THE CITY OF WINNIPEG

TENDER

TENDER NO. 170-2020

ARCHIBALD STREET OUTFALL RENEWAL AND REHABILITATION

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B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, April 29, 2020.

B2.2 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

B3. SITE INVESTIGATION

B3.1 Further to C3.1, the Bidder may view the Site without making an appointment.

B3.2 The Bidder shall not be entitled to rely on any information or interpretation received at the Site investigation unless that information or interpretation is the Bidder's direct observation or is provided by the Contract Administrator in writing.

B4. ENQUIRIES

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

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

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

B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Tender 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.

B4.6 Any enquiries concerning submitting through MERX should be addressed to:
MERX Customer Support
Phone: 1-800-964-6379
Email: merx@merx.com

B5. CONFIDENTIALITY

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

(a) was known to the Bidder before receipt hereof; or

(b) becomes publicly known other than through the Bidder; or

(c) is disclosed pursuant to the requirements of a governmental authority or judicial order.

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

B6. ADDENDA

B6.1 The Contract Administrator may, at any time prior to the Submission Deadline, issue addenda correcting errors, discrepancies or omissions in the Tender, or clarifying the meaning or intent of any provision therein.

B6.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.

B6.3 Addenda will be available on the MERX website at www.merx.com.

B6.4 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the MERX website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

B6.5 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid/Proposal. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.

B6.6 Notwithstanding B4, enquiries related to an Addendum may be directed to the Contract Administrator indicated in D5.

B7. SUBSTITUTES

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

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

B7.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.

B7.4 The Bidder shall ensure that any and all requests for approval of a substitute:

(a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;

(b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;

(c) identify any anticipated cost or time savings that may be associated with the substitute;

(d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;

(e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.

B7.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his/her sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.

B7.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, to the Bidder who requested approval of the substitute.

B7.6.1 The Contract Administrator will issue an Addendum, disclosing the approved materials, equipment, methods and products to all potential Bidders. The Bidder requesting and obtaining the approval of a substitute shall be responsible for disseminating information regarding the approval to any person or persons he/she wishes to inform.

B7.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

B7.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/her Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B18.

B7.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B8. BID COMPONENTS

B8.1 The Bid shall consist of the following components:

(a) Form A: Bid/Proposal;

(b) Form B: Prices;

(c) Form G1: Bid Bond and Agreement to Bond;

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

B8.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely.

B8.4 The Bid shall be submitted electronically through MERX at www.merx.com.

B8.4.1 Bids will **only** be accepted electronically through MERX.

B8.5 Bidders are advised that inclusion of terms and conditions inconsistent with the Tender document, including the General Conditions, will be evaluated in accordance with B18.1(a).

B9. BID

B9.1 The Bidder shall complete Form A: Bid/Proposal, making all required entries.

B9.2 Paragraph 2 of Form A: Bid/Proposal shall be completed in accordance with the following requirements:

(a) if the Bidder is a sole proprietor carrying on business in his/her own name, his/her name shall be inserted;

(b) if the Bidder is a partnership, the full name of the partnership shall be inserted;

(c) if the Bidder is a corporation, the full name of the corporation shall be inserted;

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

B9.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B9.2.

B9.3 In Paragraph 3 of Form A: Bid/Proposal, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.

B9.4 Paragraph 13 of Form A: Bid/Proposal shall be signed in accordance with the following requirements:

(a) if the Bidder is a sole proprietor carrying on business in his/her own name, it shall be signed by the Bidder;

(b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;

(c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers;

(d) if the Bidder is carrying on business under a name other than his/her own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.

B9.4.1 The name and official capacity of all individuals signing Form A: Bid/Proposal should be entered below such signatures.

B9.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

B10. PRICES

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

B10.1.1 Notwithstanding C12.2.3(c), prices on Form B: Prices shall not include the Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable.

B10.1.2 Prices stated on Form B: Prices shall not include any costs which may be incurred by the Contractor with respect to any applicable funding agreement obligations as outlined in D27 Any such costs shall be determined in accordance with D27.

B10.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.

B10.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

B10.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B10.5 The Bidder shall enter the Total Bid Price from Form B: Prices into the Total Bid Price field in MERX.

B10.5.1 Bidders are advised that the calculation indicated in B18.4 will prevail over the Total Bid Price entered in MERX.

B11. DISCLOSURE

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

B11.2 The Persons are:

(a) Channeline International – Product Information

(b) Hobas – Product Information

B12. CONFLICT OF INTEREST AND GOOD FAITH

B12.1 Further to C3.2, Bidders, by responding to this Tender, declare that no Conflict of Interest currently exists, or is reasonably expected to exist in the future.

B12.2 Conflict of Interest means any situation or circumstance where a Bidder or employee of the Bidder proposed for the Work has:

(a) other commitments;

(b) relationships;

(c) financial interests; or

(d) involvement in ongoing litigation;

that could or would be seen to:

(i) exercise an improper influence over the objective, unbiased and impartial exercise of the independent judgment of the City with respect to the evaluation of Bids or award of the Contract; or

(ii) compromise, impair or be incompatible with the effective performance of a Bidder's obligations under the Contract;

(e) has contractual or other obligations to the City that could or would be seen to have been compromised or impaired as a result of its participation in the Tender process or the Work; or

(f) has knowledge of confidential information (other than confidential information disclosed by the City in the normal course of the Tender process) of strategic and/or material relevance to the Tender process or to the Work that is not available to other bidders and that could or would be seen to give that Bidder an unfair competitive advantage.

B12.3 In connection with its Bid, each entity identified in B12.2 shall:

(a) avoid any perceived, potential or actual Conflict of Interest in relation to the procurement process and the Work;

(b) upon discovering any perceived, potential or actual Conflict of Interest at any time during the Tender process, promptly disclose a detailed description of the Conflict of Interest to the City in a written statement to the Contract Administrator; and

(c) provide the City with the proposed means to avoid or mitigate, to the greatest extent practicable, any perceived, potential or actual Conflict of Interest and shall submit any additional information to the City that the City considers necessary to properly assess the perceived, potential or actual Conflict of Interest.

B12.4 Without limiting B12.3, the City may, in its sole discretion, waive any and all perceived, potential or actual Conflicts of Interest. The City's waiver may be based upon such terms and conditions as the City, in its sole discretion, requires to satisfy itself that the Conflict of Interest has been appropriately avoided or mitigated, including requiring the Bidder to put into place such policies, procedures, measures and other safeguards as may be required by and be acceptable to the City, in its sole discretion, to avoid or mitigate the impact of such Conflict of Interest.

B12.5 Without limiting B12.3, and in addition to all contractual or other rights or rights at law or in equity or legislation that may be available to the City, the City may, in its sole discretion:

(a) disqualify a Bidder that fails to disclose a perceived, potential or actual Conflict of Interest of the Bidder or any of its employees proposed for the Work;

(b) require the removal or replacement of any employees proposed for the Work that has a perceived, actual or potential Conflict of Interest that the City, in its sole discretion, determines cannot be avoided or mitigated;

(c) disqualify a Bidder or employees proposed for the Work that fails to comply with any requirements prescribed by the City pursuant to B12.4 to avoid or mitigate a Conflict of Interest; and

(d) disqualify a Bidder if the Bidder, or one of its employees proposed for the Work, has a perceived, potential or actual Conflict of Interest that, in the City's sole discretion, cannot be avoided or mitigated, or otherwise resolved.

B12.6 The final determination of whether a perceived, potential or actual Conflict of Interest exists shall be made by the City, in its sole discretion.

B13. QUALIFICATION

B13.1 The Bidder shall:

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

(b) be financially capable of carrying out the terms of the Contract; and

(c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.

B13.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

(a) be responsible and not be suspended, debarred or in default of any obligations to the City. A list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at https://www.winnipeg.ca/matmgt/Templates/files/debar.pdf

B13.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

(a) have successfully carried out work similar in nature, scope and value to the Work; and

(b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract; and

(c) have a written workplace safety and health program if required pursuant to The Workplace Safety and Health Act (Manitoba);

(d) upon request of the Contract Administrator, provide the Security Clearances in accordance with PART F - ;

B13.4 Further to B13.1(c)the Bidder and/or any proposed Subcontractor undertaking the GRP liner installation and grouting portion of the Work, shall within three (3) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator to demonstrate the following qualifications (Form L: Contractor Experience):

(a) A minimum of three examples of successful slip liner installations (any material) greater than 1200 mm in diameter.

(b) A minimum of three examples of successful GRP liner installations greater than 1200 mm in diameter.

(c) A minimum of one example of non-circular GRP liner installation, greater than 1200 mm in diameter.

B13.5 Further to B13.4, if the Bidder does not meet qualifications of B13.4(b)and/or B13.4(c), the Bidder may still bid the Work if they meet qualifications of B13.4(a), however the Bidder will be required to employ a manufacturer's representative with the qualification listed in B13.4(b) and B13.4(c)to supervise the liner installation and grouting works in accordance with E29.

B13.6 Further to B13.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

(a) Written confirmation of a safety and health certification meeting SAFE Work Manitoba's SAFE Work Certified Standard (e.g., COR™ and SECOR™) in the form of:

(i) a copy of their valid Manitoba COR certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Certificate of Recognition (COR) Program administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or

(ii) a copy of their valid Manitoba SECOR™ certificate and Letter of Good Standing (or Manitoba equivalency) as issued under the Small Employer Certificate of Recognition Program (SECOR™) administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ Program; or

(b) a report or letter to that effect from an independent reviewer acceptable to the City. (A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/.

B13.7 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B13.8 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.

B14. BID SECURITY

B14.1 The Bidder shall include in its Bid Submission bid security in the form of a digital 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 Form G1: Bid Bond and Agreement to Bond, available on The City of Winnipeg, Corporate Finance, Materials Management Division website at https://www.winnipeg.ca/MatMgt/templates/files/eBidsecurity.pdf.

B14.2 Bid security shall be submitted in a digital format meeting the following criteria:

(a) The version submitted by the Bidder must have valid digital signatures and seals;

(b) The version submitted by the Bidder must be verifiable by the City with respect to the totality and wholeness of the bond form, including: the content; all digital signatures and digital seals; with the surety company, or an approved verification service provider of the surety company.

(c) The version submitted must be viewable, printable and storable in standard electronic file formats compatible with the City, and in a single file. Allowable formats include pdf.

(d) The verification may be conducted by the City immediately or at any time during the life of the bond and at the discretion of the City with no requirement for passwords or fees.

(e) The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding B14.2(a).

B14.3 Bonds failing the verification process will not be considered to be valid and the bid shall be determined to be non-responsive in accordance with B18.1(a).

B14.4 Bonds passing the verification process will be treated as original and authentic.

B14.4.1 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.

B14.5 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 formed with the successful Bidder and the contract securities are furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

B14.6 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Tender.

B15. OPENING OF BIDS AND RELEASE OF INFORMATION

B15.1 Bids will not be opened publicly.

B15.2 Following the Submission Deadline, the names of the Bidders and their Total Bid Prices (unevaluated and pending review and verification of conformance with requirements) will be available on the MERX website at www.merx.com.

B15.3 After award of Contract, the name(s) of the successful Bidder(s) and their Contract amount(s) will be available on the MERX website at www.merx.com.

B15.4 The Bidder is advised that any information contained in any Bid may be released if required by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law or by City policy or procedures (which may include access by members of City Council).

B15.4.1 To the extent permitted, the City shall treat as confidential information, those aspects of a Bid Submission identified by the Bidder as such in accordance with and by reference to Part 2, Section 17 or Section 18 or Section 26 of The Freedom of Information and Protection of Privacy Act (Manitoba), as amended.

B16. IRREVOCABLE BID

B16.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid/Proposal.

B16.2 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 formed and the contract securities have been furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid/Proposal.

B17. WITHDRAWAL OF BIDS

B17.1 A Bidder may withdraw his/her Bid without penalty at any time prior to the Submission Deadline.

B18. EVALUATION OF BIDS

B18.1 Award of the Contract shall be based on the following bid evaluation criteria:

(a) compliance by the Bidder with the requirements of the Tender, or acceptable deviation there from (pass/fail);

(b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B13 (pass/fail);

(c) Total Bid Price;

(d) economic analysis of any approved alternative pursuant to B7.

B18.2 Further to B18.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements or minor informalities or irregularities, if the interests of the City so require.

B18.3 Further to B18.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his/her Bid or in other information required to be submitted, that he/she is qualified.

B18.4 Further to B18.1(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.

B18.4.1 Bidders are advised that the calculation indicated in B18.4 will prevail over the Total Bid Price entered in MERX.

B19. AWARD OF CONTRACT

B19.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B19.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be qualified, and the Bids are determined to be responsive.

B19.2.1 Without limiting the generality of B19.2, the City will have no obligation to award a Contract where:

(a) the prices exceed the available City funds for the Work;

(b) the prices are materially in excess of the prices received for similar work in the past;

(c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;

(d) only one Bid is received; or

(e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.

B19.3 The Work of this Contract is contingent upon Council approval of sufficient funding in the 2020 Capital Budget. If the Capital Budget approved by Council does not include sufficient funding for the Work, the City will have no obligation to award a Contract.

B19.4 If funding for the Work is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, Bidders are advised that the terms of D27 shall immediately take effect upon confirmation of such funding, regardless of when funding is confirmed.

B19.5 Where an award of Contract is made by the City, the award shall be made to the qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B18.

B19.5.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his/her Bid upon written request to the Contract Administrator.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

C0.1 The *General Conditions for Construction* (Revision 2020-01-31) are applicable to the Work of the Contract.

C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm

C0.2 A reference in the Tender to a section, clause or subclause with the prefix "**C**" designates a section, clause or subclause in the *General Conditions for Construction*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D2. BACKGROUND AND PROJECT INFORMATION

D2.1 2018 CCTV Inspection Videos of the Archibald Street Outfall are available upon request from the Contract Administrator.

D2.2 In lieu of holding a site viewing so as to abide by recommended Covid-19 social distancing measures and regulations, additional site photos were taken on April 7, 2020 and are included in Appendix F. These photos include a look into the existing upstream chamber, intermediate manhole, and the current site conditions. Additionally, for Contractor's wanting to view the site on their own, the intermediate manhole location has been clearly marked out in field (reference photo in Appendix F).

D2.3 The existing sewer has varying cross sections throughout and portions of the sewer are fully bricklined to pipe haunches, partially bricklined to pipe haunches, or missing brick completely in some locations. The Contractor will be required to verify the existing sewer dimensions as specified in E29.

D2.4 Further to D2.3, bricks within the sewer must not be removed during preconstruction inspections so as to protect the integrity of the pipe during the summer months until work commences under dry weather flow requirements. Should the Contractor require to remove any bricks to facilitate the liner installation, this shall be done only when the dry weather flow Works commence.

D2.5 Longitudinal cracks exist in some locations along the pipe obvert (as referenced in the Condition Assessment Report included in Appendix C). The Contractor shall not apply pressurized water to the pipe obvert when cleaning as this action may result in soil loss and potentially cause movement of the pipe. The intention of sewer cleaning shall be so as to remove debris and materials such that the Contractor can adequately perform pre-design inspection, verification of existing sewer dimensions, pre-lining inspection, and prepare the sewer for lining.

D2.6 The Rivers and Creeks in Winnipeg are regulated in the summer at the approximate RSRL listed on the drawings and efforts are made to lower the river to the UWRL in the winter months. However, annual flooding occurs in the Red River Valley and water levels can fluctuate greatly from year to year and month to month and no guarantees are made that the water level will be at the levels indicated on the Drawings. Provisions are included for a temporary plug and clay cofferdam to support the preconstruction pipe inspection and the installation of the GRP liner, respectively. For more information on past river levels within the City of Winnipeg, visit https://winnipeg.ca/waterandwaste/flood/riverLevels.stm

D2.7 A copy of the DFO Request for Review document is provided in Appendix A. The Contractor shall ensure all DFO measures and regulations are adhered to during construction. Upon DFO's completed review of the project, a copy of DFO's response with be provided to the Contractor prior to dry weather flow construction.

D2.8 An internal inspection of the Archibald Street Outfall was completed in 2018. Photos from this inspection are provided in Appendix B, along with the complete Condition Assessment Report of the sewer provided in Appendix C.

D2.9 Previous coring and compression testing of the concrete sewer was completed in 2012. A copy of this test information is provided in Appendix D.

D2.10 Sewer sample testing of the Archibald Street Outfall was completed in 2011. A copy of the sampling results is provided in Appendix E.

D3. SCOPE OF WORK

D3.1 The Work to be done under the Contract shall consist of installation of a non-circular fully structural GRP liner in the Archibald Street Outfall.

D3.2 The major components of the Work are as follows:

(a) Flow Control (as required)

(b) Installation of Temporary Plug and Preconstruction Inspection of Outfall Pipe to Identify Existing Pipe Dimensions.

(c) Installation of GRP Liner

(d) Annulus Grouting of GRP Liner

(e) Developing and Constructing Access Shaft

(f) Installation of 2600 mm Diameter Debris Grate at Existing CMP Outlet

(g) Installation of Rockfill Riprap

(h) Site Restoration

D3.3 The following shall apply to the Work:

(a) City of Winnipeg Green Building Policy: New City-Owned Buildings and major additions;
http://clkapps.winnipeg.ca/DMIS/DocExt/ViewDoc.asp?DocumentTypeId=2&DocId=5989

(b) Universal Design Policy
http://clkapps.winnipeg.ca/DMIS/DocExt/ViewDoc.asp?DocumentTypeId=2&DocId=3604

D4. DEFINITIONS

D4.1 When used in this Tender:

(a) "**CSA**" means Canadian Standards Association;

(b) "**ASTM**" means American Society for Testing and Materials;

(c) "**WIS**" means Water Industry Standard;

(d) "**IGN**" means Information and Guidance Notes;

(e) **"GRP"** means glass reinforced plastic;

(f) **"RSRL" means the regulated summer river level**

(g) **"UWRL" means the unregulated winter river level**

(h) **"Archibald Street Outfall"** means the City of Winnipeg combined sewer outfall targeted for rehabilitation downstream of the Mission Flood Pumping Station and shown on the Drawings (Asset ID's: S-MA70016004 and S-MA70019979).

(i) **"Controlled Low Strength Material (CLSM)"** means cement stabilized fill, as per CW 2160.

(j) **"WRc"** means Water Research Centre

D5. CONTRACT ADMINISTRATOR

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

Ray Offman, M.Sc., (CE), P.Eng.
Infrastructure Engineer / Project Manager

Telephone No. 204-896-1209

Email Address ROffman@kgsgroup.com

D5.2 At the pre-construction meeting, Mr. Offman will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D6. CONTRACTOR'S SUPERVISOR

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

D7. NOTICES

D7.1 Except as provided for in C22.4, 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/Proposal.

D7.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D7.3 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator identified in D5.

D7.3 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following facsimile number:

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

Facsimile No.: 204 947-9155

D8. FURNISHING OF DOCUMENTS

D8.1 Upon award of the Contract, the Contractor will be provided with five (5) complete sets of the Tender. If the Contractor requires additional sets of the Tender, they will be supplied to him/her at cost.

SUBMISSIONS

D9. AUTHORITY TO CARRY ON BUSINESS

D9.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

D10. SAFE WORK PLAN

D10.1 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, if applicable.

D10.2 The Safe Work Plan should be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/Safety/default.stm

D10.3 Notwithstanding D9.1, at any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require an updated COR Certificate or Annual Letter of good Standing. A Contractor, who fails to provide a satisfactory COR Certificate or Annual Letter of good Standing, will not be permitted to continue to perform any Work.

D11. INSURANCE

D11.1 The Contractor shall provide and maintain the following insurance coverage:

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

(b) if applicable, Automobile Liability Insurance covering all motor vehicles, owned and operated and used or to be used by the Contractor directly or indirectly in the performance of the Work. The Limit of Liability shall not be less than $2,000,000 inclusive for loss or damage including personal injuries and death resulting from any one accident or occurrence.

(c) an all risks Installation Floater carrying adequate limits to cover all machinery, equipment, supplies and/or materials intended to enter into and form part of any installation.

D11.2 Deductibles shall be borne by the Contractor.

D11.3 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, as applicable.

D11.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D12. CONTRACT SECURITY

D12.1 The Contractor shall provide and maintain the performance bond and the labour and material payment bond until the expiration of the warranty period in the form of:

(a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; and

(b) a labour and material payment bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H2: Labour and Material Payment Bond), in an amount equal to fifty percent (50%) of the Contract Price.

D12.2 The Contractor shall provide the City Solicitor with the required performance and labour and material payment bonds within seven (7) Calendar Days of notification of the award of the Contract by way of an award letter and prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, if applicable.

D12.3 The Contractor shall, as soon as practicable after entering into a contract with a Subcontractor:

(a) give the Subcontractor written notice of the existence of the labour and material payment bond in D12.1(b); and

(b) post a notice of the bond and/or a copy of that bond in a conspicuous location at the Site of the Work.

D13. SUBCONTRACTOR LIST

D13.1 The Contractor shall provide the Contract Administrator with a complete list of the Subcontractors whom the Contractor proposes to engage (Form J: Subcontractor List) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the General Conditions for the return of the executed Contract Documents, if applicable.

D14. DETAILED WORK SCHEDULE

D14.1 The Contractor shall provide the Contract Administrator with a detailed work schedule at least ten (10) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the General Conditions for the return of the executed Contract.

D14.2 The detailed work schedule shall consist of the following:

(a) A critical path method (CPM) schedule for the work; and

(b) A Gantt Chart for the Work based on the CPM schedule;

as acceptable by the Contract Administrator.

D14.3 Further to D14.2, the CPM schedule shall clearly identify start and completion dates of the following Work items:

(a) Commencement date and duration of Temporary Plug Installation and Verification of Existing Sewer Dimensions

(b) Commencement date of dry weather flow Work

(c) Site Development and Mobilization

(d) Utility Locates

(e) Access Shaft Construction

(f) Liner and Grouting Works

(g) Riser Manhole

(h) Backfilling and Site Cleanup

(i) Substantial Performance

(j) Site Restoration

(k) Total Performance

D14.4 The Contractor shall update the schedule and provide it to the Contract Administrator prior to weekly construction site meetings as required for review and discussion at the meetings.

SCHEDULE OF WORK

D15. COMMENCEMENT

D15.1 The Contractor shall not commence any Work until he/she is in receipt of an award letter from the Award Authority authorizing the commencement of the Work.

D15.2 The Contractor shall not commence any Work on the Site until:

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

(i) evidence of authority to carry on business specified in D9;

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

(iii) the Safe Work Plan specified in D10;

(iv) evidence of the insurance specified in D11;

(v) the contract security specified in D12; and

(vi) the Subcontractor list specified in D13.

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

D15.3 Work on this project, with the exception of verification of existing sewer dimensions and restorations (landscaping, topsoil, seed, sod, pavement restorations, and tree planting) may not commence until dry weather flow occurs in the combined sewer. Dry weather flow is anticipated to occur no sooner than November 1, 2020. The Contractor may at any time complete their verification of existing sewer dimension measurements and should do so such that they may procure their products to suit their proposed construction schedule to meet project critical deadlines as indicated herein.

D15.4 The Contractor shall make every reasonable effort to commence the first work items initiated as part of the Work (as indicated in D15.5) within seven (7) Working Days of receipt of the award letter or as river levels allow following the 2020 Spring flood event. The Contractor shall ensure the first work items initiated as part of the Work (as indicated in D15.5) are completed in a timely manner to allow for manufacture and delivery of the GRP Liner to suit the Bidder's liner installation construction schedule to achieve the Contract Critical Dates as specified in D17 and D18 herein.

D15.5 Verification of existing sewer dimensions to determine liner dimensional requirements prior to manufacture of GRP liner segments shall be the first items initiated as part of the Work. To facilitate verification of existing sewer dimensions, a temporary plug may be installed in the downstream portion of the outfall in accordance with E25.

D16. WORKING DAYS

(a) Further to C1.1, the Contract Administrator's determination of whether or not atmospheric and Site conditions are such that a Working Day is deemed to have elapsed may be based at one time on one type of work while at another time a Working Day may be based on another type of work. When more than one type of major work is involved, the quantity of equipment that must be able to work in order to meet the requirements of a Working Day may vary considerably from that specified in the General Conditions.

(b) In the event that incidental work is behind schedule which, in the opinion of the Contract Administrator, should have been or could have been carried out by the Contractor in conjunction with or immediately following work of a major type, the City hereby reserves the right to charge Working Days on the incidental work until such time as it is up to schedule.

(c) When the major type of work involves restoration of the site to the condition it was prior to rainfall, Working Days shall not be charged.

(d) The Contract Administrator will furnish the Contractor with a daily record for each major type of work showing various information concerning the equipment, the time it worked, could have worked and Working Days charged. This report is to be signed each day by an authorized representative of the Contractor.

(e) Time spent on site completing Pre-Design inspections shall not be considered as Working Days.

D17. SUBSTANTIAL PERFORMANCE

D17.1 The Contractor shall achieve Substantial Performance within fifty (50) consecutive Working Days of the commencement of the dry-weather flow Work as specified in D15.3 or by March 1, 2021, whichever comes first.

D17.2 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.

D17.3 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.

D18. TOTAL PERFORMANCE

D18.1 The Contractor shall achieve Total Performance by June 30, 2021.

D18.2 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.

D18.3 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.

D19. LIQUIDATED DAMAGES

D19.1 If the Contractor fails to achieve Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per Working Day for each and every Working Day following the days fixed herein for same during which such failure continues:

(a) Substantial Performance – one thousand eight hundred dollars ($1,800.00);

(b) Total Performance – eight hundred dollars ($800.00);

D19.2 The amounts specified for liquidated damages in D19.1 are 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.

D19.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D20. COVID-19 SCHEDULE DELAYS

D20.1 The City acknowledges that the schedule for this Contract may be impacted by the COVID-19 pandemic. Commencement and progress of the Work shall be performed by the Contractor with due consideration to the health and safety of workers and the public and directives from health authorities and various levels of government, and in close consultation with the Contract Administrator.

D20.2 If the Contractor is delayed in the performance of the Work by reason of the COVID-19 pandemic, the Work schedule may be adjusted by a period of time equal to the time lost due to such delay and costs related to such delay will be determined as identified herein.

D20.3 A minimum of seven (7) Calendar Days prior to the commencement of Work, the Contractor shall declare whether COVID-19 will affect the start date. If the Contractor declares that COVID-19 will affect the start date, the Contractor shall provide sufficient evidence that the delay is directly related to COVID-19, including but not limited to evidence related to availability of staff, availability of Material or work by others.

D20.4 For any delay related to COVID-19 and identified after Work has commenced, the Contractor shall with seven (7) Calendar Days of becoming aware of the anticipated delay declare the additional delay and shall provide sufficient evidence as indicated in D20.3. Failure to provide this notice will result in no additional time delays being considered by the City.

D20.5 The Work schedule, including the durations identified in D17 to D18 where applicable, will be adjusted to reflect the delays accepted by the Contract Administrator. No additional payment will

be made for adjustment of schedules except where seasonal work, not previously identified in the Contract, is carried over to the following construction season.

D20.6 Where Work not previously identified is being carried over solely as a result of delays related to COVID-19, as confirmed by the Contract Administrator, the cost of temporary works to maintain the Work in a safe manner until Work recommences, will be considered by the Contract Administrator. Where the Work is carried over only partially due to COVID-19, a partial consideration of the cost of temporary works will be considered by the Contract Administrator.

D20.7 Any time or cost implications as a result of COVID-19 and in accordance with the above, as confirmed by the Contract Administrator, shall be documented in accordance with C7.

D21. SCHEDULED MAINTENANCE

D21.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

(a) Watering and maintaining of all new trees and vegetation until established as specified in E33.

D21.2 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

D22. JOB MEETINGS

D22.1 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.

D22.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

D23. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D23.1 Further to C6.26, 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).

D24. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

D24.1 Further to B13.4, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety and Health Act (Manitoba). At any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require updated proof of compliance, as set out in B13.4.

MEASUREMENT AND PAYMENT

D25. PAYMENT

D25.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D26. WARRANTY

D26.1 Notwithstanding C13.2 or, 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.

D26.1.1 In such case, the date specified by the Contract Administrator for the warranty period to begin shall be substituted for the date specified in C13.2 for the warranty period to begin.

D26.1.2 For the purpose of contract security, the warranty period shall be one (1) year.

THIRD PARTY AGREEMENTS

D27. FUNDING AND/OR CONTRIBUTION AGREEMENT OBLIGATIONS

D27.1 In the event that funding for the Work of the Contract is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, the following terms and conditions shall apply, as required by the applicable funding agreements.

D27.2 Further to D26.1, in the event that the obligations in D26 apply, actual costs legitimately incurred by the Contractor as a direct result of these obligations ("Funding Costs") shall be determined by the actual cost to the Contractor and not by the valuation method(s) outlined in C7.4. In all other respects Funding Costs will be processed in accordance with Changes in Work under C7.

D27.3 For the purposes of D27:

(a) **"Government of Canada"** includes the authorized officials, auditors, and representatives of the Government of Canada; and

(b) **"Government of Manitoba"** includes the authorized officials, auditors, and representatives of the Government of Manitoba.

D27.4 Modified Insurance Requirements

D27.4.1 If not already required under the insurance requirements identified in D11, the Contractor will be required to provide wrap-up liability insurance in an amount of no less than two million dollars ($2,000,000) inclusive per occurrence. Such policy will be written in the joint names of the City, Contractor, Consultants and all sub-contractors and sub-consultants and include twelve (12) months completed operations. The Government of Manitoba and its Ministers, officers, employees, and agents shall be added as additional insureds.

D27.4.2 If not already required under the insurance requirements identified in D11, the Contractor will be required to provide builders' risk insurance (including boiler and machinery insurance, as applicable) providing all risks coverage at full replacement cost, or such lower level of insurance that the City may identify on a case-by-case basis, such as an installation floater.

D27.4.3 The Contractor shall obtain and maintain third party liability insurance with minimum coverage of two million dollars ($2,000,000.00) per occurrence on all licensed vehicles operated at the Site. In the event that this requirement conflicts with another licensed vehicle insurance requirement in this Contract, then the requirement that provides the higher level of insurance shall apply.

D27.4.4 Further to D11.3, insurers shall provide satisfactory Certificates of Insurance to the Government of Manitoba prior to commencement of Work as written evidence of the insurance required. The Certificates of Insurance must provide for a minimum of thirty (30) days' prior written notice to the Government of Manitoba in case of insurance cancellation.

D27.4.5 All policies must be taken out with insurers licensed to carry on business in the Province of Manitoba.

D27.5 Indemnification By Contractor

D27.5.1 In addition to the indemnity obligations outlined in C17 of the General Conditions for Construction, the Contractor agrees to indemnify and save harmless the Government of Canada and the Government of Manitoba and each of their respective Ministers, officers, servants, employees, and agents from and against all claims and demands, losses, costs, damages, actions, suit or other proceedings brought or pursued in any manner in respect of any matter caused by the Contractor or arising from this Contract or the Work, or from the goods or services provided or required to be provided by the Contractor, except those resulting from the negligence of any of the Government of Canada's or the Government of Manitoba's Ministers, officers, servants, employees, or agents, as the case may be.

D27.6 Records Retention and Audits

D27.6.1 The Contractor shall maintain and preserve accurate and complete records in respect of this Contract and the Work, including all accounting records, financial documents, copies of contracts with other parties and other records relating to this Contract and the Work during the term of the Contract and for at least six (6) years after Total Performance. Those records bearing original signatures or professional seals or stamps must be preserved in paper form; other records may be retained in electronic form.

D27.6.2 In addition to the record keeping and inspection obligations outlined in C6 of the General Conditions for Construction, the Contractor shall keep available for inspection and audit at all reasonable times while this Contract is in effect and until at least six (6) years after Total Performance, all records, documents, and contracts referred to in D27.6.1 for inspection, copying and audit by the City of Winnipeg, the Government of Manitoba and/or the Government of Canada and their respective representatives and auditors, and to produce them on demand; to provide reasonable facilities for such inspections, copying and audits, to provide copies of and extracts from such records, documents, or contracts upon request by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada and their respective representatives and auditors, and to promptly provide such other information and explanations as may be reasonably requested by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada from time-to-time.

D27.7 Other Obligations

D27.7.1 The Contractor consents to the City providing a copy of the Contract Documents to the Government of Manitoba and/or the Government of Canada upon request from either entity.

D27.7.2 If the Lobbyists Registration Act (Manitoba) applies to the Contractor, the Contractor represents and warrants that it has filed a return and is registered and in full compliance with the obligations of that Act, and covenants that it will continue to comply for the duration of this Contract.

D27.7.3 The Contractor shall comply with all applicable legislation and standards, whether federal, provincial, or municipal, including (without limitation) labour, environmental, and human rights laws, in the course of providing the Work.

D27.7.4 The Contractor shall properly account for the Work provided under this Contract and payment received in this respect, prepared in accordance with generally accepted accounting principles in effect in Canada, including those principles and standards approved or recommended from time-to-time by the Chartered Professional Accountants of Canada or the Public Sector Accounting Board, as applicable, applied on a consistent basis.

FORM H1: PERFORMANCE BOND
(See D12)

KNOW ALL MEN BY THESE PRESENTS THAT

_____
(hereinafter called the "Principal"), and

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

_____

_____ dollars ($_____.____)

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

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

TENDER NO. 170-2020

ARCHIBALD STREET OUTFALL RENEWAL AND REHABILITATION

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

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

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

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

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

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

_____ day of _____ , 20____ .

SIGNED AND SEALED
in the presence of:

_____
(Witness as to Principal if no seal)

_____
(Name of Principal)

Per: _____ (Seal)

Per: _____

_____
(Name of Surety)

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

FORM H2: LABOUR AND MATERIAL PAYMENT BOND
(See D12)

KNOW ALL MEN BY THESE PRESENTS THAT

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

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

_____

_____ dollars ($_____.____)

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

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

TENDER NO. 170-2020

ARCHIBALD STREET OUTFALL RENEWAL AND REHABILITATION

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

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

(a) A claimant is defined as one having a direct contract with the Principal for labour, service and material, or any of them, used or reasonably required for use in the performance of the contract, labour, service and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment (but excluding rent of equipment where the rent pursuant to an agreement is to be applied towards the purchase price thereof) directly applicable to the Contract;

(b) The above-named Principal and Surety hereby jointly and severally agree with the Obligee that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant’s work, labour or service was done or performed, or materials were furnished by such claimant, may sue on this bond, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon;

(c) No suit or action shall be commenced hereunder by any claimant

(ii) unless claimant shall have given written notice to the Principal and the Surety above-named, within one hundred and twenty (120) days after such claimant did or performed the last of the work, labour or service, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work, labour or service was done or performed. Such notice shall be served by mailing the same by registered mail to the Principal, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the Province of Manitoba;

(iii) after the expiration of one (1) year following the date on which Principal ceased work on said Contract; including work performed under the guarantees provided in the Contract;

(iv) other than in a court of competent jurisdiction in the Province of Manitoba.

(d) The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

(e) The Surety shall not be liable for a greater sum than the specified penalty of this bond.

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

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

_____ day of _____ , 20____ .

SIGNED AND SEALED
in the presence of:

_____
(Witness as to Principal if no seal)

_____
(Name of Principal)

Per: _____ (Seal)

Per: _____

_____
(Name of Surety)

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

FORM J: SUBCONTRACTOR LIST

(See D13)

ARCHIBALD STREET OUTFALL RENEWAL AND REHABILITATION

Name	Address

FORM L: CONTRACTOR EXPERIENCE
(See B13)

ARCHIBALD STREET OUTFALL RENEWAL AND REHABILITATION

Attach additional resumes and documents as required. Indicate whether Projects/Project Personnel are for Contractor or Subcontractor, and if applicable include name of Subcontractor.

1. Project References:

Project Client/Contract: _____
(Name)

_____
(Address)

_____
(Phone) (Email)

Year	Description of Project, including size and type of pipe	Value

2. Project References:

Project Client/Contract: _____
(Name)

_____
(Address)

_____
(Phone) (Email)

Year	Description of Project, including size and type of pipe	Value

3. Project References:

Project Client/Contract: _____
(Name)

_____
(Address)

_____
(Phone) (Email)

Year	Description of Project, including size and type of pipe	Value

FORM L: CONTRACTOR EXPERIENCE
(See B13)

ARCHIBALD STREET OUTFALL RENEWAL AND REHABILITATION

4. Project References:
Project Client/Contract: _____
(Name)
_____
(Address)
_____
(Phone) (Email)

Year	Description of Project, including size and type of pipe	Value

5. Project References:
Project Client/Contract: _____
(Name)
_____
(Address)
_____
(Phone) (Email)

Year	Description of Project, including size and type of pipe	Value

6. Project References:
Project Client/Contract: _____
(Name)
_____
(Address)
_____
(Phone) (Email)

Year	Description of Project, including size and type of pipe	Value

FORM L: CONTRACTOR EXPERIENCE
(See B13)

ARCHIBALD STREET OUTFALL RENEWAL AND REHABILITATION

7. Project References:
Project Client/Contract: _____
(Name)
_____
(Address)
_____
(Phone) (Email)

Year	Description of Project, including size and type of pipe	Value

8. Project References:
Project Client/Contract: _____
(Name)
_____
(Address)
_____
(Phone) (Email)

Year	Description of Project, including size and type of pipe	Value

9. Project References:
Project Client/Contract: _____
(Name)
_____
(Address)
_____
(Phone) (Email)

Year	Description of Project, including size and type of pipe	Value

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

E1.1 These Specifications shall apply to the Work.

E1.2 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.

E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/Spec/Default.stm

E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.

E1.2.3 Further to C2.4(d), Specifications included in the Tender shall govern over *The City of Winnipeg Standard Construction Specifications*.

E1.3 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B7. In every instance where a brand name or design specification is used, the City will also consider approved equals and/or approved alternatives in accordance with B7.

E1.4 The following are applicable to the Work:

Drawing No.	Drawing Name/Title
1-03030-D0001-001	Cover Sheet
1-03030-D0002-001	Index page
1-03030-C0001-001	Archibald Street Outfall – Plan & Profile
1-03030-C0002-001	Miscellaneous Details – Sheet 1 of 2
1-03030-C0002-002	Miscellaneous Details – Sheet 2 of 2

GENERAL REQUIREMENTS

E2. ALLOWANCE FOR SOILS INVESTIGATION

E2.1 Description

E2.1.1 The Contractor may complete a one (1) day drilling and sampling program to investigate subsurface soil and groundwater conditions at the site.

E2.1.2 Further to C3.1,

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

E2.2 Construction Methods

E2.2.1 A total of two (2) test holes at locations chosen by the Contractor shall be drilled to practical power auger refusal using either solid or hollow stem augers depending on site conditions. Drilling shall be completed by a suitable contractor specializing in geotechnical soil investigation and sampling.

E2.2.2 Drilling shall be supervised by a suitable company with experience in geotechnical soil investigation and analysis.

E2.2.3 Soil sampling shall be performed at 1.5 m intervals and at any change in soil stratigraphy within overburden materials. Standard Penetration Tests (SPTs) shall be completed at 1.5

m increments down to the appropriate bearing stratum. Clay soil samples shall be tested in the field with a field Torvane to estimate the undrained shear strength, while SPTs shall be completed in granular soils to determine density. The colour, moisture content, consistency, density, plasticity and grain size of the soil samples shall be detailed on the test hole log.

E2.2.4 The test holes shall be backfilled to grade with bentonite chips and auger cuttings. The test hole locations and elevation shall be recorded with survey grade Global Positioning System equipment.

E2.2.5 The depth to groundwater shall be noted during the drilling and shall be examined for evidence of groundwater inflows, sloughing and squeezing both during and upon the completion of the drilling.

E2.2.6 Detailed test hole logs of the encountered stratigraphy incorporating field observations, laboratory test results and estimated depth of groundwater shall be prepared.

E2.2.7 All test hole log information and coordinates of each test hole shall be provided to the Contract Administrator.

E2.3 Measurement and Payment

E2.3.1 The cost for soil investigation shall be paid for under the Contract Unit Price for “Allowance for Soils Investigation”. Costs will be based on actual invoiced costs to complete the soil investigation with allowable mark-ups in accordance with the General Conditions.

E3. OFFICE FACILITIES

E3.1 Contractor shall supply one (1) stand alone office facility to be located at the Site to be used exclusively by the Contract Administrator.

E3.2 The Contractor shall supply office facilities meeting the following requirements:

(a) The field office shall be for the exclusive use of the Contract Administrator and City staff and will be used for weekly site meetings.

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

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

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

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

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

(g) A portable toilet shall be located near the field office building. The toilet shall have a locking door.

(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 the Contract Administrator deems it necessary.

E3.3 Measurement and Payment

(a) Supply of office facilities shall be considered incidental to Site Development and Restoration. No separate payment or measurement will be made.

E4. TRUCK WEIGHT LIMITS

E4.1 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.

E5. DANGEROUS WORK CONDITIONS

E5.1 Further to clause C 6.24 of the General Conditions, the Contractor shall be aware that underground chambers, manholes, and sewers are considered a confined space and shall follow the "Guidelines for confined Entry Work" as published by the Manitoba Workplace Safety and Health Division.

E5.2 The Contractor shall be aware of the potential hazards that can be encountered in gate chambers, manholes and sewers such as explosive gases, toxic gases and oxygen deficiency.

E5.3 The air in a confined space must be tested before entry and continuously during the time that personnel are inside the space. Equipment for continuous monitoring of gases must be explosion-proof and equipped with a visible and audible alarm. The principal tests are for oxygen deficiency, explosion range and toxic gases. Testing equipment must be calibrated in accordance with manufacturer's specifications.

E5.4 The Contractor shall ventilate all confined spaces including underground chambers, tunnels, pipes and shafts as required and approved by the Manitoba Workplace Safety and Health Act (the “Act”). If no ventilation is supplied, a Worker must wear a respirator or supplied air to enter the confined space.

E5.5 Workers must wear a respirator or supplied air at all times when entering a chamber, manhole or sewer where live sewage is present.

E5.6 The Contractor shall provide a photoionization detector (PID) on Site at all times to monitor potential hydrocarbon vapours in the confined spaces. The gas detector and safety equipment conforming to the Act shall be made available to the Contract Administrator for his/her use during inspections. In addition, the Contract Administrator shall collect discrete air samples for laboratory analysis.

E5.7 The Contract Administrator may issue a Stop Work order to the Contractor if the above guidelines are not being followed. The Contractor shall not resume his operations until the Contract Administrator is satisfied the Contractor is following the appropriate procedures. The Contractor shall have no claim for extra time or costs due to the Stop Work order for not following these safety guidelines.

E6. CONFINED SPACE ENTRY

E6.1 The Contractor shall be aware that Hydrogen Sulphide Gas is present in all underground structures connected to the City’s sewer systems and has been known to accumulate in concentrations sufficient to cause serious harm or death to personnel who are not using adequate Personal Protective Equipment (PPE).

E6.2 The Contractor’s attention is drawn to the Province of Manitoba Workplace Safety and Health Act (‘the Act’), and the Regulations and Guidelines there-under pertaining to Confined Space Entry Work and in particular the requirements for conducting hazard/risk assessments and providing PPE.

E7. WATERWAY BY-LAW AND PERMITS

E7.1 The Contractor shall note that all Works fall within 107 metres (350 feet) of the regulated summer water level of the Red River and Seine River and are therefore within the jurisdiction of the Waterway By-law. The Contract Administrator will apply and arrange for payment by the City

for the required Waterway Permits for the permanent Work. The Contractor shall adhere to restrictions imposed by the permit.

E7.2 The Contractor shall be responsible to apply and pay for Waterway Permits for all temporary Works, including construction access ramps as outlined in E12.

E7.3 Under no circumstances will stockpiling of any material be permitted within 106.7 m (350 ft) of the regulated summer water level of the Red River and Seine River.

E8. ENVIRONMENTAL PROTECTION PLAN

E8.1 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.

E8.2 The Contractor is advised that at least the following Acts, Regulations, and By-laws apply to the Work and are available for viewing at the office of the Contract Administrator.

(a) Federal
- (i) Canadian Environmental Assessment Act (CEAA) c.37
- (ii) Canadian Environmental Protection Act;
- (iii) Transportation of Dangerous Goods Act and Regulations c.34;
- (iv) The Fisheries Act;
- (v) Navigable Waters Protection Act;
- (vi) Migratory Birds Convention Act and Regulations, c.22;
- (vii) Species at Risk Act, c.29;
- (viii) Transportation Association of Canada's Transportation Association of Canada National Guide to Erosion and Sediment Control on Roadway Projects, 2005;
- (ix) Applicable Fisheries and Oceans Canada Operational Statements for Manitoba for Temporary Stream Crossings;
- (x) The Department of Fisheries and Oceans Freshwater Intake End-of-Pipe Fish Screen Guidelines, DFO 1995;
- (xi) Fisheries and Oceans Policy on Wetland Conservation 1991;
- (xii) Navigable Waters Best Practices; and
- (xiii) Any other applicable Acts, Regulations, and By-Laws.

(b) Provincial
- (i) The Dangerous Goods Handling and Transportation Act D12
- (ii) The Endangered Species Act E111
- (iii) The Environment Act c.E125
- (iv) The Fire Prevention Act F80
- (v) The Manitoba Heritage Resources Act H39.1
- (vi) The Manitoba Noxious Weeds Act N110
- (vii) The Manitoba Nuisance Act N120
- (viii) The Pesticides Regulation, M.R. 94/88R
- (ix) The Public Health Act c.P210
- (x) The Water Protection Act, c.W65
- (xi) The Workplace Safety and Health Act W210
- (xii) The Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat, Manitoba National Resources, 1996
- (xiii) Any other applicable Acts, Regulations, and By-Laws
- (xiv) And current applicable associated regulations.

(Note: Provincial regulations updated as of September 1999)

(c) Municipal

(i) The City of Winnipeg Neighbourhood Liveability By-Law No. 1/2008;

(ii) The City of Winnipeg By-Law No. 1573/77 and all amendments up to and including 7670/2000;

(iii) City of Winnipeg Best Management Practices for Activities In and Around the City's Waterways and Watercourses, City of Winnipeg 2005

(iv) The City of Winnipeg Motor Vehicle Noise Policies and Guidelines

(v) The City of Winnipeg By-Law No. 2480/79 and all amendments up to and including 7976/2000

(vi) The City of Winnipeg By-Law No. 92/2010

(vii) And any other applicable Acts, Regulations, and By-Laws.

E8.3 The Contractor is advised that the following environmental protection measures apply to the Work.

(a) Materials Handling and Storage

(i) Storage on construction materials shall be confined to the defined laydown areas as shown on the Contract Drawings or at a location approved by the Contract Administrator.

(ii) Construction materials shall not be deposited or stored on riverbanks or river shorelines unless written acceptance from the Contract Administrator is received in advance.

(iii) Construction materials and debris shall be tied down or secured if severe weather and high wind velocities are forecasted. Work shall be suspended during extreme high wind conditions.

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

(b) Fuel Handling and Storage

(i) The Contractor shall obtain all necessary permits from Manitoba Conservation for the handling and storage of fuel products and shall provide copies to the Contract Administrator.

(ii) All fuel handling and storage facilities shall comply with The Dangerous Goods and Transportation Act Storage and Handling of Petroleum Products Regulation and any local land use permits.

(iii) Fuels, lubricants, and other potentially hazardous materials as defined in The Dangerous Goods and Transportation Act shall be stored and handled within the approved storage areas.

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

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

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

(vii) When 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.

(viii) Washing, refuelling, and servicing of machinery and mobile equipment and vehicles shall take place at least 100 metres from a watercourse.

(ix) The area around storage Sites and fuel lines shall be distinctly marked and kept clear of snow and debris to allow for routine inspection and leak detection.

(x) The deposit of deleterious substances into water frequented by fish is prohibited under the Fisheries Act, 1985. The Contractor shall take appropriate precautions to ensure that potentially deleterious substances (such as fuel, hydraulic fluids, oil, sediment, etc.) do not enter any water body.

(xi) 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. Additionally, appropriate staff on Site shall be trained for proper handling of deleterious liquids (i.e. fueling) and trained in preventing and cleaning up minor spills.

(xii) Machinery shall arrive on Site in a clean condition and shall be maintained to be free to fluid leaks.

(c) Waste Handling and Disposal

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

(ii) At no time during construction shall personal or construction waste be permitted to accumulate for more than one day at any location on the construction Site, other than at a dedicated storage area as may be approved by the Contract Administrator.

(iii) The Contractor shall, during and at the completion of construction, clean-up the construction area and 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 require special disposal methods (refer to Section 30.5D).

(iv) On site volumes of sewage and/or septage will be removed on a weekly basis.

(v) The Contractor shall ensure sewage, septage, and other liquid wastes generated on Site are handled and disposed of by a certified disposal contractor.

(vi) Indiscriminate dumping, littering, or abandonment shall not take place.

(vii) No on-site burning of waste is permitted.

(viii) Structurally unsuitable site excavation material will be removed by the Contractor.

(ix) Waste storage areas shall not be located so as to block natural drainage.

(x) Run-off from a waste storage area shall not be allowed to cause siltation of a watercourse.

(xi) 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.

(xii) Equipment shall not be cleaned near watercourses; contaminated water from onshore cleaning operations shall not be permitted to enter watercourses.

(xiii) The Contractor shall notify and receive written approval from the Contract Administrator prior to discharge from any dewatered areas. The discharge will be released into a well-vegetated area, filter bag, settling basin, or storm sewer system to remove the suspended material and other deleterious substances from the discharge before it finds its way into any watercourse. Discharge from dewatering areas may require approved disposal via the sanitary sewer system or disposal truck in accordance with Construction Specifications, at the request of the Contract Administrator.

(xiv) Flows will be dissipated so that dewatering discharges minimize erosion at the discharge point.

(d) Dangerous Goods/Hazardous Waste Handling and Disposal

(i) Dangerous goods/hazardous wastes are identified by, and shall be handled according to, The Dangerous Goods Handling and Transportation Act and Regulations.

(ii) The Contractor shall be familiar with The Dangerous Goods Handling and Transportation Act and Regulations.

(iii) The Contractor shall have on-site staff that is trained and certified in the handling of the dangerous/hazardous goods, when said dangerous/hazardous goods are being utilized on-site for the performance of the Work.

(iv) Different waste streams shall not be mixed.

(v) Disposal of dangerous goods/hazardous wastes shall be at approved hazardous waste facilities.

(vi) Liquid hydrocarbons shall not be stored or disposed of in earthen pits on-site.

(vii) Used oils shall be stored in appropriate drums, or tankage until shipment to waste oil recycling centres, incinerators, or secure disposal facilities approved for such wastes.

(viii) Used oil filters shall be drained, placed in suitable storage containers, and buried or incinerated at approved hazardous waste treatment and disposal facilities.

(ix) Dangerous goods/hazardous waste storage areas shall be located at least 100 metres away from the high water line and be dyked.

(x) Dangerous goods/hazardous waste storage areas shall not be located so as to block natural drainage.

(xi) Run-off from a dangerous goods/hazardous waste storage area shall not be allowed to cause siltation of a watercourse.

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

(e) Emergency Response

(i) The Contractor shall ensure that due care and caution is taken to prevent spills.

(ii) The Contractor shall report all major spills of petroleum products or other hazardous substances with significant impact on the environment and threat to human health and safety (as defined in Table 1 below) to Sustainable Development, immediately after occurrence of the environmental accident, by calling the 24-hour emergency phone number (204) 945-4888. The Contract Administrator shall also be notified.

(iii) The Contractor shall designate a qualified supervisor as the on-site emergency response co-ordinator for the project. The emergency response co-ordinator shall have the authority to redirect manpower in order to respond in the event of a spill.

(iv) The following actions shall be taken by the person in charge of the spilled material or the first person(s) arriving at the scene of a hazardous material accident or the on-site emergency response co-ordinator:

(i) Notify emergency-response co-ordinator of the accident:

- identify exact location and time of accident
- indicate injuries, if any
- request assistance as required by magnitude of accident (Sustainable Development 24-hour Spill Response Line (204) 945-4888, Police, Fire Department, Ambulance, company backup)

(ii) Attend to public safety:

- stop traffic, roadblock/cordon off the immediate danger area
- eliminate ignition sources
- initiate evacuation procedures if necessary

(iii) Assess situation and gather information on the status of the situation, noting:

- personnel on-site
- cause and effect of spill

- estimated extent of damage
- amount and type of material involved
- proximity to waterways, sewers, and manholes

(iv) If safe to do so, try to stop the dispersion or flow of spill material:

- approach from upwind
- stop or reduce leak if safe to do so
- dike spill material with dry, inert sorbet material or dry clay soil or sand
- prevent spill material from entering waterways and utilities by diking
- prevent spill material from entering manholes and other openings by covering with rubber spill mats or diking Resume any effective action to contain, clean up, or stop the flow of the spilled product.

(v) The emergency response co-ordinator shall ensure that all environmental accidents involving contaminants shall be documented and reported to Sustainable Development according to The Dangerous Goods Handling and Transportation Act Environmental Accident Report Regulation 439/87.

(vi) When dangerous goods are used on-site, materials for containment and cleanup of spill material (e.g. absorbent materials, plastic oil booms, and oversized recovery drums) shall be available on-site.

(vii) Minor spills of such substances that may be contained on land with no significant impact on the environment may be responded to with in-house resources without formal notification to Manitoba Environment.

(viii) City emergency response, 9-1-1, shall be used if other means are not available.

(ix) The on-site emergency response coordinator shall contact The Canadian Coast Guard, Selkirk (204) 785-6030, if the spill material reaches and is on or in the Red or Assiniboine Rivers.

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

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

9.2	Aquatic Toxic	1 kg or 1 L
9.3	Wastes (Chronic Toxic)	5 kg or 5 L

* Container capacity (refers to container water capacity)
** PG = Packing Group(s)

(f) Noise and Vibration

(i) Noise-generating activities shall be limited to the hours indicated in the City of Winnipeg Noise Bylaw, and the Province of Manitoba Environment Act Licence, unless otherwise accepted in advance by the Contract Administrator. The activities will generally be restricted to 7:00 am to 7:00 pm weekdays with written permission of the Contract Administrator and the City of Winnipeg for any afterhours or weekend work required for special cases. No extended or alternative working hours/dates will be permitted for pile driving activities.

(ii) The Contractor shall be responsible for scheduling Work to avoid potential noise problems and/or employ noise reduction measures to reduce noise to acceptable limits. The Contractor shall also demonstrate to the Contract Administrator that Works to be performed during the night-time period, on Sundays, and Holidays as stated in the Licence shall not exceed the approved limit.

(iii) The Contractor shall locate stationary noise generating equipment (i.e. generators) away from sensitive receptors and wildlife areas.

(iv) Construction vehicles and equipment will adhere to posted speed limits.

(g) Dust and Emissions

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

(ii) The Contractor shall minimize the construction equipment idling times and turn off machinery, when feasible.

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

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

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

(vi) Stockpiled soils shall be covered with tarpaulin covers to prevent the creation of dust.

(h) Erosion Control

(i) The Contractor shall develop a sediment control plan prior to beginning construction in adherence to the Transportation Association of Canada National Guide to Erosion and Sediment Control on Roadway Projects, the City of Winnipeg's Best Management Practices for Activities in and Around the City's Waterways and Watercourses, and to the satisfaction of the Contract Administrator.

(ii) Exposure of soils shall be kept to a minimum practical amount, acceptable to the Contract Administrator. The cover of trees and undergrowth shall be preserved to the maximum extent possible.

(iii) Sediment control fencing, or other such erosion control structures, shall be employed wherever construction activity increases the potential for runoff to carry sediment into a drainage channel or other watercourse. The Contractor shall inspect

all such structures daily during heavy construction activity in the areas of the structures and after heavy rainfall to ensure their continued integrity.

(iv) All areas disturbed during construction shall be landscaped and revegetated with native and/or introduced plant species in order to restore and enhance the Site and to protect against soil erosion unless otherwise indicated.

(v) The disturbed surface shall be revegetated so as to create a dense root-system in order to defend against soil erosion on the right-of-way and any other disturbed areas susceptible to erosion.

(vi) The loss of topsoil and the creation of excessive dust by wind during construction shall be prevented by the addition of temporary cover crop, water, or tackifier, if conditions so warrant.

(vii) The Contractor shall routinely inspect all erosion and sediment control structures and immediately carry out and necessary maintenance. Several inspections will be performed during rainy days.

(viii) Construction activities will be avoided during periods of high winds to prevent erosion and the creation of dust.

(i) Runoff Control

(i) Measures shall be undertaken to ensure that runoff containing suspended soil particles is minimized from entering the sewer system and adjacent rivers and creeks to the greatest extent possible, to the satisfaction of the Contract Administrator.

(ii) Areas that are heavily disturbed and vulnerable to erosion or gullying will be dyked to redirect surface runoff around the area prior to spring runoff.

(iii) Construction activities on erodible slopes shall be avoided during spring runoff and heavy rain fall events.

(iv) Soil and fill shall not be stockpiled on immediate water course bank areas. Stockpile locations shall be presented for review and approval to the Contract Administrator.

(j) Fish

(i) Due to the presence of spawning fish species no instream works will occur between April 1 and June 15 of any given year.

(ii) Culvert removal, instream culvert construction works, and specified underground works occurring within the riverbank shall be constructed during periods of low flow. Flowing water should be diverted around the construction area using a cofferdam and bypass pump. Water will be diverted in a manner that avoids sediment generation to downstream areas and does not alter the volume of flow in the watercourse. Use cofferdams made of non-earthen material such as aquadams, sand bags, sheet pile or clean granular material wrapped in poly-plastic or other suitable isolation materials are completely removed form the watercourse once construction is complete.

(iii) Any fish trapped within an isolated area will be captured and returned to the watercourse unharmed. Fish includes fin fish, crayfish and mussels (clams).

(iv) A buffer of vegetation will be maintained when working along waterways, where possible.

(v) The duration of Work and amount of disturbance to the bed and banks of the waterbody will be minimized.

(k) Wildlife

(i) No clearing of trees, shrubs, or vegetation is permitted between May 1 and July 31 of any year to protect the nesting and breeding season for migratory birds and other wildlife, unless otherwise identified by a Project biologist.

(ii) No disruption, movement, or destruction shall occur to any migratory bird nests.

(iii) In the event that a species at risk or a nest is encountered during construction, all Work will cease in the immediate area, the site will be made safe, and the Contract Administrator shall be contacted for further direction.

(l) Vegetation

(i) Vegetation shall not be distributed without written permission of the Contract Administrator. The Contractor shall protect plants or trees which may be at risk of accidental damage. Such measures may include protective fencing or signage and shall be approved in advance by the Contractor Administrator.

(ii) Trees damaged during construction activities shall be examined by bonded tree care professionals; viable trees damaged during construction activities shall be pruned according to good practise by bonded tree care professionals. Damaged trees which are not viable shall be replaced at the expense of the Contractor.

(iii) Trees identified to be at risk by the Contract Administrator are to be strapped with 25 x 150 x 2400 millimetre wood planks, or suitably protected as approved by the Contract Administrator.

(iv) Herbicides and pesticides shall not be used adjacent to any surface watercourses.

(v) All landowners adjacent to the area of application of herbicides or pesticides shall be notified prior to the Work.

(vi) Trees or shrubs shall not be felled into watercourses.

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

(m) Landscaping

(i) Construction waste (excluding common construction gravel, sand, etc.) shall be removed to a minimum depth of 600 mm below final grade in all areas that are to be backfilled with suitable material and revegetated in accordance with Standard City Practice.

(ii) The Contractor shall adhere to the landscaping plan for maintenance of initial stage and development stages of the plant community.

(n) Construction Traffic

(i) Workforce parking shall be limited to the areas designated for such as detailed in the Contract Documents, or as otherwise may be directed by the Contract Administrator.

(ii) The Contractor shall adhere to the Standard Provisions of the Standard Construction Specifications, and of the Manual of Temporary Traffic Control in Work Areas on City Streets of The City of Winnipeg, Works & Operations Division.

(iii) The Contractor’s laydown area, construction site and access road shall be fenced and gated to secure the Site and materials and to discourage pedestrian entrance to construction area and to control any potential hazard to the public, particularly children.

(iv) For circumstances where the Contract Administrator has accepted Site access of special equipment or material, the Contractor shall provide adequate flag persons for traffic control in the vicinity of any public buildings.

(o) Access

(i) The Contractor shall maintain access to affected residential properties.

(ii) The Contractor shall provide or maintain general and off-street access to any affected business during construction.

E9. SHOP DRAWINGS

E9.1 Description

(a) This Specification shall revise, amend and supplement the requirements of CW 1110.

(i) The term ‘shop drawings’ means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, including Site erection drawings which are to be provided by the Contractor to illustrate details of a portion of the Work.

(ii) The Contractor shall submit specified shop drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be show on all submissions for Engineering review.

(iii) Provision of Shop Drawings will be considered incidental to the price for supply and delivery of equipment and materials.

(b) Shop Drawings

(i) Original drawings are to be prepared by Contractor, Subcontractor, Supplier, Distributor, or Manufacturer, which illustrate appropriate portion of Work; showing fabrication, layout, setting or erection details as specified in appropriate sections.

(ii) Shop drawings for the following structural components shall bear the seal of a registered Engineer in the Province of Manitoba.

- Reinforcing steel.
- Shoring
- Metal Fabrications.

(c) Contractor's Responsibilities

(i) Review shop drawings, product data and samples prior to submission and stamp and sign drawings indicating conformance to the Contract requirements.

(ii) Verify:

- Temporary Plug Submittal
- Flow Control Submittal
- Existing Pipe Cross Section Field Measurements
- Shoring Submittal
- GRP Liner Design and Riser Manhole Submittal (Including Calculations)
- Grouting Plan Submittal

(iii) Coordinate each submission with requirements of Work and Contract Documents. Individual shop drawings will not be reviewed until all related drawings are available.

(iv) Notify Contract Administrator, in writing at time of submission, of deviations from requirements of Contract Documents.

(v) Responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator's review of submission, unless Contract Administrator gives written acceptance of specified deviations.

(vi) Responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.

(vii) The Contractor shall make any corrections required by the Contract Administrator and shall resubmit the Shop Drawings. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Contract Administrator on previous submission.

(viii) After Contract Administrator's review and return of copies, distribute copies to subtrades as appropriate.

(ix) Maintain one (1) complete set of reviewed shop drawings, filed by Specification Section Number, at the Site of the Work for use and reference of the Contract Administrator and Subcontractors.

(d) Submission Requirements

(i) Schedule submissions at least 14 Calendar Days before dates reviewed submissions will be needed, and allow for a 10 Calendar Day period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.

(ii) Submit one digital PDF copy of shop drawings. The Contractor is advised that the Contract Administrator will retain the original copy and return one digital PDF copy to the Contractor.

(iii) Accompany submissions with transmittal letter, containing:

- Date
- Project title and Tender number
- Contractor's name and address
- Number of each shop drawing, product data and sample submitted
- Specification Section, Title, Number and Clause
- Drawing Number and Detail/Section Number
- Other pertinent data

(iv) Submissions shall include:

(a) Date and revision dates.
(b) Project title and Tender number.
(c) Name of:
  (a) Contractor
  (b) Subcontractor
  (c) Supplier
  (d) Manufacturer
  (e) Separate detailer when pertinent
(d) Identification of product of material.
(e) Relation to adjacent structure or materials.
(f) Field dimensions, clearly identified as such.
(g) Specification section name, number and clause number or drawing number and detail/section number.
(h) Applicable standards, such as CSA or CGSB numbers.
(i) Contractor's stamp, initialed or signed, certifying review of submission, verification of field measurements and compliance with Contract Documents.

(e) Other Considerations

(i) Fabrication, erection, installation or commissioning may require modifications to equipment or systems to conform to the design intent. Revise pertinent shop drawings and resubmit.

(ii) Material and equipment delivered to the Site of the Works will not be paid for at least until pertinent shop drawings have been submitted and reviewed.

(iii) Incomplete shop drawing information will be considered as stipulated deductions for the purposes of progress payment certificates.

(iv) No delay or cost claims will be allowed that arise because of delays in submissions, re-submissions and review of shop drawings.

E9.2 Measurement and Payment

E9.2.1 The provision of Shop Drawings shall be considered incidental to the Work and will not be measured for payment. No additional payment will be made.

E10. FLOW CONTROL

E10.1 Description

E10.1.1 During winter months sewers can receive flow of an undetermined amount from groundwater infiltration, water main breaks, snow melt and other unforeseen sources.

E10.1.2 Provide flow control measures to contend with and maintain flow in the combined sewer directed to the outfall pipe being lined. Flow control measures shall include but not be limited to diversions, flumes and by-pass pumping.

E10.1.3 The Bidder is advised that continuous service must be maintained at the Archibald Street Outfall Site throughout construction, and that a bypass plan will be required in the event of

an upstream water main break, sewer overflow, or other unforeseen source of inflow into the combined sewer system during construction.

E10.1.4 Discharge hoses for by-pass pumping shall not be laid across vehicle or pedestrian traffic areas and must be protected from freezing during winter months. Pumping equipment if used, shall be set-up in a location and in such a way to not be a noise problem for nearby residences.

E10.1.5 Provide a flow control plan to the Contract Administrator for review and approval before prior to commencing the Work.

E10.1.6 In the event the flow in the sewer system is expected to exceed the sewer capacity due to spring runoff, the Contract Administrator may suspend Work activities that require temporary by-pass pumping and temporary shutdown of the Site. Suspension of these activities will continue until the high flow diminishes in the sewer.

E10.1.7 If in the opinion of the Contract Administrator suspension of Work activities that require temporary by-pass pumping and temporary shutdown of the Site may cause a delay in completion of the Work through no fault of the Contractor, the completion date of the Work may be adjusted accordingly.

E10.2 Payment

E10.2.1 Payment for flow control shall be included under the item “Site Development and Restoration”

E11. CHANNEL PROTECTION

E11.1 The ice surface and riverbank channel shall be cleared of construction materials prior to ice break-up. The Contractor shall clean up all materials, including but not limited to: soil, snow fence, construction debris, etc. from this construction activity. All items that will have an adverse impact on the channel shall be removed. Channel Protection shall be considered incidental to the Works of this Contract and no measurement or payment will be made for this item.

E12. SITE DEVELOPMENT AND RESTORATION

E12.1 Description

E12.1.1 This Specification shall cover all aspects of the Site Development and Restoration Work, including but not limited to mobilization and demobilization, erection, maintenance and removal of safety fencing, swamp mats as required for access, traffic control and signage, sediment control Works, snow clearing, flow control, temporary cofferdams, protection and pruning as required of existing trees and brush, removal of fallen trees and debris, removal and reinstallation of site furniture, office facilities, general access development, access maintenance and removal, and Site Restoration.

E12.1.2 The Tender quantities listed on Form B: Prices include an estimated quantity of Topsoil, Seeding, and Sodding based on shaft installation at the intermediate manhole. All Topsoil, Seeding, and Sodding beyond the quantities listed on Form B: Prices will be considered incidental to Site Development and Restoration, and no additional payment will be made for the additional quantities.

E12.1.3 Additional site specific works included within this specification are the:

(a) Works and permits associated with raising and/or relocating overhead power lines and/or light standards as required to facilitate the Works. Contact the local Manitoba Hydro Office to arrange for Manitoba Hydro Staff to lift power lines, temporarily support utilities, and/or relocate utilities as required. Only Manitoba Hydro staff will be permitted to lift power lines.

E12.2 Materials

E12.2.1 Equipment

(a) 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.

E12.3 Construction Methods

E12.3.1 Site and Construction Access

(a) The Contractor shall be responsible to develop suitable Site access. This includes but is not limited to, temporary bridging over structures, temporary removal and reinstallation of safety fencing, any landscaping and grading repairs, restoration of vegetation, etc. necessary to restore any Site and construction access areas to their pre-existing condition. Prior to commencing construction the Contractor shall submit their site access plan to the Contract Administrator for approval.

(b) All construction access ramps from the top bank area down to the edge of the river shall be constructed by excavating to the necessary ramp grade and disposing of the material off Site. Under no circumstances will the excavated material or any additional materials be placed as fill in the ramp area. Detailed construction access ramp drawings are to be submitted to the Contract Administrator for approval a minimum seven (7) days prior to any construction activity on Site.

(c) The Contractor is responsible for obtaining and paying for all required permits and permissions that are necessary for Site access, including a Waterways Access Permit, if required by the City of Winnipeg. Contact the Riverbank Management Contract Administrator at 986-5159 for information regarding Waterways Permits.

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

E12.3.2 Frozen Waterways Permit

(a) The Contractor is responsible for obtaining a Frozen Waterway Permit for permission to Work on the river ice. Contact the City of Winnipeg Zoning and Permits Office.

E12.3.3 Diversion of Flows

(a) Flows such as snowmelt, rainfall, a water main break, or any other flow traveling through the outfall shall be diverted during construction as specified in E9. The cost of the flow diversion is considered incidental to Site Development and Restoration.

E12.3.4 Temporary Coffer Dam

The Contractor shall erect a temporary cofferdam (as required) to provide a safe environment to carry out the Work associated with this project. Cofferdam designs shall be submitted to the Contract Administrator for approval before construction. Where clay material is used, clay shall consist of a high plasticity 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. Material for the cofferdam shall be inspected and approved by the Contract Administrator before construction. Cofferdam materials shall be completely removed following construction.

E12.3.5 Vegetation Removal

Some vegetation (living trees smaller than 50 mm, fallen larger trees and sod) removal may be permitted in order to facilitate Site access. Existing vegetation shall not be removed without prior approval from the Contract Administrator. The Contractor shall load and haul any removed vegetation, and dispose of the material off Site immediately upon collection. Stockpiling shall not be permitted unless written approval has been obtained from the Contract Administrator.

E12.3.6 Snow and Ice Removal

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

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

E12.3.7 Safety Fence

The Contractor shall erect and maintain for the duration of the project a safety fence, acceptable to the Contract Administrator, to restrict access to the Site. The fencing shall enclose the entire Site with appropriate gates or openings that are closed at the end of each Work day. Appropriate signs shall be erected to warn all recreational users of the river that an open water hazard exists. This shall include but not be limited to snowmobilers and skiers. The installed fencing shall consist of Dupont Number L70 orange plastic safety fence or approved equal in accordance with B7, with a mesh spacing of 45 mm, constructed as shown in the contract drawings. Upon completion of the Work, the fence shall be removed and disposed of off Site.

E12.3.8 Environmental Regulations

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

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

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

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

E12.3.9 General Site Cleanup and Restoration

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

E12.3.10 Topsoil and Sod

(a) Further to E12.1.2. where topsoil and sodding is required to restore laydown areas, or similar temporary work areas, it shall be considered incidental to Site Development and Restoration. No separate payment shall be made for topsoil and sod in these areas.

E12.4 Method of Measurement and Payment

Site Development and Restoration

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

50% of the Site Development and Restoration unit price will be paid on the first progress payment following commencement of the work on the specific Site being developed.

The remaining 50% of the Site Development and Restoration unit price will be paid subsequent to the completion of the Work and restoration and clean-up of the Site.

E12.4.1 Topsoil and Sod

(a) Where topsoil and sodding is required to restore laydown areas, or similar temporary work areas, it shall be considered incidental to Site Development and Restoration. No separate payment shall be made for topsoil and sod in these areas.

E13. INSTALLATION OF SILT FENCE

E13.1 Description

E13.1.1 This specification covers the erection of temporary silt fencing, which shall be installed and maintained at the locations shown on the drawings or as directed by the Contract Administrator, to control runoff and minimize the release of detrimental silt loading to watercourses.

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

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

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

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

E13.2 Materials

E13.2.1 Fence 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/m2

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

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 E13.2.4. Attach silt fence filter fabric on top of wire mesh in similar fashion. Overlap any fence seams (wire mesh or filter fabric) by 450 mm minimum. Ensure that wire mesh and filter fabric are installed on the upslope side of the post and are fully laid in anchor trench as shown.

(c) Install and compact impermeable excavated materials into anchor trench and slope as indicated. Compact to 95% of maximum dry density (ASTM D-698).

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 E11 without releasing any deleterious substances to the adjacent watercourse.

E13.4 Measurement and Payment

E13.4.1 The supply, placement, and removal of silt fence shall be measured on a length basis and paid for at the Contract Unit Price per lineal metre for “Silt Fence”. The length to be paid for shall be the total number of metres supplied and placed in accordance with this Specification, accepted and measured by the Contract Administrator. Payment of silt fence shall be in accordance with the following payment schedule:

(a) Sixty percent (60%) of the Contract Unit Price per lineal metre for “Silt Fence” shall be paid following supply and installation.

(b) Forty percent (40%) of the Contract Unit Price per lineal metre for “Silt Fence” shall be paid following final removal.

E13.4.2 Removal of accumulated sediment from the silt fence is considered incidental to the Work and no separate measurement or payment will be made.

E14. TREE REMOVAL

E14.1 Description

E14.1.1 This specification shall cover the removal of existing trees and be in supplement to CW3010 City of Winnipeg Tree Removal Guidelines.

E14.1.2 The Work to be done by the Contractor under this specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E14.2 Materials

E14.2.1 Existing Trees to be Removed

The existing trees to be removed include, but not limited to ash, elm, cottonwood, basswood, oak, pine, maple, spruce, etc., all of which may be cut with standard chain saw equipment. The existing trees range from 50 mm to 1,000 mm diameter.

E14.3 Construction Methods

E14.3.1 Prior to commencement of the Work the Contract Administrator shall identify all trees for removal. The Contractor must coordinate via the Contract Administrator for the City's Parks Forestry Branch to complete an assessment of the value of the trees in advance of their removal.

E14.3.2 The Contractor shall cut down only trees designated to be removed, and grub out all stumps and roots greater than 100 mm diameter. In general, the Contractor shall start at the top of the tree and remove branches or trunks not longer than 2 m. Trees are to be felled so as to land within the limits of the Works. The Contractor shall load and haul all trees, stumps, roots, logs, brush, rubbish and all other surface litter from the Site and dispose of these materials at an approved disposal Site, acceptable to the Contract Administrator.

E14.3.3 The Contractor shall take all precautions to prevent damage to structures, adjacent property and to trees and shrubs. In the event of damage, the Contractor will be held liable, and shall be required to provide appropriate restoration at his cost, to the satisfaction of the Contract Administrator.

E14.3.4 Any trees damaged during construction activities shall be examined by a bonded tree care professional and pruned as required. Damaged trees which are not viable shall be replaced by the Contractor at his own cost.

E14.4 Measurement and Payment

E14.4.1 The removal of existing trees shall be measured on a per tree basis and paid for at the Contract Unit Price per unit for the "Items of Work" listed below. The amount to be paid shall be the total number of trees removed in accordance with this specification, accepted and measured by the Contract Administrator.

Items of Work: Tree Removal

i. 50 mm to 249 mm Diameter

ii. 250 mm to 499 mm Diameter

iii. 500 mm to 1000 mm Diameter

iv. Greater than 1000 mm Diameter

E14.4.2 The removal of trees and brush less than 50 mm diameter is considered incidental to the Work and no separate measurement or payment will be made.

E15. PROTECTION OF EXISTING TREES

E15.1 Removal of some trees may be required. The Contract Administrator will identify which trees will be removed. The Contractor shall take the following precautionary steps to avoid damage from construction activities to any existing trees not marked for removal within the limits of the construction area.

E15.1.1 Do not stockpile materials and soil or park vehicles and equipment within 2 metres of trees.

E15.1.2 Strap mature tree trunks with 25 x 150 x 2400 wood planks. Smaller trees shall be similarly protected using appropriately sized wood planks.

E15.1.3 Excavations shall be carried out in a manner to minimize damage to existing root systems. Where roots must be cut to facilitate an excavation they shall be neatly pruned at the face of the excavation and coated with an appropriate wound dressing to prevent infection.

E15.1.4 Work on Site shall be carried out in a manner to minimize damage to existing tree branches. Where damage to tree branches does occur, the Contractor shall neatly prune the damaged branch.

E15.1.5 American elm trees shall not be pruned between April 1st and August 1st and Siberian elm trees between April 1st and July 1st of any year under provisions of The Dutch Elm Disease Act.

E15.2 All damage to existing trees due to construction activities shall be repaired to the requirements and satisfaction of the City of Winnipeg, Public Works Department, Forestry Branch at the Contractor's expense.

E15.3 Costs for protection of trees shall be considered incidental to Site Development and Restoration.

E16. EROSION CONTROL BLANKETS

E16.1 Description

E16.1.1 This Specification shall cover the supply and placement of erosion control blankets to provide temporary erosion control in localized areas (as directed by the Contract Administrator).

E16.2 Materials

E16.2.1 The blanket material shall consist of wheat or barley straw, coconut fibres, or other plants approved by the Contract Administrator. Acceptable products will be S32 BD Double Net Straw Blankets with biodegradable netting or approved alternative in accordance with B7. The blanket material shall be air dried, reasonably light in colour, and shall not be musty, mouldy, caked or otherwise of low quality. The blanket material shall be free of coarse (chaff) material and free of noxious weeds and/or seeds to prevent the introduction of weeds into previously seeded and planted areas.

E16.3 Construction Methods

E16.3.1 General

(a) The Contractor shall supply and place erosion control blankets immediately after final grading is completed and prior to March 1.

(b) Erosion control blankets shall be placed as directed, measured and accepted by the Contract Administrator.

(c) Covered areas shall be inspected periodically and after runoff producing storm events. Damaged areas shall be repaired immediately as determined by the Contract Administrator. Areas requiring recovering as directed by the Contract Administrator will be re-measured and additionally paid for at the Contract Unit Price for the Work item.

E16.3.2 Installation

(a) The erosion control blankets shall be installed as per the manufacturer's recommended procedures. Blankets shall be rolled out on smoothed out soils starting from the top of the slope. The Contractor is to start by stapling the blanket at the top of the slope in a 150 mm deep by 150mm wide trench. The trench will be backfilled and compacted so that water will flow evenly onto the blanket.

(b) The Contractor shall roll the blankets down the slope insuring soil blanket contact. Edges are to be overlapped a minimum 50 mm with parallel blankets.

(c) If more than one blanket is need for the run down the slope then adjoining ends must be overlapped a minimum 100 mm shingle style. Overlapped areas are to be stapled with a staggered pattern of staples.

E16.3.3 Removal

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

E16.4 Measurement and Payment

E16.4.1 Supply, placement and removal of erosion control blankets will be measured on an area basis and paid for at the Contract Unit Price for "Erosion Control Blankets". The area to be paid for shall be the total number of square metres of ground covered by blankets, supplied and placed in accordance with this Specification, accepted and measured by the Contract Administrator.

E17. ROCKFILL RIPRAP

E17.1 Description

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

E17.2 Materials

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

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

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

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

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

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

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

5	0-5%

E17.3 Submittals

E17.3.1 The Contractor shall submit the proposed supplier(s) and location of quarry Sites for supply of riprap.

E17.3.2 Representative samples of the rockfill riprap submitted for material testing purposes shall be completed as specified herein.

E17.4 Quarry Sites

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

E17.5 Testing and Approval

E17.5.1 All materials set forth in this Specification shall be subject to inspection and testing by the Contract Administrator or by the testing laboratory designated by the Contract Administrator. There shall be no charge for any materials taken by the Contract Administrator for testing purposes.

E17.5.2 The Contract Administrator will visit proposed quarry Sites for inspection of the proposed rockfill material and quarry faces a minimum of fourteen (14) days prior to supply and placement of riprap.

E17.5.3 No supply and placement of riprap will be permitted prior to the Contract Administrator reviewing the source.

E17.5.4 The procedures for preparation of all rockfill samples for use in material inspection and testing shall be subject to review and acceptance by the Contract Administrator for individual tests. The samples may be obtained from crushed and processed material at the sizing necessary for specific tests if the material is deemed to be representative of the riprap that will be used, subject to the acceptance of the Contract Administrator.

E17.5.5 The testing frequency necessary to confirm the material quality will be specified at the discretion of the Contract Administrator.

E17.6 Construction Methods

E17.6.1 Rockfill Riprap shall be pushed or rolled into place in such a manner that the larger rocks are uniformly distributed and the smaller rocks serve to fill the places between the larger rocks such that excessive segregation of the various particle sizes does not occur.

E17.6.2 Sufficient levelling shall be done to produce a neat and uniform surface, conforming to the shape and dimensions shown on the Drawings.

E17.6.3 The allowable fill tolerances shall be within ± 50 mm of the grades and thickness shown on the Drawings, provided positive downslope grading is achieved.

E17.6.4 Provide a smooth uniform surface from the existing grade and new riprap when placing outside edges or transitions, as accepted by the Contract Administrator.

E17.6.5 Temporary stockpiling of riprap along the riverbank shall not be permitted. Material shall be placed to the required lines and grade shown the Drawing immediately upon delivery to the Site.

E17.7 Measurement and Payment

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

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

E18. RIVERBANK REGRADING

E18.1 Description

E18.1.1 This Specification shall cover the riverbank regrading at the site, including excavation and reworking of excavated material, and imported impervious clay supply and placement.

E18.1.2 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.

E18.2 Materials

E18.2.1 The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification.

E18.2.2 Native Material to be Excavated

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

E18.2.3 Clay Backfill

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

E18.3 Construction Methods

E18.3.1 General

(a) The riverbank regrading will be completed in the lower, mid and upper bank portions of the bank. The limits of the riverbank regrading will be laid out in the field by the Contract Administrator.

E18.3.2 Native Material to be Excavated

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

E18.3.3 Clay Backfill

(a) The depressions within the limits of the existing mid and upper bank shall be infilled with clay backfill material. The clay backfill material shall be pushed and kneaded into place to ensure that the entire excavated volume is entirely filled with clay, and that no void spaces remain. The clay backfill shall be compacted to a minimum of 95% of the SPMDD.

(b) Clay backfill for placement within the limits of the existing lower, mid and upper bank shall not be stockpiled on the riverbank.

E18.4 Measurement and Payment

E18.4.1 Basis of Measurement

The supply and placement of the riverbank regrading will be measured on a volume basis. The volume to be paid for shall be the total number of cubic metres of “Riverbank

Regrading", excavated, supplied and/or placed in accordance with this Specification, as measured in the field and accepted by the Contract Administrator.

E18.4.2 Basis of Payment

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

E19. GEOTEXTILE

E19.1 Description

E19.1.1 This Specification shall cover the supply and placement of the geotextile fabric below the rockfill riprap.

E19.2 Materials

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

E19.2.2 Geotextile rolls shall be furnished with suitable wrapping for protection against moisture and extended exposure from the sun, and contamination from dirt, dust, and any other deleterious materials. The geotextile shall remain wrapped in a protective covering until it is used.

E19.2.3 Non-woven geotextile fabric shall meet or exceed the following requirements:

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

E19.2.4 Suitable products shall be Mirafi 180 N or approved equivalent in accordance with B7.

E19.3 Construction Methods

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

E19.3.2 All Work related to the geotextile storage, handling, and installation shall comply with the procedures and recommendations of the manufacturers, and as accepted by the Contract Administrator.

E19.3.3 Snow and ice shall be cleared from the riverbank in accordance with E12 prior to placement of geotextile.

E19.3.4 The fabric shall be loosely laid in order to allow conformity to the bedding surface. Folds and wrinkles in the fabric shall be avoided. Pins, nails or weights shall be installed to hold the fabric in place such that placement of fill material will not excessively stretch or tear the fabric and seam overlaps will be maintained.

E19.3.5 The fabric shall be overlapped in a downstream direction (upstream panel overtop of downstream panel) at all joints a minimum of 600 mm. The overlap shall be pinned or secured as approved by the Contract Administrator.

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

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

E19.3.8 Any damaged geotextile, as identified by the Contract Administrator, shall be repaired immediately at the Contractors own cost. All fill material shall be cleared a minimum of 1 m around the damaged area. The damaged area shall be covered with a geotextile patch that shall be large enough to be sewn or overlapped a minimum of 600 mm onto the undamaged geotextile.

E19.4 Measurement and Payment

E19.4.1 The supply and placement of geotextile, and related Work specified herein will be measured on an area basis and paid for at the Contract Unit Price for "Geotextile". The area to be paid for shall be the total number of square metres of ground covered by geotextile, placed in accordance with this Specification, accepted and measured by the Contract Administrator.

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

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

E20. CAST-IN-PLACE CONCRETE CONSTRUCTION

E20.1 Description

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

E20.2 Materials

(a) Concrete Design

(i) Proportioning of fine aggregate, coarse aggregate, cement, and water for cast-in-place concrete shall be as follows:

- Cement Type: HS
- Minimum Compressive Strength @ 28 days: 30 MPa
- Maximum coarse aggregate size: 19 mm
- Maximum Water/Cement ratio: 0.45
- Slump (Before Plasticizing): 80 mm +/- 30 mm
- Slump (After Plasticizing): 150 mm +/- 30 mm

(ii) All admixtures must be compatible and meet the following standards:

- Air entraining agents to ASTM C260
- Chemical admixtures (water reducing) to ASTM C494
- Type F high-range water reducing (super-plasticizing) admixture shall be used when a slump of more than 110 mm is desired.

(b) Lean-Mix Concrete Design

(i) Proportioning of fine aggregate, coarse aggregate, cement, and water for lean mix concrete shall be as follows:

- Cement Type: HS
- Minimum Compressive Strength @ 28 days: 15 MPa
- Slump: 80 mm
- Air Content: nil
- Minimum Cement Content = 240 kg/m3

- Maximum Water/Cement Ratio = 0.49

(c) Grout

(i) Grout shall be Sika Grout 212 or approved equal in accordance with B7.

(d) Reinforcing Steel

(i) Reinforcement is new deformed billet steel bar conforming to CSA G30.18 (Latest). Grade 400.

(ii) Unless noted otherwise, reinforcement clear concrete cover distances shall be a minimum of:

- 75 mm for concrete cast against earth.
- 50mm for all other concrete.

(iii) Reinforcing steel shall be clean, free of rust, dirt, loose scale, oil, grease or any material that could reduce bond with the concrete.

(e) Waterstop shall be SikaSwell S-2 (Hydrophilic Polyurethane Sealant) extrudable swelling waterstop or approved equivalent in accordance with B7.

E20.3 Measurement and Payment

E20.3.1 Cast-in-place concrete will be considered incidental to the Work listed in individual Part E specifications and shall be included in the associated price for each applicable item. No direct measurement for payment will be made for this item.

E21. COLD WEATHER REQUIREMENTS

E21.1 Description

(a) Should any concrete Work be required to be carried out when the mean daily temperature is below 5°C or anticipated to be below 5°C within the next 24 hours, cold weather requirements will be specified herein.

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

E21.2 Construction Methods

(a) The following are minimum requirements for protecting concrete during and after placement during freezing weather, but mere adherence to these requirements will not relieve the Contractor of the necessity for producing concrete which has not been weakened or injured by frost of freezing, or replacing such damaged Work at no additional expense to the City;

(i) Before any concrete is placed, all ice, snow, and frost shall be completely removed from all formwork, and other surfaces against which concrete temperatures of such surfaces raised above 7°C for twenty-four (24) hours minimum prior to concreting. Where concrete Work is to come in contact with the earth, the surface of the earth shall be completely free of frost when concrete is placed thereon.

(ii) Concrete aggregates and water shall be heated to not over 80°C. Concrete shall be not less than 20°C or more than 30°C in temperature when deposited. Concrete when placed during freezing weather, or if freezing is anticipated during curing period, shall be fully enclosed and the temperature of same maintained at not less than 20°C for five (5) days nor less than 5°C for an additional five (5) days.

(iii) Heating enclosures shall be strong and wind-proof, well ventilated with heating units so located as to prevent local overheating or drying of the concrete or damage from combustion gases. Only indirect fired heaters will be accepted. Units must be vented outside the enclosure. No direct fired units will be accepted.

(iv) The Contractor shall inform the Contract Administrator well in advance as to the methods of enclosure and frost protection he proposes to employ.

E21.3 Measurement and Payment

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

ACCESS SHAFT CONSTRUCTION AND PIPE ACCESS MODIFICATIONS

E22. SUPPLY AND INSTALLATION OF TEMPORARY SHORING FOR ACCESS SHAFT

E22.1 Description

E22.1.1 This Specification shall cover shoring requirements for the Works where required under Manitoba Acts, Regulations, and Guidelines, or as indicated on the Drawings.

E22.2 Construction Methods

E22.2.1 The Contractor shall install an access shaft to permit access to the top of the existing trunk sewer to facilitate GRP liner installation and installation of new GRP riser manhole.

E22.2.2 Excavation

(a) Remove excavated material from the Site immediately. Excavated material shall not be stockpiled on-Site or along river bank.

(b) All Working areas below grade shall be kept adequately and securely supported during and after excavation until the shoring and bracing is in place to prevent loss of ground or injury to any person from falling material.

E22.2.3 Excavation Safety Fence

(a) Further to Clause 3.1 of CW 1130, completely cover the excavation and provide a security fence to completely surround the excavation when unattended generally in accordance with the following.

(b) Safety fence installed shall be as per E12.

E22.2.4 Shoring

(a) The type, strength, and amount of shoring and bracing shall be such as the nature of the ground and attendance conditions may require, taking into account property lines, existing slopes, utilities and roadways.

(b) Shoring and bracing shall be so spaced and dimensioned as to prevent caving, loss of ground, surface settlement, or squeezing of the soil beyond the neat lines of excavation. It shall be free from defects that might impair its strength or suitability for the Work. Sheeting/shoring and bracing shall conform to the latest revisions of the “Construction Safety Act” of the Department of Labour of the Government of Manitoba and in accordance with Province of Manitoba “W210 The Workplace Safety and Health Act” and “Guidelines for Excavation Work”.

(c) Supporting design calculations as required to facilitate review of the submission for conformance with the Contract Documents.

(d) Submit AutoCAD Shop Drawings and design calculations for the shoring/excavation system designed and sealed by a Professional Engineer registered or licensed to practice in the Province of Manitoba and experienced in the structural design of shoring systems. The designer of the shoring system shall inspect the system during construction and certify, in writing to the Contract Administrator, that construction is in conformance with the approved design.

(e) Shoring and bracing shall be installed such that the structure size and wall thickness shown on the shop drawings can be obtained subsequent to installation of the shoring system.

(f) Shoring and bracing shall be designed and installed to prevent settlement and damage to existing structures. In the event of damage, the Contractor will be held liable, and shall be required to provide appropriate restoration at his cost, to the satisfaction of the Contract Administrator.

(g) Shoring and bracing shall remain in place until concrete has attained 75% of the design strength.

E22.2.5 Monitoring Movement of Shoring

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

E22.3 Measurement and Payment

E22.3.1 All costs associated with the supply and installation of shoring, and performing all operations herein described and all other items incidental to the Work included in this specification, shall be paid for at the Contract Lump Sum price for “Supply and Installation of Temporary Shoring for Access Shaft”.

E23. PIPE ACCESS MODIFICATIONS

E23.1 Description

(a) This Specification shall cover the modifications to the combined sewer outfall required to gain access for the purposes of installing the GRP liner.

E23.2 Construction Methods

(a) Removal of top of existing sewer shall be sized to permit installation of GRP liner and construction of the sewer closure.

E23.3 Demolition / Removal of Top of Sewer

E23.3.1 Demolish existing concrete structures as shown on the Drawings and as follows:

(a) Carefully remove the top of the existing sewer. The use of pneumatic breakers is prohibited. Top of sewer may be saw cut or removed using small hand held jack hammers. Final opening in the existing sewer shall be neatly cut square to the existing pipe prior to construction of the trunk sewer closure.

E23.4 Sewer Closure

(a) Construct sewer closure as indicated on the Drawings after completion of the liner installation.

(b) Complete cast in place concrete reinforcing steel work as shown on the Drawings and in accordance with E20 and E21.

E23.5 Measurement and Payment

(a) Pipe Access Modifications shall be measured and paid on a Lump Sum basis as listed in the Form B: Prices.

(b) Payment for “Pipe Access Modifications” shall include the supply of all materials and equipment required to complete the work, including but not limited to demolition, cast-in-place concrete, and reinforcing steel as specified herein.

E24. EXCAVATION AND BACKFILL

E24.1 Description

(a) This Specification covers the requirements for excavation and backfilling of trenches and structures.

E24.2 Excavation

(a) Materials shall not be stockpiled

(b) Carefully excavate to expose the existing pipeline

(c) Only smooth edged buckets may be utilized for excavations within 1.5 m of existing sewer.

(d) The existing sewer shall be located prior to proceeding with excavations within 1 m of the pipe. Final excavation (within 300 mm of pipe wall) shall be completed using soft dig or hand excavation methods to prevent damage to the pipe.

(e) Excess excavation materials shall be disposed of off-site.

E24.3 Backfill

(a) Excavations to access the sewer pipe shall be backfilled Cement Stabilized Fill as indicated on the Drawings.

(b) Backfilling with frozen material will not be permitted.

E24.4 Measurement and Payment

(a) Excavation and backfilling as specified herein shall be considered incidental to “Pipe Access Modifications” and “Supply and Installation of GRP Riser Manhole” and will not be measured for payment. No separate payment will be made.

SEWER AND MANHOLE CONSTRUCTION

E25. TEMPORARY SEWER PLUG

E25.1 General

(a) This specification covers the supply and installation of a temporary sewer plug to facilitate pre-design inspection and verification of existing sewer dimensions as specified herein prior to the manufacture of GRP liner segments.

E25.2 Submittals

(a) Submit Shop Drawings for review and approval by the Contract Administrator, in accordance with E9

(i) The submittal for the plug installation must be provided a minimum of 2 weeks so the plan may be reviewed by the Water and Waste Department.

(b) Flow Control Plan in accordance with E10.

E25.3 Materials

(a) The Contractor shall supply and hire a diving subcontractor as required to install a suitably sized inflatable plug within the 2600 mm CMP end section of the outfall, as indicated on the Drawings or an alternate as approved by the Contact Administrator in accordance with B7.

E25.4 Construction Methods:

(a) A coordination meeting must be held with the Contractor, their subcontractors undertaking work associated with the plug installation, the Contract Administrator and the City of Winnipeg Water and Waste departments (Engineering and Construction Branch and Operations) a minimum of two weeks prior to the planned installation of the plug.

(b) Under no circumstances may a plug be installed if rain is in the forecast.

(c) A representative of the Contractor must be on site full time while the plug is installed.to remove the plug if upstream water levels enter the outfall or if rain is expected to occur.

(i) The manholes upstream of the gate chamber (within the pump station) must be monitored by the Contractor while the plug is installed to detect elevated water levels. If water is observed flowing in this manhole, the sewer flows have elevated above normal dry weather flows (controlled by a weir located upstream of the pump station and the plug will need to be immediately removed.

(ii) If the forecast changes and rain is expected after the plug has been installed, the Contractor must suspend the inspection and remove the plug.

(d) Clean interior contact surfaces of pipe and install temporary plug.

(e) Plugs shall be watertight and capable of withstanding the anticipated external river/creek water levels.

(f) Decant the water in the outfall on the upstream side of the plug to the creek. No sediment may be transferred to the river/creek in accordance with DFO regulations.

E25.5 Measurement and Payment

(a) Supply and installation of Temporary Plug shall be paid on a lump sum basis for the installation of the plug diameter listed on Form B Prices. The price shall include all Works and materials necessary to complete the installation as identified herein and as indicated on the Drawings.

E26. SEWER CLEANING

E26.1 Description

E26.1.1 This Specification shall amend and supplement Standard Specifications CW 2140.

E26.1.2 The intention of sewer cleaning is to remove debris such that verification of existing pipe dimensions can be completed, preparation of liner and grouting works, and pipe CCTV inspections.

E26.2 Construction Methods

E26.2.1 Remove loose and solid debris to adequately perform pre-design inspection, verification of existing sewer dimensions, pre-lining inspection, and to adequately prepare the sewer for lining.

E26.2.2 The Contractor is advised that longitudinal cracks exist in some locations along the pipe obvert (as referenced in Appendix C). The Contractor shall not apply pressurized water to the pipe obvert as this action may result in soil loss and potential movement of the pipe.

E26.2.3 Advise the Contract Administrator immediately when pipe material or backfill material is observed during the cleaning of a sewer. The Contract Administrator will direct one of the following operations be performed.

E26.2.4 (i) Complete or attempt to complete cleaning of the sewer.

E26.2.5 (ii) Suspend cleaning operations and inspect the sewer.

E26.2.6 (iii) Simultaneously clean and inspect the sewer

E26.3 Measurement and Payment

E26.3.1 Amend Section 4.1 of Specification CW 2140 to read:

E26.3.2 (a) Sewer Cleaning will be measured on a time basis and paid for at the Contract Unit Price for “Sewer Cleaning”. The time to be paid will be the total number of hours of sewer cleaned in accordance with this specification, accepted and measured by the Contract Administrator.

E26.3.3 (b) Sewer Cleaning shall include all water supply costs, permits (D.F.O. or otherwise), cleaning, reverse set-up cleaning, dumping, travel time, tipping fees, units, flow control and whatever may be required for the cleaning of the outfall pipe.

E26.3.4 (c) 75% of the payment will be made upon satisfactory completion of the cleaning work. The remaining 25% of the payment will be made upon final acceptance of the sewer cleaning as determined by the review of the corresponding video inspection.

E26.3.5 Delete sections 4.3, 4.7 and 4.8 of specification CW 2140.

E27. DE-WATERING / DE-ICING OUTFALL PIPE

E27.1 Description

E27.1.1 This Specification shall apply to the de-icing and de-watering of the outfall pipe under frozen conditions as required for sewer inspection or to carry out the Work.

E27.1.2 Works for de-watering and de-icing of outfall pipe will only be permitted between December 1 and March 15 of any given year.

E27.1.3 A copy of the DFO Request for Review is included in Appendix A. Methodologies outlined in the submission, including but not limited to, construction methods, schedules, sediment and erosion control, and site restoration shall apply to the Work.

E27.2 Materials

E27.2.1 Equipment

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

(b) All equipment shall be operated and maintained in accordance with E8 (Environmental Protection Plan) and DFO Request for Review measures provided in Appendix A**.**

E27.3 Construction Methods

E27.3.1 Temporary Clay Coffer Dam Installation

(a) Temporary Clay Coffer Dam Installation shall be installed prior to de-watering and de-icing works and in accordance with E12.

E27.3.2 De-Icing Outfall Pipe

(a) The Contractor shall supply heating and hoarding in accordance with CW 2160 to remove all ice from inside the outfall pipe as required.

E27.3.3 De-watering Outfall Pipe

(a) The Contractor must comply with all measures to avoid causing harm to fish and fish habitat as outlined in Appendix A and regulatory provisions including the requirements stated in any DFO guidelines, regulations or permits. Contractor shall submit a De-Watering Outfall Pipe plan to the Contract Administrator, including the type of pumping equipment to be used, prior to commencement of de-watering works.

(b) Contractor shall provide 24-hour monitoring of all de-watering pumping works.

(c) Contractor shall monitor the turbidity of the water. Upon turbid water and/or when the pump begins to take in sediment, the contractor shall stop pumping operations. All sediment shall then be pumped into a holding tank or tank truck and disposed of off site.

(d) Contractor shall make every reasonable effort to control sediment and dissipate water velocity in accordance with Appendix A.

(e) The contractor shall ensure the pumping system is sized properly and adjustments may be required to suit local conditions. The contractor shall be required to supply and operate at least (1) 100mm diameter flood pump. Primary pumps shall be critically silenced when used in residential settings where excessive noise levels would create a disturbance. A back-up pump should be readily available on-site in case of pump failure. Pumping operations shall follow in accordance with Appendix A.

E27.4 Measurement and Payment

E27.4.1 De-watering and de-icing the outfall pipe will be paid for at the lump sum unit price for "De-icing Outfall" 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..

E27.4.2 De-icing Outfall will only be paid out once per season (if required) to facilitate the Work described above. The Contractor will be responsible to maintain the temperature of the pipe to facilitate their Work and to inhibit ice formation throughout the time that work is occurring.

E28. SEWER INSPECTION

E28.1 Description

E28.1.1 The Contractor shall perform the following sewer inspections in accordance with CW 2145 except as modified herein. All inspection work shall be undertaken in the presence of the Contract Administrator.

(a) Pre-Design Inspection, as required to determine the size and shape of the host pipe and liner in accordance with E29.9.2. Undertake Pre-Design inspection prior to manufacture of liner. No coding submission will be required.

(b) Pre-Lining Inspection after sewer cleaning and preparation. No coding of the submission will be required.

(c) Post-Lining Inspection subsequent to installing the GRP liner. Full coding required. Perform post-lining inspection immediately following GRP liner installation while flow control measures are in place.

(d) Warranty Inspection before expiration of the warranty period and acceptance. Full coding required.

E28.1.2 This Specification shall amend and supplement Standard Specification CW 2145.

E28.1.3 This Specification covers inspection of sewers and manholes using internal video equipment for the purposes of assessing thoroughness of cleaning, observing and recording structural and service defects and construction features and to verify new sewer construction prior to acceptance.

E28.1.4 The Contractor is advised that the existing sewer has varying cross sections and portions of the sewer are fully bricklined, partially bricklined, or missing bricks completely. The Contractor is required to take accurate measurements to facilitate the design of an appropriate liner.

E28.1.5 Further to E28.1.4, bricks within the sewer must not be removed during the preconstruction sewer inspection to protect the integrity of the pipe during the summer months until work commences under dry weather flow requirements.

E28.2 Construction Methods

E28.2.1 Sewer Condition Coding

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

E28.2.2 Cross Sectional Measurements

The Contractor shall record cross section measurements every 5 m to capture the existing dimensions of the outfall. Stationing should be from the upstream face of the gate chamber or manhole. The Contractor will record the cross sectional measurements on an Inspection Form provided by the Contract Administrator.

E28.2.3 Maximum Vertical Deflection

The maximum observed vertical deflection "pinch point" in the outfall shall be recorded with its appropriate stationing.

E28.3 Measurement and Payment

E28.3.1 Amend Section 4.4 of specification 2145 to read

(a) Sewer inspection will be measured on a length basis and paid for at the Contract Unit Price for “Sewer Inspection”. Length to be paid for will be the total length of sewer inspected in accordance with this specification, accepted and measured by the Contract Administrator.

(b) Cross sectional measurements and maximum vertical deflection measurements will be considered incidental to the sewer inspection.

(c) Payment will not be made until the required report submissions are accepted by the Contract Administrator.

E28.4 Delete Section 4.6 of Specification 2145.

E29. GRP LINING

E29.1 Description

(a) This Specification shall cover the following:

(i) Verification of Existing Sewer Dimensions;

(ii) Sewer preparation for liner installation;

(iii) GRP liner installation;

(iv) GRP liner grouting.

E29.2 References:

(a) WRc Sewerage Risk Management Website (Sewerage Rehabilitation Manual)

(b) IGN 4-34-02 – Specification for Glassfibre Reinforced Plastics (GRP) Sewer Linings

(c) ASTM F1216 – Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Inversion and Curing of a resin-impregnated tube

(d) ACI 229 – Report on Controlled Low-Strength Materials

E29.3 Submittals

E29.3.1 Provide the GRP liner design submittals to the Contract Administrator in accordance with this Specification and E9, a minimum of ten (10) Business Days prior to the manufacture of GRP liner.

E29.3.2 Provide all other required submittals to the Contract Administrator in accordance with this Specification and E9, a minimum of twenty (20) Business Days prior to starting the GRP lining work.

E29.3.3 Submit the GRP design Shop Drawings sealed and signed by a Professional Engineer licensed to practice in the Province of Manitoba. Shop Drawings shall include the following information:

(a) GRP thickness computations including all specified design checks. Identify design assumptions based on a review of the soil investigations and inspection videos that differ from the information provided in the Specifications for the existing sewer design conditions.

(b) Calculations showing the hydraulic capacity of the GRP lined sewer versus the existing sewer.

(c) Details of the GRP composite proposed and verification of all short and long term material properties.

(d) Design mix and relevant constituent properties for the grout mixture.

(e) Other information that may reasonably be required by the Contract Administrator to confirm the GRP liner design proposed conforms to the specified requirements and design intent.

E29.3.4 Submit a construction protocol that provides information on the following:

(a) Confined entry and safety protocols.

(b) Proposed sewer service flow control plan in accordance with E10.

(c) Details of template establishment and inspection protocol to confirm the size of annulus, liner, and length of lining sections.

(d) Pipe assembly details including joint assembly requirements, temporary support of segmental panels to facilitate construction and grouting operations.

(e) Detailed grouting protocol including minimum and maximum grouting pressures, maximum allowable liner deflection/deformation, and quality assurance and quality control program to verify grout physical characteristics and annulus filling verification.

(f) Detailed implementation schedule for panel assembly, annulus grouting, service reinstatement, and terminations.

E29.4 GRP Liner Design

E29.4.1 General

(a) Design GRP segmental lining as a Type II lining system in accordance with WRc Sewerage Risk Management – Sewer Renovation Section (most recent version) and these Specifications. The liner shall be designed to accommodate full overburden load as indicated herein.

(b) Size GRP segments in accordance with design objectives to minimize annulus size and to maximize hydraulic capacity, with due consideration to meet reasonable constructability considerations.

E29.4.2 Design Objectives

(a) Maximizing the structural enhancement of the sewer by installing a structural section of sufficient quality and sufficient strength to address all relevant loading conditions and preclude further sewer deterioration.

(b) Minimizing the hydraulic capacity impact of rehabilitation by maximizing the bore of the rehabilitated sewer.

(c) Reducing infiltration and exfiltration that may compromise long term structural stability of the pipe.

(d) Preventing root intrusion.

(e) Providing sufficient chemical resistance to prevent sewer pipe degradation related to the conveyance of storm water or sewage.

(f) Minimizing sewer service disruption to the combined sewer function during the rehabilitation process.

(g) Minimizing the time required to complete the sewer rehabilitation.

E29.4.3 Hydraulic Requirements

(a) Perform a design check to confirm the full flow hydraulic capacity of the GRP liner is equal or greater than the existing sewer. Use the ‘Colebrook-White” formula with assumed ‘ks’ value of 0.03 mm for the GRP liner. The ‘ks’ value for the existing sewer may be estimated based on observed condition of the pipeline using the tables found on the WRc Sewerage Risk Management Website (Sewerage Rehabilitation Manual) – Sewer Management Planning, The Assessment of Sewer Hydraulic Roughness. The following ‘ks’ value may be assumed for the existing sewer:

(i) Archibald Street Outfall – 15.0 mm

E29.4.4 Type II Design

(a) Design as a Type II liner in accordance with WRc Sewerage Risk Management Website (Sewerage Rehabilitation Manual) – Sewer Renovation Section, with the provision that the applied loads consider full overburden loads and the following minimum design checks:

(i) Short term buckling/deformation checks against external pressure due to grouting operations. Short term checks to address both external pressure and flotation.

(ii) Long term check buckling/deformation checks due to hydrostatic pressure;

(iii) Provide allowance for full earth and superimposed loading as noted below.

(b) Use the following minimum design assumptions:

(i) Flexible liner, no bond with host pipe.

(ii) Groundwater table is at existing ground surface

(iii) Verified long and short term values for flexural modulus, long term flexural strain (measured in hood direction), and long term tensile strength, all tested in accordance with IGN-4-34-02.

(iv) Calculate dead load based on soil density of 18 kN/m^3 in the design of the overburden soil and applied dead and live load formula from Clause X.1.2.2 of Appendix X1 of ASTM F1216. Include an allowance for an AASHTO HS20 concentrated live load in the total external pressure on the pipe.

(v) Minimum factor of safety (N) of 2 against failure in determination of maximum permissible external pressure.

(vi) Liner design shall meet design objectives as indicated in E29.4.2. To achieve maximum structural enhancement of the sewer, a minimum liner thickness of 50 mm shall be required should hydraulic capacity allow.

E29.5 Existing Sewer Design Conditions

(a) The assessment of liner system design conditions and site specific repairs required to accommodate lining were based on the conditions observed from sewer inspections that were performed in 2018. Images from these inspections are included in Appendix B. Copies of the CCTV video inspections are available to the Contractor in digital format upon request.

(b) The Contractor shall be responsible to determine the actual amount of sediment and debris in the sewers included in this Work.

(c) The Contractor is advised that a bend exists with the Archibald Street Outfall approximately 10 m downstream of the chamber wall. The design shall consider and include design of bend transition piece(s) as required to accommodate the existing bend.

(d) The Contractor is advised that a rough graded grout floor exists within the outfall. The Contractor may chip down or remove sections of the grout floor if required to facilitate installation of the GRP liner. However any modification to the existing host pipe must not impact the pipes capacity to support the overburden soils (ie, modifications should not impact pipe liner install and grouting). Proposed methodology for any removal or repair of existing grout or concrete within the existing pipe shall be submitted and approved by the Contractor Administrator prior to commencing the Work.

E29.6 Materials

E29.6.1 GRP Liner

(a) Constituent materials and manufacturing of GRP segments shall conform to IGN-4-34-02.

(b) Joints shall be capable of withstanding internal and external hydrostatic pressures. Assume both internal and external water levels at ground surface.

(c) Appearance Criteria

(i) Each GRP panel shall be reviewed relative to Table 3 of Appendix G of IGN 4-34-02 for confirmation that all external and internal surfaces are within final allowable defect limits.

(d) Approved Manufacturers:

(i) Channeline International (Contact: Andy Sherwin)

(ii) Hobas Pipe (Contact: Gabriel Castelblanco)

(iii) Or Approved Equivalent in accordance with B7.

E29.6.2 GRP Liner Performance Requirements

(a) GRP Liners shall meet the greater of the Performance Requirements noted in Table 1 of Section 8 of IGN 4-34-02 or the project specific design requirements. The manufacturer shall demonstrate Type Testing results to confirm conformance with both the IGN specification and production run testing. Type testing shall be required for confirmation of all short or long term properties in Table 1 (Section 9, Clauses 9.2, 9.3, 9.4, 9.5, 9.6), while production run tests are also required to substantiate short term properties for short term flexural modulus and strength. Shear bond testing shall be carried out on a production run basis as noted herein.

E29.6.3 Annular grout shall conform to the requirements of ACI 229.

E29.6.4 Transitions

(a) Transitions shall be completed as shown on the Drawings using 35 MPa concrete or approved equivalent in accordance with B7, compatible with the liner and grouting materials.

E29.7 Quality Control

E29.7.1 Qualifications

(a) GRP Liner Installation

(i) The Contractor responsible for the GRP Liner installation shall meet the qualification requirements as specified in B13.4.

(ii) Should the Contractor not meet the qualification requirements as indicated in B13.4, the Contractor shall be required to employ a manufacturer's representative to supervise the installation of GRP Liner and associated grouting works. The manufacturers representative shall have at minimum three (3) years of experience supervising GRP liner construction and shall submit a description of referenced projects including the owner's name, contact information, project superintendent, and pipe type. The manufacturer's representative shall be capable of complying with the qualifications specified for the Contractor and shall be acceptable to the Contract Administrator. The manufacturer's representative shall supervise all GRP Liner operations including training the Contractor's personnel as required.

(b) Grouting

(i) The Contractor or Subcontractor supplying and placing the grout shall be capable of developing a mix design, and batching, mixing, handling and placing grout under buried pipe conditions; shall have furnished and placed grout on at least three (3) projects of similar size and scope specified herein which have been in successful operation; and shall have a record of experience and quality of work using low density cellular grout as satisfactory to the Contract Administrator.

E29.7.2 Maintain the following Quality Control records of the work and provide to the Contract Administrator after completion of the work.

(a) Summary of the GRP segment manufacturing records, including:

(i) All QA/QC testing carried out in accordance with IGN 4-34-02 for each GRP liner design.

(ii) A certificate of compliance in accordance with Appendix H of IGN 4-34-02 for the GRP liner design.

(b) A grouting summary

E29.8 Sewer Cleaning

E29.8.1 Sewer cleaning shall be completed in accordance with E26 to adequately prepare the sewer for lining.

E29.9 Sewer Inspections

E29.9.1 Perform the following sewer inspections in accordance with E28. All inspection work shall be undertaken in the presence of the Contract Administrator.

(a) Pre-Design Inspection: as required to determine size and shape of the host pipe and liner in accordance with E29.9.2. Undertake Pre-Design inspection prior to manufacture of liner. No coding submission required. Control flow as required to adequately determine the host pipe dimensions.

(b) Pre-Lining Inspection: after sewer cleaning and preparation. No coding of the submission will be required.

(c) Post-Lining Inspection: subsequent to installing the GRP liner and sewer reinstatement. Full coding will be required. Perform post-lining inspection immediately after sewer reinstatement while flow control measures are in place.

(d) Warranty Inspection: before expiration of the warranty period and acceptance. No coding required. Control flow not required.

E29.9.2 Verification of Existing Sewer Dimensions

(a) Verify dimensional requirements of sewer to be rehabilitated prior to manufacture of the GRP segments (during Pre-Design inspection) to determine liner dimensional requirements. Acceptable methods would include:

(i) Passing a template of sufficient size, rigidity, length, and cross section through the host pipe pre- and post-lining.

(ii) Utilizing sufficiently accurate laser profiling technology that is specifically designed to quantify dimensional requirements for this application.

E29.9.3 Review the Pre-Design inspection video with the Contract Administrator before starting preparatory work to confirm the extent and precise location of all pre-work required.

E29.9.4 Review the Pre-Lining Inspection video with the Contract Administrator at least 24 hours before commencing installation and obtain approval to install liner. The Pre-Lining inspection shall confirm:

(a) Necessary Cleaning and pipe preparation work have been satisfactorily completed.

(b) Condition of the sewer pipe is consistent with the design conditions and the Specifications. Advise the Contract Administrator of any condition that is contrary to the design conditions or assumptions made that may affect either long or short term performance of the GRP liner prior to commencing lining.

(c) The limit and precise location of any internal point repairs (as required).

E29.9.5 Post lining inspection is to confirm the fit and finish of the liner and adequacy of the termination transitions.

E29.9.6 Warranty Inspection is to confirm the fit and finish of the liner, need for any remedial work, and acceptance of any repair work performed during the warranty period. Sewer cleaning in accordance with the specifications indicated herein is required to obtain a satisfactory inspection.

E29.9.7 Provide the Contract Administrator with the following sewer inspection reports. Reports shall be prepared in accordance with CW 2145.

(a) Submit pre-design inspection prior to manufacture of liner.

(b) Submit pre- and post-lining inspection and reports prior to completion of construction.

(c) Submit a Warranty Inspection report prior to Final Acceptance of the Work.

E29.10 Sewer Preparation and Repairs Prior to Lining

(a) Perform sewer preparation and repairs as required for installation of the GRP liner and as indicated in the Specification and Construction Drawings.

(b) Remove intruding solid debris in accordance with CW 2140.

(c) Sewer Invert Restoration

(i) The Contractor shall restore the sewer invert of the existing sewer as required for installation of the GRP liner. Any voids found shall be filled with a non-shrink, watertight cement grout, an appropriate polyurethane grout compound, or other approved grouting product prior to liner installation.

E29.11 Installation of GRP Liners

E29.11.1 GRP Panel Installation

(a) Assemble GRP panels in accordance with approved installation protocol submission.

(b) Profile of alignment shall be offset to invert of pipe to as great a degree as possible leaving largest annulus at crown.

(c) Securely fasten panels in-place to facilitate construction and sufficiently to assure that panels are not displaced during grouting operations. Ensure that temporary support system minimizes point loads and other features that may cause damage to GRP liner during grouting operations.

E29.11.2 Annulus Grouting

(a) Carry out annulus grouting in accordance with approved grouting protocol submission.

(b) Grout holes to be pre-drilled. Provide suitable stop valves at collar of holes for use in maintaining pressure during grouting. Upon completion, the holes should be repaired after grouting with appropriate preparation and filler materials as approved in grouting submission.

(c) General requirements that apply to grouting works include:

(i) Do not begin grouting works until the existing host pipe is cleaned of materials and debris.

(ii) No standing water shall be allowed where grout is to be placed.

(iii) Inform the Contract Administrator at least 48 hours in advance of placement of grout.

(iv) Estimate the volume of grout required (include overfill allowance based on grout properties, sewer geometry and condition, and previous experience with grout mixture);

(v) By-pass or pump through any sewer flows that occur during grouting operations;

(vi) Minimize infiltration (or its effects);

(vii) Inject from the downstream end of the rehabilitated section;

(viii) Inject from the invert towards the crown;

(ix) Provide air vents at the high points;

(x) Monitor and record the injection pressures. Locate pressure gauges or appropriate range for monitoring the grout injection pressures in the line transporting the grout, at the point of injection. Injection pressure shall be low enough to prevent pipe movement and/or damage.

(xi) Provide a means of direct communication between the injection point and the pump operator.

(xii) Inspect the lining for signs of distortion or floatation;

(xiii) Monitor and record the volume of grout injected and compare with the estimate (with due consideration of overfill allowance);

(xiv) Regularly monitor for grout leaks in sections of sewer upstream and downstream, drain connections (via inspection chambers), particularly if the volume of grout injected exceeds the estimate grout take.

(xv) All void space outside of the liner pipe shall be completely filled with grout. Provide air release piping in the crown of the pipe to allow displaced air and air lost from grout to escape and be replaced with grout. Grout shall be placed in accordance with approved submittals.

(xvi) Grouting the annular space between host pipe and liner shall be accomplished by placing grout in lifts as per approved grouting plan submittal, so as to not induce movement of the pipe, pipe overstressing, or excessive deformation.

(d) The volume to be grouted at any one time can varied to suit the various constraints such as the workability of the grout, design of the lining (including floatation), capacity of the mixing and pumping equipment, and the necessity for over pumping.

(e) Grout should either be injected through multiple preformed holes (nominally 50 mm diameter) located in the haunches and crown of the lining or through pipes cast into the crown and invert of the stop ends. The former method is preferable, because in the event of a blockage, grouting can recommence at the adjacent panel. The grout should be injected from the lowest vent hole and successive holes plugged as air free grout is seen to issue from them. If the major dimension of the lining exceeds 1000 mm, consideration should be given to the provision of more grout holes.

E29.11.3 Transitions at Liner Termination

(a) At transition terminations, the interface between the exterior surface of the liner and the host pipe shall be made watertight. The transition shall extend from the termination if the liner 1 meter into the host pipe (unless otherwise shown on the Drawings) and provide a gradual transition from the host pipe to the lined section. Grouted transition shall match the GRP liner internal diameter and taper to a thickness of no more than 13mm where meeting the host pipe.

(b) Preparation of the host pipe and installation of concrete grout shall follow the manufacturers recommendations.

E29.12 Post Construction Design Review for Total Performance

(a) The Contract Administrator will perform a post-construction design review to confirm that the completed liner meets the design objectives relative to structural requirements prior to Total Performance. The design review will utilize the measured values for flexural strength, flexural modulus for the GRP liner.

(b) The Contract Administrator will advise of any discrepancies between the constructed GRP and the design requirements.

(c) Perform necessary remedial measures to confirm that any GRP liners deemed as structurally deficient will comply with the design life objectives such as determination of a more representative groundwater elevation locally through monitoring, and supplemental strength testing and thickness measurements.

(d) Repair sections of GRP removed for supplemental testing by placing an approved internal point repair of the same thickness and strength as the full segment liner.

(e) Review remedial action with the Contract Administrator prior to implementation.

(f) Perform further testing, monitoring, and calculations and install structural enhancements at own cost.

E29.13 Measurement and Payment

E29.13.1 Supply and Installation of GRP Liner

(a) Liner installation will be measured on a length basis and paid for at the Contract Unit Price for “Supply and Installation of GRP Liner”. Length to be paid for will be the total

number of lineal meters of GRP liner supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

(b) Measurement for the supply and installation of the GRP liner will be made horizontally at grade, above the centreline of the pipe from termination point to termination point.

(c) Eighty percent (80%) of the payment will be made upon satisfactory completion of the GRP installation work. The remaining twenty percent (20%) of the payment will be made upon confirmation of the grout strength, and delivery and acceptance of all required submissions, shop drawings, and inspection reports.

(d) Payment for the supply and installation of GRP liner shall include but is not limited to the following:

(i) Verification of Existing Sewer Dimensions
(ii) Submittals, including: GRP design, material samples, material testing, operations protocol, and construction protocol.
(iii) All required sewer preparation work
(iv) Supply and Installation of GRP Liner
(v) Grouting of GRP Liner
(vi) Transitions at liner termination
(vii) Test Samples
(viii) Quality Control Testing and Records

E30. SUPPLY AND INSTALLATION OF GRP RISER MANHOLE

E30.1 Description

(a) The work specified in this section includes the removal of the existing concrete manhole and replacing with a new GRP riser manhole, complete with manhole saddle, grade rings, frame, cover, and riser pipe, and any other appurtenances as required and specified herein.

E30.2 Submittals

(a) Furnish Shop Drawings and Calculations for the manhole riser pipe.

E30.3 Design Criteria

(a) Design the riser pipe to accommodate lateral earth and groundwater loading.

E30.4 Materials

(i) GRP riser manhole and saddle shall be manufactured by the same supplier as the GRP liner to ensure watertight connection of materials.
(ii) Manhole frames and covers shall be in accordance with CW 2130.
(iii) Riser backfill shall be as specified on the Drawings.

E30.5 Construction Methods

(a) The riser pipe(s) shall be installed and joined in strict conformance with the manufacturer's written instructions.

(b) Manhole frame and cover shall not be set to final grade until backfilling and any riverbank regrading required has been completed, unless otherwise approved by the Contract Administrator.

(c) Set manhole frame in concrete collar as shown on the Drawings.

(d) Set top of cover flush with surface of adjoining ground surface, unless otherwise shown or directed.

E30.6 Measurement and Payment

(a) Furnishing and installation of riser manhole shall be measured on a vertical meter basis and paid for at the Contract Unit Price for "Supply and Installation of GRP Riser Manhole". The price shall include all work described herein and as shown on the Drawings, and includes removal of existing concrete manhole, excavation, riser pipe, connection of the GRP riser pipe to new GRP liner pipe, backfill as specified on the Drawings, concrete, reinforcement, polyethylene wrap, flat top reducers, gaskets, manhole frames and covers, and all appurtenances and miscellaneous materials required to complete the Work.

E31. SUPPLY AND INSTALLATION OF DEBRIS GRATE

E31.1 Description

E31.1.1 This Specification shall cover the supply and installation of the 2600 mm diameter debris grate to be installed within the existing CMP outlet. The Work specified in this section shall include the furnishing of all labour, materials, equipment, tools, supplies, and all things necessary to complete the Work.

E31.2 Materials and Construction Methods

E31.2.1 Shop drawings shall be submitted for the debris grate and shall be installed as shown on the Drawings. Galvanizing shall be hot-dip conforming to requirements of CSA G164-N1981 to a minimum net retention of 600 g/m2. All bolts and nuts shall be galvanized steel, conforming to ASTM A-320 Grade B8M. All welding shall be fully approved by the Canadian Welding Bureau in conformance with CSA Standard W47.1. Welding shall be done by currently licensed welders only. Welding splatter and other fabricator burrs, where exposed, shall be ground off and/or filed smooth, and left ready for subsequent operations. All miscellaneous metal, after fabrication shall be hot-dip galvanized. No separate measurement will be made for hot-dip galvanizing.

E31.2.2 Debris grate shall be installed as detailed and in the location shown on the Drawings.

E31.3 Measurement and Payment

E31.3.1 The supply and installation of the Debris Grate shall be measured on a unit basis. The units to be paid for shall be the total number of debris grate installed in accordance with this specification and acceptable to the Contract Administrator as computed from measurements made by the Contract Administrator.

E31.3.2 Supply and installation of Debris Grate will be paid for at the Contract Unit Price for "Supply and Installation of Debris Grate", measured specified herein, which price shall be payment in full for performing all operations described and all other items incidental to the Work included in this specification.

RESTORATION

E32. NATIVE GRASSES

E32.1 Description

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

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

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

E32.2 Materials

E32.2.1 Lower and Mid Bank Revegetation

(a) Seed Mixture

Grass seed shall consist of a Canada common native seed mix as follows:
20% Slender Wheatgrass
20% Switchgrass
20% Big Bluestem
20% Canada Wildrye
10% Fringed Brome
10% Canada Milkvetch

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

Prairie Cordgrass
Streambank Wheatgrass
Western Wheatgrass
Northern Wheatgrass

No more than (2) wheatgrass species shall be used in the mixture.

E32.3 Construction Methods

E32.3.1 Seeding

(a) Grass seed shall be sown at a rate of 0.5 kg per 100 square metres.

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

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

E32.3.2 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

E32.3.3 Quality Control

(a) Inspection

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

(b) Access

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

E32.4 Method of Measurement

E32.4.1 Topsoil and Seeding

(a) The supply and placement of the native grass seeding within the lower and mid bank areas will be measured on an area basis. **The maximum area to be paid for shall be the area indicated on Form B: Prices, which is based on the area to be seeded as a direct result of specified works. Topsoil and Seeding area above this quantity shall be considered incidental to E12: Site Development and Restoration.**

(b) The formula used to calculate topsoil and seeding areas is: *[3*(pipe diameter)+6] * pipe length* for all excavated pipe sections, including renewals and removals.

(c) Where installed pipe lengths vary due to field conditions or instructions from the Contract Administrator, the quantity of Topsoil and Seeding to be paid will be adjusted as appropriate.

E32.5 Basis of Payment

E32.5.1 Topsoil and Seeding (Native Grass Seed Mix)

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

E33. PLANTING OF TREES AND SHRUBS

E33.1 Description

E33.1.1 Trees and Shrubs will be planted in 2020 as directed by the Contract Administrator. Plantings will consist of trees and shrubs in various container sizes.

E33.1.2 The Work to be undertaken by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all other things necessary for and incidental to the satisfactory performance and completion of all Work as shown on the Drawings and as herein specified.

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

E33.1.4 Reference

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

E33.1.5 Source Quality Control

(a) All plant material shall be randomly inspected at the source upon request of the Contract Administrator.

(b) Trees are to be grown in nurseries under proper cultural practices as recommended by the Canadian Nursery Trades Association.

(c) Only those trees that have been grown for at least the four (4) previous years in local Manitoba nurseries located in an Agriculture Canada Plant Hardiness Zone designation of 2(a or b) or 3(a or b) and within a 250 km radius of Winnipeg, will be accepted. Trees that have grown in plant hardiness zones 1 and 4 or greater will be rejected.

E33.1.6 Maintenance

(a) The Contractor shall be responsible for the maintenance of the trees and shrubs for a period of one (1) year from the date of Total Performance. Any areas planted after September 15th, the maintenance period will commence on May 15th of the following year or such date as mutually agreed upon by all parties.

(b) Water to ensure soil moisture conditions for optimum growth and health of plant material. Ensure watering techniques do not cause erosion.

(c) Reform damaged watering saucers.

(d) Remove weeds as per overall weed control strategy.

(e) Replace or re-spread damaged, missing or disturbed mulch.

(f) For non-mulched areas, cultivate monthly to keep top layer of soil friable.

(g) If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from Contract Administrator prior to application.

(h) Apply fertilizer as directed by manufacturer's specifications.

(i) Remove dead, broken or hazardous branches from plant material.

(j) Keep trunk protection and tree supports in proper repair and adjustment.

(k) Remove trunk protection, tree supports and level watering saucers at end of warranty period.

(l) Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

(m) Submit weekly written reports to Contract Administrator identifying:

(i) Maintenance work carried out.

(ii) Development and condition of plant material.

(iii) Preventative or corrective measures required which are outside Contractor's responsibility.

E33.1.7 Warranty

(a) The Contractor shall, at his/her expense, warrant the Work against any and all defects or deficiencies resulting from insect infestation, disease and mechanical damage due to improper handling, installation or maintenance, for a period of one (1) year from the date of the Total Performance. Nursery stock damaged by vandalism or reasons beyond the control of the Contractor shall be replaced by the client.

(b) End-of-Warranty inspection will be conducted by the Contract Administrator.

(c) The Contract Administrator reserves the right to request material replacement or extend the Contractor's Maintenance responsibilities for an additional one (1) year if, at the end of the Warranty Period, leaf development and growth are not sufficient to ensure future survival of the plant material.

E33.1.8 Replacements

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

(b) Defective trees shall be replaced within three (3) days of notification to the Contractor, unless otherwise agreed to by the Contract Administrator.

(c) The Contractor shall extend Maintenance and Warranty on replacement tree for a period equal to the original Maintenance and Warranty Periods.

(d) The Contractor shall continue such replacement, Maintenance and Warranty until tree is acceptable.

E33.2 Materials

E33.2.1 Planting Soil and Mulch

(a) As per Planting Preparation.

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

E33.2.2 Miscellaneous Materials

(a) Water shall be potable and free of minerals which may be detrimental to plant growth.

(b) Stakes shall be metal T-Bar, steel, 40x40x5x2440 mm.

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

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

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

(f) Fertilizer shall be a slow release formulation of low nitrogen and high phosphorus e.g. 10-50-12. Apply quantities at rates stated by product manufacturer.

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

(h) Wire Baskets shall be horticultural accepted product designed to carry the weight and to contain a burlap-covered root ball. Minimum diameter basket size is to conform to the same minimum diameter of the tree root ball for the respective minimum tree caliper sizes.

E33.2.3 Plant Material

(a) All nursery stock supplied shall be Canadian Prairie nursery grown, and of species and sizes indicated in the plant list on the Drawings. Its quality shall be in accordance with the "Guide Specification for Nursery Stock of the Canadian Nursery Trades Association".

(b) Any nursery stock dug from native stands, wood lots, orchards, or neglected nurseries and which have not received proper cultural maintenance as advocated by the Canadian Nursery Trades Association shall be designated as "collected plants". The use of "collected plants" will not be permitted unless specified below.

(c) Nomenclature of specified nursery stock shall conform to the International Code of Nomenclature for Cultivated Plants and shall be in accordance with the approved scientific names given in the latest edition of Standardized Plant Names. The names of varieties not named therein are generally in conformity with the names accepted in the nursery trade.

(d) Plants larger than specified may be used if approved by the Contract Administrator. The use of such plants shall not increase the Contract price.

(e) Plants shall be free of disease, insect infestation, rodent damage, or environmental stress.

(f) Trees:

(i) To be characteristically developed for their species and structurally sound, well branched, healthy and vigorous and densely foliated when in leaf. The tree is to have a healthy, well developed, fibrous root system which may be verified through a testing procedure that destructively samples one or more randomly selected root balls;

(ii) To have been root pruned regularly, but not later than one growing season prior to arrival on-site. The Contractor may be required to furnish documentation to the client on their root-pruning program. Trees in excess of 75 mm caliper are to have been half root pruned during each of two successive growing seasons, the latter at least, one growing season prior to arrival on-site;

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

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

(v) To be free of disease, insect infestation, rodent damage, sun scald, frost cracks, abrasions, unhealed scars, scars exceeding 5cm in diameter, major forks or crooks in the trunk, broken branches, or angled leaders. Trees having the above defects will not be accepted by the Contract Administrator;

(vi) Trees having a leader which has developed at a sharp angle to the trunk as a result of pruning or trunk damage will not be accepted;

(vii) Trees exhibiting suppressed, weakly developed branches due to competition from other closely spaced trees in the nursery will not be accepted. Trees exhibiting dead branches will not be accepted.

(viii) Any tree that has come out of dormant stage and is too far advanced will not be accepted unless prior approval obtained. Approval is required for any tree which has been held in cold storage.

(ix) Balled and burlapped trees in excess of a 3 m height must have been dug with large firm ball. Roots in root balls must be comprised of 75% fibrous and feeder root systems. Secure root balls with burlap, heavy twine and rope. For trees 75 mm or more in caliper, wrap ball in double layer of burlap and drum lace with minimum 10 mm diameter rope. Protect root balls against sudden changes in temperature and exposure to heavy rainfall.

(x) Tree spade dug trees are to be dug with mechanized digging equipment with hydraulic spade. Lift root ball from hole, place in wire basket designed for purpose and lined with burlap. Tie basket to ball with heavy rope. Take care not to injure trunk of tree with wire basket ties or rope.

(xi) Use of collected or native trees is not permitted.

E33.2.4 Tree and Shrub Quantity and Size

(a) Trees and shrubs are to be planted at the quantities and caliper listed in Form B and broken down in detail below. Any variations to size, caliper or species of specified trees will require a request for approval from the Contract Administrator.

(i) Large trees shall be a minimum 75 mm caliper, 2.5 m in height, with a minimum of eight (8) major branches 2 m above grade, have balled and burlapped root balls, and be double stake. Tree species specific to the site shall consist of:

- American Elm
- Bur Oak
- Manitoba Maple
- Basswood
- Cottonwood

(ii) Shrubs in two gallon containers shall be well formed, dense, bushy plants. The species of the planted shrubs shall consist of:

- Nannyberry (shrub form) with a minimum of nine (9) basal stems and a minimum height of 900 mm
- Red Oiser Dogwood with a minimum of nine (9) basal stems and a minimum height of 900 mm
- False Indigo with a minimum of five (5) basal stems and a minimum height of 450 mm

(b) Planting locations will be determined on-site by the Contract Administrator.

(c) Trees are to conform to the measurements specified in Form B, except that trees larger than specified may be used if approved by the Contract Administrator.

(d) Trees are to be measured when the branches are in their normal position. Height dimensions specified are to refer to the main body of the tree and not from branch tip to root base. Where trees have been measured by caliper or diameter, reference is to be made to the diameter of the trunk measured 15 cm above the ground as the tree stands in the nursery prior to lifting. Caliper of tree shall be appropriately designed on a permanently fixed tag on one of the branches.

E33.2.5 Shipment and Pre-Planting Care

(a) Coordinate shipping of trees and excavation of holes to ensure minimum time lapse between digging and planting.

(b) Tie branches of trees securely, and protect trees against abrasion, exposure and extreme temperature change during transit. Avoid binding of trees with rope or wire which would damage bark, break branches or destroy natural shape of tree. Give full support to root ball of trees during lifting.

(c) Cover tree foliage with tarpaulin, and protect bare roots by means of dampened straw, peat moss, saw dust or other acceptable material to prevent loss of moisture during transit and storage.

(d) Remove broken and damaged roots with sharp pruning shears. Make clean cuts, and cover cuts over 10 mm diameter with a tree wound dressing.

(e) Keep roots moist and protected from sun and wind. Heel-in trees which cannot be planted immediately in shaded areas and water well.

E33.3 Construction Methods

E33.3.1 Workmanship

(a) All areas and locations provided for planting will be staked out or painted on-Site by the Contract Administrator. Excavation shall not proceed until the layout has been inspected and approved by the Contract Administrator. Excavation shall not be undertaken until all underground utilities have been located and protected.

(b) Coordinate operations. Keep Site clean and planting holes drained. Immediately remove soil or debris spilled onto street pavement, grass or sidewalk.

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

E33.3.2 Planting Time

(a) Plant trees and shrubs as early as May 15, 2021 but no later than June 30, 2021 depending when Topsoil are placed and prepared.

(b) Plant only under conditions that are conducive to health and physical conditions of trees.

(c) Provide planting schedule to Contract Administrator. Extending planting operations over long period using limited crew will not be accepted.

(d) The Contractor must obtain all above and below ground clearances from all the utilities as well as the appropriate District Operations Branch in a timely manner so as not to jeopardize the schedule of the complete tree planting Contract.

E33.3.3 Excavation

(a) Tree pit to be dug with back hoe.

(b) Excavate tree pits as indicated by stakes or paint marks.

(c) Protect bottom of excavations against freezing.

(d) Remove water which enters excavations prior to planting. Ensure source of water is not ground water and notify Contract Administrator.

(e) Upon excavation of the planting, the excavation shall be backfilled with a Topsoil mixture to a depth to permit adequate installation and stabilization of the plant material. Topsoil shall be placed in accordance with City of Winnipeg Standard Construction Specification CW 3540 to a 300 mm depth.

E33.3.4 Installation

(a) Plantings of trees and shrubs shall be undertaken as approved by the Contract Administrator. Configuration of planting shall be subject to input and final approval by the Contract Administrator.

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

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

(d) No tree pit is to be left open at the end of the Contractor's Work Day. Planting program is to be planned to ensure that all approved trees delivered to the Site at designated planting locations are installed and thoroughly watered the same day as delivery.

(e) With balled and burlapped root balls and root balls in wire baskets, burlap shall be loosened and cut away from the top 1/3 without disturbing root ball. Wire shall be cut away and removed from the top 1/3 of the root ball. Burlap or rope shall not be pulled from under root ball. Non-biodegradable wrapping shall be removed.

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

(g) After inserting the tree and tamping the root system with Topsoil in layer of 150mm, water shall be poured in until the pit is thoroughly soaked. Filling of the hole shall then be completed and the fill-in soil shall be packed firmly around the roots, leaving a concave surface for convenient watering. After filling, the planting shall be watered at frequent intervals.

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

(i) All nursery stock shall be set plumb in the centre of pits and at levels as shown on the planting details after settlement has taken place.

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

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

(l) Each tree must be planted such that the trunk flare is visible at the top of the root ball. Trees where the trunk flare is not visible shall be considered a deficiency and payment for the planting will not be received until the deficiency is addressed. Do not cover the top of the root ball with soil.

E33.3.5 Supply and Installation of Mulch

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

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

E33.3.6 Fertilizing

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

E33.3.7 Trunk / Beaver Protection

(a) Install trunk protection on trees.

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

E33.3.8 Pruning

(a) The Contractor shall provide a licensed Manitoba Certified Arborist for each Work crew or Work Site.

(b) Employ clean sharp tools and make cuts flush with branch collars. Remove dead and injured branches.

E33.3.9 Watering

(a) Trees are to be watered during the planting procedure as described previously, and once a week thereafter, or more frequently as required, during the growing season.

(b) Apply 40 litres of water per 25 mm caliper per application using deep root feeder or low/pressure nozzle and hose. The water stream must not gouge out a hole in the soil and mulch.

(c) A complete record is to be kept of each series of waterings for all planted trees noting: 1) location, and 2) date of watering. This record shall be sent bi-weekly to the Contract Administrator.

E33.4 Measurement and Payment

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

E33.4.2 Payment for Installation and maintenance of trees and shrubs shall be paid for at the Contract Unit Prices for “Tree Revegetation”. This price shall be payment in full for supplying all labour, equipment and materials, and performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E34. REMOVAL OF CONCRETE DEBRIS

E34.1 Description

E34.1.1 This Specification shall cover the removal of the concrete debris located at the lower bank and outlet of the Archibald Street Outfall.

E34.2 Construction Methods

E34.2.1 The Contractor is advised that some additional Site cleanup is required at the Archibald Street Outfall site. All existing concrete debris located near the outfall outlet shall be removed and appropriately disposed off site.

E34.3 Measurement and Payment

E34.3.1 The removal of concrete debris shall be measured by tonnes and paid for at the Contract Unit Price for “Removal of Concrete Debris”. The weight to be paid for shall be the total tonnes of garbage removed from Site and taken to a waste facility, in accordance with this Specification, and accepted and measured by the Contract Administrator.

E34.3.2 The Contractor shall supply and deliver receipts of weigh bills to the Contract Administrator before payment will be made.

E34.3.3 All costs associated with removal of concrete debris, which includes collection of debris, transport, and tipping fees, will be considered incidental to the Work.

PART F - SECURITY CLEARANCE

F1. SECURITY CLEARANCE

F1.1 Each individual proposed to perform Work under the Contract shall be required to obtain a Police Information Check from the police service having jurisdiction at his place of residence. This can be obtained from one of the following;

(a) police service having jurisdiction at his/her place of residence; or

(b) Sterling BackCheck – for existing account holders, log into your account to send individual invitations to employees requiring security clearance. For those that do not have an account, click on the following link to open an account: https://forms.sterlingbackcheck.com/partners/platform2-en.php?&partner=winnipegcity ; or

(c) Commissionaires (Manitoba Division), forms to be completed can be found on the website at: https://www.commissionaires.ca/en/manitoba/home ;or

(d) FASTCHECK Criminal Record & Fingerprint Specialists, forms to be completed can be found on the website at: https://myfastcheck.com

F1.2 The following is a link to information for obtaining the Police Information Check including the Vulnerable Sector screening from the City of Winnipeg Police Service. http://winnipeg.ca/police/pr/PIC.stm

F1.2.1 The Police Information Check shall include a Vulnerable Sector Screening. This can be obtained by following the link below http://winnipeg.ca/police/pr/PIC.stm .

(a) Individuals will need to state in the form, that they may be working in City of Winnipeg pools, libraries and community centres;

F1.3 The original Police Information Check (Form P–612) will be provided by the Winnipeg Police Service to the individual applicant. The original has a validation sticker from the Winnipeg Police Service in the top right hand corner. The applicant shall:

(a) Provide the original Police Information Check (Form P–612) to the Contract Administrator.

F1.4 Prior to the award of Contact, 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 Police Information Check obtained not earlier than one (1) year prior to the Submission Deadline, or a certified true copy thereof, for each individual proposed to perform the Work.

F1.5 Any individual for whom a Police Information Check is not provided, or for whom a Police Information Check indicates any convictions or pending charges related to property offences or crimes against another person will not be permitted to perform any Work.

F1.6 Any Police Information Check obtained thereby will be deemed valid for the duration of the Contract subject to a repeated records search as hereinafter specified.

F1.7 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 Police Information Check. Any individual who fails to provide a satisfactory Police Information Check as a result of a repeated Police Information Check will not be permitted to continue to perform any Work.