering until it is used.

E7.2.3 Non-woven geotextile fabric shall meet or exceed the following requirements:

Parameter	Test Method	Minimum Criteria
Grab Tensile Strength	ASTM D4632	900 N
Mullen Burst	ASTM D3786	2600 kPa
Puncture	ASTM D4833	550 N
Trapezoidal Tear	ASTM D4533	350 N
Apparent Opening Size	ASTM D4751	1.2 mm
Permittivity	ASTM D4491	1.2 sec ⁻¹
Flow Rate	ASTM D4491	60 L/sec/m ²

E7.2.4 Suitable products shall be Amoco 4553, Layfield LP 8, Emco R080, Geotex 801, Terrafix 600R, Armtec 250, Mirafi 180 N, Trevira 011/250, or approved equivalent.

E7.3 Construction Methods

E7.3.1 Geotextiles shall consist of non-woven fabric.

E7.3.2 All Work related to the geotextile storage, handling, and installation shall comply with the procedures and recommendations of the manufacturers, and as accepted by the Contract Administrator.

E7.3.3 Snow and ice shall be cleared from the riverbank in accordance with E6.7.1 prior to placement of geotextile.

E7.3.4 The fabric shall be loosely laid in order to allow conformity to the bedding surface. Folds and wrinkles in the fabric shall be avoided. Pins, nails or weights shall be installed to hold the fabric in place such that placement of fill material will not excessively stretch or tear the fabric and seam overlaps will be maintained.

E7.3.5 The fabric shall be overlapped in a downstream direction (upstream panel overtop of downstream panel) at all joints a minimum of 600 mm. The overlap shall be pinned or secured as approved by the Contract Administrator.

E7.3.6 A minimum of 300 mm of material shall be placed over the fabric prior to equipment passage.

- E7.3.7 Riprap shall be placed on the geotextile in such a manner that the geotextile is not damaged, torn, excessively stretched, or punctured.
- E7.3.8 Any damaged geotextile, as identified by the Contract Administrator, shall be repaired immediately at the Contractors own cost. All fill material shall be cleared a minimum of 1 m around the damaged area. The damaged area shall be covered with a geotextile patch that shall be large enough to be sewn or overlapped a minimum of 600 mm onto the undamaged geotextile.
- E7.4 Method of Measurement
- E7.4.1 The supply and placement of the geotextile material shall be measured on an area basis. The area to be paid for shall be the total number of square metres of ground covered by the geotextile (i.e. overlap at all joints shall be considered a single layer), placed in accordance with this Specification and accepted by the Contract Administration, as measured in the field.
- E7.5 Basis of Payment
- E7.5.1 The supply and placement of the geotextile material will be paid at the contract Unit Price per square metre for "Geotextile", 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.
- E7.5.2 Geotextile used for repairs will be excluded from the quantity paid.

E8. ROCKFILL RIPRAP

- E8.1 Description
- E8.1.1 This Specification shall cover the supply and placement of rockfill riprap.
- E8.2 Materials
- E8.2.1 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.
- E8.2.2 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.
- E8.2.3 Should the Contractor choose to use limestone, it shall be durable white crystalline limestone. Softer buff to yellow dolomite or dolostone will not be accepted.
- E8.2.4 The rockfill material shall meet the following requirements:

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

E8.2.5 Rockfill riprap shall be well graded having a full range and even distribution of sizes and shall conform to the following gradation:

<u>Canadian Metric Sieve Size (millimeters)</u>	<u>Percent of Total Dry Weight Passing Each Sieve</u>
450	100%
300	50-70%
200	25-40%
100	10-20%
50	0-5%

E8.3 Submittals

E8.3.1 The Contractor shall submit the proposed supplier(s) and location of quarry Sites for supply of riprap.

E8.3.2 Representative samples of the rockfill riprap submitted for material testing purposes shall be completed as specified herein.

E8.4 Quarry Sites

E8.4.1 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.

E8.5 Testing and Approval

E8.5.1 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.

E8.5.2 The Contract Administrator will visit proposed quarry Sites for inspection of the proposed rockfill material and quarry faces a minimum of fourteen (14) days prior to supply and placement of riprap.

E8.5.3 No supply and placement of riprap will be permitted prior to the Contract Administrator reviewing the source.

E8.5.4 The procedures for preparation of all rockfill samples for use in material inspection and testing shall be subject to review and acceptance by the Contract Administrator for individual tests. The samples may be obtained from crushed and processed material at the sizing necessary for specific tests if the material is deemed to be representative of the riprap that will be used, subject to the acceptance of the Contract Administrator.

E8.5.5 The testing frequency necessary to confirm the material quality will be specified at the discretion of the Contract Administrator.

E8.6 Construction Methods

E8.6.1 Subcutting of the existing subgrade shall be performed in accordance with E.12

E8.6.2 Place geotextile as shown on the Drawings and in accordance with E7. Snow and ice shall be cleared from the bank in accordance with E6.7.1.

E8.6.3 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.

- E8.6.4 Sufficient levelling shall be done to produce a neat and uniform surface, conforming to the shape and dimensions shown on the Drawings.
- E8.6.5 The allowable fill tolerances shall be within ± 50 mm of the grades and thickness shown on the Drawings, provided positive downslope grading is achieved.
- E8.6.6 Provide a smooth uniform surface from the existing grade and new riprap when placing outside edges or transitions, as accepted by the Contract Administrator.
- E8.6.7 Temporary stockpiling of riprap along the riverbank shall not be permitted. Material shall be placed to the required lines and grade shown the Drawing immediately upon delivery to the Site.

E8.7 Method of Measurement

E8.7.1 Rockfill

The supply and placement of the Rockfill Riprap will be measured on a weight basis including all required excavation. The weight to be paid for shall be the total number of metric tonnes of Rockfill Riprap material, supplied and placed in accordance with this Specification, acceptable to the Contract Administrator, as measured on a certified weigh scale.

The Contractor shall provide the weigh tickets to the Contract Administrator for the material supplied to the Site at the time of delivery. No payment will be made for any weigh tickets that are not supplied at the time of delivery.

E8.8 Basis of Payment

E8.8.1 Rockfill Riprap

Rockfill Riprap will be paid for at the Contract Unit Price for "Rockfill Riprap", measured as specified herein, which price shall be payment in full for performing all operations including but not limited to, the excavated material in areas shown to be sub-cut into the bank, and providing all other items incidental to the Work included in this Specification.

E9. ROCKFILL COLUMNS

E9.1 Description

E9.1.1 This Specification shall cover the installation of the rockfill columns, including the auger drilling, sleeving, cuttings removal, supply and placement of rockfill and clay cap backfill, compaction of rockfill backfill with a vibration lance capable of increasing the placed density by a minimum 15%, and provisions for handling groundwater infiltration.

E9.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for an incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E9.2 Materials

E9.2.1 General

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

E9.2.2 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. Softer buff to yellow dolomite or dolostone will not be accepted.
- (d) The rockfill material shall meet the following requirements:

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

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

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

E9.2.3 Clay Cap

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

E9.2.4 Rockfill Column Sleeves

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

E9.3 Submittals

- E9.3.1 The Contractor shall submit the proposed supplier(s) and location of quarry Sites for supply of rockfill backfill.

E9.4 Quarry Sites

E9.4.1 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.

E9.5 Testing and Approval

E9.5.1 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.

E9.5.2 The Contract Administrator will visit proposed quarry Sites for inspection of the proposed rockfill material and quarry faces a minimum of fourteen (14) days prior to supply and placement of riprap.

E9.5.3 No supply and placement of riprap will be permitted prior to the Contract Administrator reviewing the source.

E9.5.4 The procedures for preparation of all rockfill samples for use in material inspection and testing shall be subject to review and acceptance by the Contract Administrator for individual tests. The samples may be obtained from crushed and processed material at the sizing necessary for specific tests if the material is deemed to be representative of the riprap that will be used, subject to the acceptance of the Contract Administrator.

E9.5.5 The testing frequency necessary to confirm the material quality will be specified at the discretion of the Contract Administrator.

E9.6 Construction Methods

E9.6.1 General

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

E9.6.2 Excavation

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

E9.6.3 Sleeving Rock Column Shafts

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

E9.6.4 Backfilling and Compaction

- (a) Excavated rock column shafts shall be backfilled immediately upon excavation. The Contractor will use vibratory equipment to density the rockfill backfill material sufficiently to increase the rockfill density a minimum of 15% versus uncompacted columns. The vibratory method to be used will be a vibratory lauce which can be inserted through the placed rockfill directly to the bottom of the rockfill column.
- (b) After placement of the rockfill to the required dimensions shown on the Drawings, the impervious clay cap shall be placed in layers not exceeding 200 millimetres, and compacted to a minimum of 95% of the Standard Proctor Maximum Dry Density. The clay cap shall be located within undisturbed native material surrounding the caisson. 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.

E9.6.5 Supply of Rockfill

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

E9.6.6 Stockpiling of Rockfill Material

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

E9.6.7 Contaminated Rockfill Material

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

E9.7 Method of Measurement

E9.7.1 Shaft Drilling

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

E9.7.2 Rockfill Backfill

The supply and placement of the Rockfill Backfill will be measured on a weight basis. The weight to be paid for shall be the total number of metric tonnes of Rockfill Backfill material, supplied and placed in accordance with this Specification, acceptable to the Contract

Administrator, as measured on a certified weigh scale. The Contractor shall provide the weigh tickets to the Contract Administrator for the material supplied to the Site at the time of delivery. No payment will be made for any weigh tickets that are not supplied at the time of delivery.

E9.7.3 Sleeving

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

E9.7.4 Rockfill Backfill Vibratory Compaction

Vibratory compaction of the rockfill backfill shall be considered incidental to the supply and placement of the Rockfill Backfill. No separate measurement shall be made.

E9.8 Basis of Payment

E9.8.1 Shaft Drilling

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

E9.8.2 Rockfill Backfill

The supply and placement of 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, including Rockfill Backfill Vibratory Compaction, and all other items incidental to the Work included in this Specification.

E9.8.3 Sleeving

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

E10. ROCKFILL TRENCH SHEAR KEY

E10.1 Description

This Specification shall cover the installation of the rockfill trench shear key, including excavation, removal of excavated material, supply and placement of rockfill, clay cap backfill, and incidental provisions for handling groundwater infiltration.

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

E10.2 Materials

E10.2.1 General

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

E10.2.2 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. Softer buff to yellow dolomite or dolostone will not be accepted.
- (d) The rockfill material shall meet the following requirements:

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

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

<u>Canadian Metric Sieve Size (millimeters)</u>	<u>Percent of Total Dry Weight Passing Each Sieve</u>
450	100%
300	50 – 70%
200	25 – 40%
100	10 – 20%
50	0 – 5%

E10.2.3 Clay Cap

The impervious clay cap at the top of the rockfill trench shear key 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.

E10.3 Submittals

- E10.3.1 The Contractor shall submit the proposed supplier(s) and location of quarry Sites for supply of rockfill backfill.

E10.4 Quarry Sites

- E10.4.1 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.

E10.5 Testing and Approval

E10.5.1 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.

E10.5.2 The Contract Administrator will visit proposed quarry Sites for inspection of the proposed rockfill material and quarry faces a minimum of fourteen (14) days prior to supply and placement of riprap.

E10.5.3 No supply and placement of riprap will be permitted prior to the Contract Administrator reviewing the source.

E10.5.4 The procedures for preparation of all rockfill samples for use in material inspection and testing shall be subject to review and acceptance by the Contract Administrator for individual tests. The samples may be obtained from crushed and processed material at the sizing necessary for specific tests if the material is deemed to be representative of the riprap that will be used, subject to the acceptance of the Contract Administrator.

E10.5.5 The testing frequency necessary to confirm the material quality will be specified at the discretion of the Contract Administrator.

E10.6 Construction Methods

E10.6.1 General

The excavation shall be supervised at all times, and open excavations shall be adequately guarded or covered to protect Worker safety. No excavations shall be permitted to be left open overnight.

E10.6.2 Shear Key Construction

The shear key excavation shall be excavated to the depths and widths, and in the locations shown on the Drawings. An adequate volume of rockfill for backfilling shall be on-site prior to excavation of each incremental length of the trench shear key. The excavation shall proceed in a timely manner and rockfill must be placed as soon as excavation takes place. Stockpiling of excavated material on the riverbank will not be permitted. The maximum open length of the shear key at any time shall be 2 metres along the bottom of the excavation. The Contractor shall maintain the excavation in dry condition and shall be required to prevent surface water from entering the excavation.

In no case shall the shear key be left open at the end of the day. The shear key must be filled with rockfill at the end of each day.

After placement of the rockfill to the required dimensions shown on the Drawings, the impervious clay cap shall be placed in layers not exceeding 200 millimetres, and compacted to a minimum of 95% of the Standard Proctor Maximum Dry Density. The clay cap shall be located within undistributed native material surrounding the trench. Care shall be taken to ensure that an effective seal results between the wall of the excavation and the clay material placed to protect against water infiltration into the trench, as approved by the Contract Administrator.

The top elevation of the trench excavation shall be located to minimize the risk of river-water entering the excavation. Water infiltration may occur as the bottom of the trench approaches the till. Discharge of water contained within the trench excavation into the river will be acceptable. The Contractor shall be responsible to contain and direct any displaced water such that it will not affect other construction Work, cause sediment to enter the water course, or cause excessive erosion of the native riverbank soils. The control of the water shall be the responsibility of the Contractor and shall be considered incidental to the Work.

E10.6.3 Supply of Rockfill

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

E10.6.4 Stockpiling of Rockfill Material

The stockpiling of rockfill material on the lower bank will not be permitted at locations where the trench shear key has not been installed. The methodology for the stockpiling of rockfill at the lower bank area at locations where the trench shear key has been installed shall be subject to the approval of the Contract Administrator. Stockpiles of rockfill for the Rock Columns and Trench Shear Key shall be kept separate.

E10.6.5 Contaminated Rockfill Material

Where crushed limestone has become contaminated with silt, clay, 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. The contaminated material shall be weighed and deducted from the total weight of crushed limestone measured for payment, prior to disposal. The cost to have the contaminated material weighed shall be the responsibility of the Contractor.

E10.7 Method of Measurement

E10.7.1 Trench Shear Key Excavation

The excavation for the shear key construction will be measured on a volume basis. The volume to be paid shall be the total number of cubic metres of material excavated and disposed of in accordance with this Specification, and as computed from measured depth and length, multiplied by the fixed base width and 0.25H:IV side slopes as shown on the Drawings.

E10.7.2 Rockfill Backfill

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

E10.8 Basis of Payment

E10.8.1 Trench Shear Key Excavation

Trench Shear Key Excavation will be paid for at the Contract Unit Price for "Trench Excavation", 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.

E10.8.2 Rockfill Backfill

The supply and placement of Rockfill in the Trench Shear Key Excavation 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.

E11. CHANNEL PROTECTION

E11.1 The ice surface and riverbank channel shall be cleared prior to ice break-up. The Contractor shall clean up all materials, including but not limited to , soil, snow fence, construction debris, etc. from his 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.

E12. COMMON EXCAVATION

E12.1 Description

E12.1.1 This Specification shall cover excavation of the riverbank.

E12.1.2 The Work to be done under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Works as hereinafter specified.

E12.2 Materials

E12.2.1 Excavation

The materials covered in this Specification consist of the in-situ overburden soils and may include but not necessarily limited to organic topsoil, clay, silt , sand, gravel, fill, rubble, trees, tree roots, shrubs, etc., all of which may be excavated with standard hydraulic excavation equipment.

E12.3 Construction Methods

All material encountered within the limits of the riverbank regrading following stripping shall be excavated to the lines and grades shown on the Drawings. All excavation shall proceed from the top of slope down to minimize the potential for slope instability. All materials shall be removed off site immediately upon excavation. The allowable excavation tolerances shall be with 50 mm of the grade shown on the Drawings, provided positive drainage is achieved.

E12.4 Method of Measurement

Common Excavation will be measured on a volume basis. The volume to be paid for shall be the total number of cubic metres excavated and removed in accordance with this Specification and as computed from measured length, width and fixed depth as shown on the Drawings.

E12.5 Basis of Payment

The riverbank regrading shall be paid for at the Contract Unit Price per cubic metre for "Common Excavation" 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.

E13. SILT FENCE

E13.1 Description

E13.1.1 This specification covers the erection of temporary silt fencing, which shall be installed and maintained to control runoff and minimize the release of detrimental silt loading to watercourses.

E13.1.2 The scope Work included in this specification is as follows:

- (a) Supply and Install temporary silt fencing at locations as directed by the Contact Administrator, in accordance with the Specifications, 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. The silt fence shall be removed and disposed of off-site by March 31, 2006.

E13.2 Materials

E13.2.1 Fences Posts

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

E13.2.2 Filter Fabric

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

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

Acceptable Product: "Amoco 2130 Silt Fence Fabric" or approved equal.

E13.2.3 Wire Mesh

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

E13.2.4 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.

E13.3 Construction Methods

E13.3.1 Ensure that no deleterious substances are discharged into the adjacent watercourse at any time during construction activities.

E13.3.2 Silt Fence Installation

- (a) Excavate 150 x 150 anchor trench along alignment of silt fence as indicated.
- (b) Install fence posts as indicated. Ensure that fence posts are firmly driven into undisturbed soil, or are completely and firmly backfilled if installed via auger methods. Attach wire mesh as support backing for silt fence filter fabric with fasteners as

specified in E13.5.2. 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).

E13.3.3 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 E13.3.2. If silt fence is found to be loose or torn, repair or replace as necessary to comply with E13.3.2.
- (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.

E13.3.4 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 E6, without releasing any deleterious substances to the adjacent watercourse.

E13.4 Method of Measurement

The silt fence will be paid for on a length basis. The Work to be paid for shall be the total number of lineal metres supplied and placed in accordance with this Specification, accepted and measured by the Contract Administrator.

E13.5 Basis of Payment

E13.5.1 The silt fence shall be paid for at the Contract Unit Price per lineal metre for "Silt Fence" 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 including in this Specification. Payment of silt fence shall be in accordance with the following 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.

E13.5.2 Removal of accumulated sediment from the silt fence is considered incidental to the Work and no separate measurement or payment will be made.

E14. TOPSOIL AND SEEDING

E14.1 Description

Topsoil and seeding shall be completed in accordance with CW 3520-R6 except as noted herein.

E14.2 Materials

Grass seed shall consist of a Canada common native seed mix as follows:
20% Slender Wheatgrass

20% Switchgrass
20% Big Bluestem
20% Canada Wildrye
10% Fringed Brome
10% Canada Milkvetch

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

Prairie Cordgrass
Streambank Wheatgrass
Western Wheatgrass
Northern Wheatgrass

Oats shall be Canada No. 1 Grade.

E14.3 Submittals

The Contractor shall submit the proposed seed mix for review by the Contract Administrator prior to initiating seeding operations.

E14.4 Construction Methods

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

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

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

E14.5 Maintenance of Seeded Area

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

All other maintenance of seeded area shall be in accordance with CW 3520-R6.

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 and Fisheries Authorization.

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

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

B. Provincial

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

C. Municipal

1. The City of Winnipeg By-law No. 2480/79 and all amendments up to and including 7969/2000
2. The City of Winnipeg By-law No. 1573/77 and all amendments up to and including 7670/2000
3. The City of Winnipeg By-law No. 5888/92
4. The City of Winnipeg By-law No. 6581/95
5. 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

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

B. Fuel Handling and Storage

1. The Contractor shall obtain all necessary permits from Manitoba Conservation for the handling and storage of fuel products and shall provide copies to the Contract Administrator.
2. All fuel handling and storage facilities shall comply with The Dangerous Goods and Transportation Act Storage and Handling of Petroleum Products Regulation and any local land use permits.
3. Fuels, lubricants, and other potentially hazardous materials as defined in The Dangerous Goods and Transportation Act shall be stored and handled within the approved storage areas.
4. In accordance with Section 2.5 (Construction: General Guidelines) of the Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat, (DFO and DNR, 1996), the Contractor shall ensure that any temporary fuel storage areas established for construction of the project are contained by an impermeable dike and are located a minimum distance of 100 metres away from the high water line of the Assiniboine River.

Dikes shall be designed, constructed, and maintained to retain not less than 100% of the capacity of the total number of containers or 110% of the largest container, whichever is greatest. The dikes shall be constructed of clay or similar impervious material. If this type of material is not available, the dike shall be constructed of locally available material and lined with high density polyethylene (HDPE). Furthermore, the fuel storage area(s) shall be secured by a barrier such as a high fence and gate to prevent vandalism.

5. The Contractor shall ensure that all fuel storage containers are inspected daily for leaks and spillage.
6. Products transferred from the fuel storage area(s) to specific Work Sites shall not exceed the daily usage requirement.
7. When servicing requires the drainage or pumping of fuels, lubricating oils or other fluids from equipment, a groundsheet of suitable material (such as HDPE) and size shall be spread on the ground to catch the fluid in the event of a leak or spill.
8. Refuelling of mobile equipment and vehicles shall take place at least 100 metres from a watercourse.
9. The area around storage Sites and fuel lines shall be distinctly marked and kept clear of snow and debris to allow for routine inspection and leak detection.
10. A sufficient supply of materials, such as absorbent material and plastic oil booms, to clean up minor spills shall be stored nearby on-site. The Contractor shall ensure that additional material can be made available on short notice.

C. Waste Handling and Disposal

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

D. Dangerous Goods/Hazardous Waste Handling and Disposal

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

E. Emergency Response

1. The Contractor shall ensure that due care and caution is taken to prevent spills.
2. The Contractor shall report all major spills of petroleum products or other hazardous substances with significant impact on the environment and threat to human health and safety (as defined in Table 1 below) to Manitoba Conservation, immediately after occurrence of the environmental accident, by calling the 24-hour emergency phone number (204) 945-4888. The Contract Administrator shall also be notified.
3. The Contractor shall designate a qualified supervisor as the on-site emergency response co-ordinator for the project. The emergency response co-ordinator shall have the authority to redirect manpower in order to respond in the event of a spill.
4. The following actions shall be taken by the person in charge of the spilled material or the first person(s) arriving at the scene of a hazardous material accident or the on-site emergency response co-ordinator:
 1. Notify emergency-response co-ordinator of the accident:
 - identify exact location and time of accident
 - indicate injuries, if any

- request assistance as required by magnitude of accident (Manitoba Conservation 24-hour Spill Response Line (204) 945-4888, Police, Fire Department, Ambulance, company backup)
 - Attend to public safety:
 - stop traffic, roadblock/cordon off the immediate danger area
 - eliminate ignition sources
 - initiate evacuation procedures if necessary
 - Assess situation and gather information on the status of the situation, noting:
 - personnel on-site
 - cause and effect of spill
 - estimated extent of damage
 - amount and type of material involved
 - proximity to waterways, sewers, and manholes
 - If safe to do so, try to stop the dispersion or flow of spill material:
 - approach from upwind
 - stop or reduce leak if safe to do so
 - dike spill material with dry, inert sorbet material or dry clay soil or sand
 - prevent spill material from entering waterways and utilities by diking
 - prevent spill material from entering manholes and other openings by covering with rubber spill mats or diking
 - Resume any effective action to contain, clean up, or stop the flow of the spilled product.
5. The emergency response co-ordinator shall ensure that all environmental accidents involving contaminants shall be documented and reported to Manitoba Conservation according to The Dangerous Goods Handling and Transportation Act Environmental Accident Report Regulation 439/87.
 6. When dangerous goods are used on-site, materials for containment and cleanup of spill material (e.g. absorbent materials, plastic oil booms, and oversized recovery drums) shall be available on-site.
 7. Minor spills of such substances that may be contained on land with no significant impact on the environment may be responded to with in-house resources without formal notification to Manitoba Environment.
 8. City emergency response, 9-1-1, shall be used if other means are not available.
 9. The on-site emergency response coordinator shall contact The Canadian Coast Guard, Selkirk (204) 785-6030, if the spill material reaches and is on or in the Red or Assiniboine Rivers.

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

<u>Classification</u>	<u>Hazard</u>	<u>Reportable Quantity/Level</u>
1	Explosives	All
2.1	Compressed Gas (flammable)	100 L*
2.2	Compressed Gas	100 L*
2.3	Compressed Gas (toxic)	All
2.4	Compressed Gas (corrosive)	All
3	Flammable Liquids	100 L

4		Flammable Solids	1 kg
5.1	PG** I & II	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

1. Vegetation shall not be distributed without written permission of the Contract Administrator. The Contractor shall protect plants or trees which may be at risk of accidental damage. Such measures may include protective fencing or signage and shall be approved in advance by the Contractor Administrator.
2. Trees damaged during construction activities shall be examined by bonded tree care professionals; viable trees damaged during construction activities shall be pruned according to good practise by bonded tree care professionals. Damaged trees which are not viable shall be replaced at the expense of the Contractor.
3. Trees identified to be at risk by the Contract Administrator are to be strapped with 25 x 100 x 2400 millimetre wood planks, or suitably protected as approved by the Contract Administrator.
4. All landowners adjacent to the area of application of herbicides or pesticides shall be notified prior to the Work.
5. Trees or shrubs shall not be felled into watercourses.
6. 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. Red and Assiniboine Rivers Navigation Protection

Dangerous Goods/Hazardous Waste Handling and Disposal

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

- (b) The Contractor shall provide, install, and maintain adequate warning signs and lighting on any structure beyond the water's edge to notify boats and other craft navigating on the Assiniboine River that construction is underway. These warnings shall meet the requirements of the Winnipeg Rivers and Streams Authority and of the Canadian Coast Guard.
- (c) Prior to commencing any applicable operations over the Red River, the Contractor shall provide to the Contract Administrator a copy of all necessary approvals received by the Contractor.

E16. TREE AND SHRUB PLANTING

E16.1 Description

- E16.1.1 This Specification shall cover the supply and planting of new trees and shrubs.
- E16.1.2 The Contractor shall supply all labour, material, equipment and services necessary to complete the Work specified herein.

E16.2 Materials

- E16.2.1 The Contractor shall supply and install the size and species as shown below.

TREES

SIZE

Green Ash	2 x 75 mm calliper
Manitoba Maple	2 x 75 mm calliper
Cottonwood (male)	2 x 75 mm calliper

SHRUBS

SIZE

Dogwood	6 x 1 gallon pot
---------	------------------

- E16.2.2 Trees shall 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 specified by calliper or diameter, reference is to be made to the diameter of the trunk measure 15 cm above the ground as the tree stands in the nursery prior to lifting.
- E16.2.3 Water is to be potable and free of minerals which may be detrimental to plant growth.
- E16.2.4 Planting soil shall consist of black topsoil, a fertile friable natural loam containing by volume not less than 4% and no more than 25% of organic matter for clay loams, and not less than 2% and no more than 25% for sandy loams, with an acidity value ranging from pH 6.0 to 7.5 capable of sustaining vigorous plant growth.
- E16.2.5 Root ball burlap shall be 150 g Hessian burlap, biodegradable.
- E16.2.6 Anti-desiccant shall be a wax-like emulsion to provide film over tree leaf surfaces reducing evaporation but permeable enough to permit transpiration.
- E16.2.7 Wound dress shall be a horticulturally accepted non-toxic, non-hardening emulsion.
- E16.2.8 Wire baskets shall be a horticulturally accepted product designed to carry the weight and burlap-covered root ball. Minimum diameter basket size to conform to the same maximum diameter of the tree root ball for the respective minimum tree calliper.

- E16.2.9 Mulch shall be a clean bark or wood chip mulch with chips not less than 15 mm nor larger than 75 mm in size and not more than 20 mm thick. Mulch is to be free of leaves, branches, and other extraneous matter.
- E16.2.10 Fertilizer shall be a slow release formulation of low nitrogen and high phosphorous e.g. 10-50-12. Apply quantities at rates stated by the product manufacturer.
- E16.2.11 Quality and source of trees and shrubs shall comply with Guide Specification for Nursery Stock, 1985 Edition of Canadian Nursery Trades Association referring to size and development of the plant and root ball. Nomenclature of specified trees shall conform to the International Code for Nomenclature of Cultivated Plants.
- E16.2.12 All trees and plants shall be clearly labelled as to species, size, and nursery origin until such time as they have been set in place on Site, and approved by the Contract Administrator. After approval the Contractor shall remove all tags and labels.
- E16.2.13 Trees are to have been root pruned regularly, but not later than one growing season prior to arrival on Site. The Contractor may be required to provide the Contract Administrator with documentation outlining his root-pruning program.
- E16.2.14 Trees are to be characteristically developed for their species and structurally sound, well branched, healthy and vigorous and densely foliated when in leaf. The tree is to have a healthy, well developed, fibrous root system which may be verified through a testing procedure that destructively samples one or more randomly selected root balls.
- E16.2.15 Trees are to have only one, sturdy, reasonably straight and vertical trunk, and a well balanced crown with fully developed leader.
- E16.2.16 Trees shall be free from disease, insect infestation, rodent damage, sun scald, frost cracks, abrasions, unhealed scars, scars exceeding 5 cm in diameter, major forks or crooks in the trunk, broken branches, or angled leaders.
- E16.2.17 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.
- E16.2.18 Balled and burlapped trees in excess of 3 m height must have been dug with large firm balls. Roots in balls must be comprised of 75% fibrous and feeder root systems.
- E16.2.19 Tree spade dug trees are to be dug with mechanized digging equipment with hydraulic spade. Root balls are to satisfy C.N.T.A. standards.
- E16.2.20 Use of collected and native trees is not permitted.
- E16.3 Construction Methods**
- E16.3.1 Trees and shrubs shall be planted during unfrozen ground conditions and suitable weather conditions for plant growth. Trees are to be planted within forty-eight (48) hours of excavation from the nursery. The location of plantings will be staked out or painted on Site by the Contract Administrator.
- E16.3.2 Excavate planting pits as indicated by the stakes or paint marks. Excavated soil shall be removed off site. Remove any water that enters excavations prior to planting. Loosen bottom of planting hole to depth of 100-150 mm, cover the bottom of each excavation with minimum 150 mm topsoil mixture and incorporate with the subgrade. Plant trees vertically and orient to give the best appearance in relation to structure, roads, and sidewalks. With balled and burlapped root balls and root balls in wire baskets, loosed burlap and cut away to top 1/3 without disturbing root ball. Do not pull burlap or rope form under root ball. Non-biodegradable wrapping must be removed.

- E16.3.3 Tamp planting soil around root system in layers of 150 mm eliminating air voids. When 2/3 of planting soil has been placed, fill hole with water. After water has completely penetrated into soil, complete backfilling. Each plant shall have an earth saucer at its base having a diameter as large as the excavation with a 10 cm lip formed at the perimeter of the saucer to retain water. When planting is completed, give surface of planting saucer dressing of fertilizer. Mix fertilizer thoroughly with top layer of planting soil and water in well.
- E16.3.4 Trees shall be individually staked within seven (7) calendar days following planting with two 2.4 m metal T-bars located on the northwest and southeast side of the tree, and connected to the trunk with rubber hose or an industry accepted substitute. Prune nursery stock after planting to compensate for loss of roots suffered during transplanting.
- E16.3.5 Trees and shrubs shall be watered during the planting procedure and once a week thereafter, or more frequently if required, during the growing season.
- E16.4 Maintenance
- E16.4.1 The Contractor shall provide a one year maintenance of trees and shrubs from the date of Total Performance. Maintenance Work shall include:
- E16.4.2 Fertilizing – Spread Fertilizer consisting of synthetic slow release with maximum 35% nitrogen evenly at a frequency, ratio and rates recommended by the Manufacturer.
- E16.4.3 Watering –Apply 40 litres of water per tree twice a month or more if drought conditions prevail.
- E16.4.4 Tree Supports and Tie Adjustments – Maintain tree supports and ties in proper repair. Remove supports as directed by Contract Administrator. Strengthen any tree which is leaning.
- E16.4.5 Replace trees and shrubs that die within the one-year maintenance period.
- E16.5 Method of Measurement
- The supply, planting and maintenance of trees and shrubs will be measured on a unit basis. The amount to be paid for shall be the total number of trees and shrubs supplied, planted and maintained in accordance with this Specification and accepted by the Contract Administration.
- E16.6 Basis of Payment
- The supply, planting and maintenance of trees and shrubs will be paid for at the contract unit price per tree and shrub for “Tree and Shrub Planting”, measured as specified herein, which 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.