THE CITY OF WINNIPEG

TENDER

TENDER NO. 741-2025

2024 TRENCHLESS REHABILITATION OF NON-CIRCULAR COMBINED SEWERS – CONTRACT 4

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 2024 Trenchless Rehabilitation of Non-Circular Combined Sewers – Contract 4

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, November 28, 2025.

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

B3. SITE INVESTIGATION

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

B3.2 The Bidder is advised that 3rd Party construction work at the Conway Pump Station may be ongoing until June 2026. Refer to D20.

B3.3 The Bidder is responsible for inspecting the Site, the nature of the Work to be done and all conditions that might affect their Bid or their performance of the Work, and shall assume all risk for conditions existing or arising in the course of the Work which have been or could have been determined through such inspection

B4. ENQUIRIES

B4.1 All enquiries shall be directed to the Contract Administrator identified in D6.1.

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 they have 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 D6.

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 their 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 they wish 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 their 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 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.

B8.3 The Bid shall be submitted electronically through MERX at www.merx.com.

B8.3.1 Bids will **only** be accepted electronically through MERX.

B8.4 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 their own name, their 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 their 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 their 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 their duly authorized officer or officers;

(d) if the Bidder is carrying on business under a name other than their 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 D36. Any such costs shall be determined in accordance with D36.

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) N/A

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 their 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 their 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 their 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 their 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 their 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 their sole discretion:

(a) disqualify a Bidder that fails to disclose a perceived, potential or actual Conflict of Interest of the Bidder or any of their 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 their 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 their 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 their 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, Purchasing 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) have completed the Accessible Customer Service online training required by the Accessibility for Manitobans Act (AMA) (see B13.9 and D8)

(e) upon request of the Contract Administrator, provide the Security Clearances in accordance with PART F - SECURITY CLEARANCE, and

(f) utilize only CIPP suppliers and installers pre-approved under the City of Winnipeg "Request for Qualifications for the Supply and Installation of Cured-In-Place Pipe (CIPP), Bid Opportunity No. 403-2007".

B13.4 Further to B13.3, the Bidder must be able to demonstrate the following specific qualifications in accordance with B13.10:

(a) a minimum of 2000 m of large diameter sewer rehabilitation (≥1200 mm) in the last 5 years; or,

(b) a minimum of 2000 m of large diameter sewer installation (≥900 mm) in the last 5 years.

B13.5 Further to B13.3, the Bidder or Subcontractor undertaking CIPP lining must be able to demonstrate the following specific qualifications in accordance with B13.10:

(a) three (3) examples of successful CIPP installations in non-circular sewers with an internal height equal to or greater than 1200 mm;

(b) three (3) examples of successful CIPP installations utilizing continuous temperature monitoring systems;

(c) one (1) example of a successful CIPP large diameter sewer liner installation requiring active mainline and sewer service flow control; and

(d) a minimum of 20 km of CIPP sewer lining completed within the last five (5) years.

B13.6 Further to B13.3, the Bidder, Subcontractor, or Key Project Personnel undertaking GRP sewer lining must be able to demonstrate the following specific qualifications in accordance with B13.10:

(a) three (3) examples of successful GRP sewer liner installations in non-circular sewers with an internal height equal to or greater than 1200 mm;

(b) one (1) example of a successful GRP sewer liner installation requiring active mainline and sewer service flow control; and

(c) a minimum of 2 km of GRP sewer lining completed within the last five (5) years.

B13.7 Key Project Personnel utilized to meet the requirements of B13.6 must play a key role in the development of construction protocols, shop drawing submissions, be on site for and/or direct pre-design inspection work, and be on site for all liner installation and annulus grouting work.

B13.8 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 at http://www.winnipeg.ca/matmgt/Safety/default.stm.

B13.9 Further to B13.3(d), the Bidder acknowledges that they and all Subcontractors have obtained training required by the Accessibility for Manitobans Act (AMA) available at https://accessibilitymb.ca/resources-events-and-training/online-training.html for anyone that may have any interaction with the public on behalf of the City of Winnipeg.

B13.10 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. The Bidder shall utilize Form L: Contractor Experience or provide similar project sheets containing all information identified in Form L: Contractor Experience. Experience provided for key personnel must be accompanied by a project specific submission for each referenced project, complete with all identified reference contact information.

B13.11 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 their 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: https://www.winnipeg.ca/media/4929/.

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 their 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 their Bid or in other information required to be submitted, that they are 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 Further to B18.1(a), in the event that a unit price is not provided on Form B: Prices, the City may determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

B18.4.2 Where MRST is shown on Form B as a separate line item, if that Line item is not completed, the MRST shall be considered to be included in the Total Bid Price.

B18.4.3 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 their 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 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 D36 shall immediately take effect upon confirmation of such funding, regardless of when funding is confirmed.

B19.4 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.

B19.4.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of their 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, Purchasing 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. FORM OF CONTRACT DOCUMENTS

D2.1 Notwithstanding C4.1(c) and C4.4, the Contract Documents will be provided to the Contractor electronically and there will be no requirement for execution and return to the City by the Contractor. Accordingly, the provisions under C4.4(a) and C4.4(b) are no longer applicable.

D3. SCOPE OF WORK

D3.1 The Work to be done under the Contract shall consist of the rehabilitation of existing sewers by installation of CIPP and/or GRP liners.

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

(a) mobilization to the Site(s);

(b) traffic control;

(c) flow control;

(d) develop access to the sewers at each site location;

(e) sewer cleaning, preparation, and inspections;

(f) trenchless rehabilitation of the identified sewers;

(g) reconstruction of sewer obverts and manholes; and,

(h) site restoration.

D4. SITE INVESTIGATION DUE DILIGENCE AND RISK

D4.1 Notwithstanding C3.1, the Contractor acknowledges that the site investigation reports and other site information included in this Tender have been provided to it and may be relied upon by the Contractor to the extent that the Contractor uses Good Industry Practice in interpreting such report(s) and site information and carries out the Work in accordance with Good Industry Practice based upon such report(s) and the information contained in them and such other site information. In the event that a site condition related to:

(a) the location of any utility which can be determined from the records or other information available at the offices of any public authority or person, including a municipal corporation and any board or commission thereof, having jurisdiction or control over the utility;

(b) the Site conditions, including but not limited to subsurface hazardous materials or other concealed physical conditions;

(c) the location, nature, quality or quantity of the materials to be removed or to be employed in the performance of the Work;

(d) the nature, quality or quantity of the Plant needed to perform the Work;

(e) all matters concerning access to the Site, power supplies, location of existing services, utilities or materials necessary for the completion of the Work; and

(f) all other matters which could in any way affect the performance of the Work;

that could not have been “properly inferable”, “readily apparent” and readily discoverable” using Good Industry Practice by the Contractor, results in additional Work which is a direct result of

this newly discovered site condition, such additional Work will be considered by the City under Changes in Work.

D5. DEFINITIONS

D5.1 When used in this Tender:

(a) "**Acceptance Testing**" means testing completed on the installed product to confirm material properties and other attributes of the installed product;

(b) "**ACI**" means American Concrete Institute;

(c) "**ASCE**" means American Society of Civil Engineers;

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

(e) "**AWWA**" means American Water Works Association;

(f) **"CIPP"** means Cured-In-Place Pipe;;

(g) **"Combined Sewer (CS)"** means a sewer conveying both wastewater and surface runoff within or from a combined sewer district;

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

(i) "**Demonstration Testing**" means demonstration installations, sample prep, and testing completed by the installer to demonstrate the proposed means and methods meet the project requirements;

(j) "**Fully Deteriorated (FD)**" means the host pipe is not structurally sound and cannot support soil and live loads or is expected to reach this condition over the design life of the rehabilitated pipe. Liners for fully deteriorated pipes shall be designed to support all overburden loads, including: soil, live, and external hydrostatic pressure;

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

(l) "**Host Pipe**" means the existing sewer intended for rehabilitation through the installation of various trenchless repair methods;

(m) **"ICRI"** means International Concrete Repair Institute;

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

(o) "**ISO**" means International Organization for Standardization;

(p) "**Key Project Personnel**" means members of the Bidders project team who will play a key role in the Work. These include, but are not limited to the project manager, site foreman, and technical advisor;

(q) **"Land Drainage Sewer (LDS)"** means a sewer conveying primarily land drainage (surface runoff) flows;

(r) "**LRFD**" means load and resistance factored design;

(s) "**MOP**" means manual of practice;

(t) **"NACE"** means National Association of Corrosion Engineers;

(u) "**Partially Deteriorated (PD)**" means the host pipe can support the soil and surcharge loads throughout the design life of the rehabilitated pipe. Liners for partially deteriorated pipes shall be designed to account for external hydrostatic pressure only;

(v) "**Payment Certification**" means the Contract Administrator's statement of the sums certified to be paid by the City to the Contractor with reference to its interim and final progress estimates and/or the Contractor's Proper Invoice;

(w) "**Proper Invoice**" means the definition within *The Builders' Liens Act*, R.S.M. 1987, c. B91 and any subsequent amendments thereto, and also includes the criteria to be included in an invoice, as set out in the Measurement and Payment provisions of the Contract;

(x) "**Site 1"** refers to Jessie Avenue from Guelph Street to Harrow Street;

(y) "**Site 2"** refers to Jessie Avenue from Wentworth Street to Lilac Street;

(z) "**Site 3"** refers to Jessie Avenue from Lilac Street to Arbuthnot Street;

(aa) "**Site 4"** refers to Portage Avenue at Conway Street;

(bb) "**Supply Chain Disruption"** means an inability by the Contractor to obtain goods or services from third parties necessary to perform the Work of the Contract within the schedule specified therein, despite the Contractor making all reasonable commercial efforts to procure same. Contractors are advised that increased costs do not, in and of themselves, amount to a Supply Chain Disruption;

(cc) "**The Builders' Liens Act**" or "**the BLA**" means *The Builders' Liens Act*, R.S.M. 1987, c. B91 and any subsequent amendments thereto'

(dd) "**Type 1 Liners**" means GRP liners designed and constructed to form a composite structure with the host pipe to resist externally applied soil and live loads as defined in the WRc Sewerage Rehabilitation Manual;

(ee) "**Type 2 Liners**" means GRP liners designed and constructed to support externally applied loads independent of the host pipe as defined in the WRc Sewerage Rehabilitation Manual;

(ff) "**Type Testing**" means material testing completed by the manufacturer to confirm typical short and long term material properties for a proposed product;

(gg) **"Wastewater Sewer (WWS)"** means a sewer primarily conveying wastewater flows (no significant surface runoff) in a separated sewer district.

(hh) "**WIS**" means Water Industry Standard; and,

(ii) "**WRc**" means Water Research Council.

D6. CONTRACT ADMINISTRATOR

D6.1 The Contract Administrator is Stantec Consulting Ltd., represented by:

Nathan Kehler, P. Eng.
Sr. Civil Engineer

Telephone No. 431-388-5986
Email Address nathan.kehler@stantec.com

D6.2 At the pre-construction meeting, Mr. Kehler will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D7. CONTRACTOR'S SUPERVISOR

D7.1 At the pre-construction meeting, the Contractor shall identify their designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D8. ACCESSIBLE CUSTOMER SERVICE REQUIREMENTS

D8.1 The Accessibility for Manitobans Act (AMA) imposes obligations on The City of Winnipeg to provide accessible customer service to all persons in accordance with the Customer Service Standard Regulation ("CSSR") to ensure inclusive access and participation for all people who live, work or visit Winnipeg regardless of their abilities.

D8.1.1 The Contractor agrees to comply with the accessible customer service obligations under the CSSR and further agrees that when providing the Goods or Services or otherwise acting on the City of Winnipeg's behalf, shall comply with all obligations under the AMA applicable to public sector bodies.

D8.1.2 The accessible customer service obligations include, but are not limited to:

(a) providing barrier-free access to goods and services;

(b) providing reasonable accommodations;

(c) reasonably accommodating assistive devices, support persons, and support animals;

(d) providing accessibility features e.g. ramps, wide aisles, accessible washrooms, power doors and elevators;

(e) inform the public when accessibility features are not available;

(f) providing a mechanism or process for receiving and responding to public feedback on the accessibility of all goods and services; and

(g) providing adequate training of staff and documentation of same.

D9. SUPPLIER CODE OF CONDUCT

D9.1 The Contractor has reviewed and understands the City's Supplier Code of Conduct. This document is located at: https://www.winnipeg.ca/media/4891

D9.2 The Contractor agrees to comply with the Supplier Code of Conduct as it may be amended or replaced from time to time. The Contractor is responsible for periodically checking the above link for updates to the Supplier Code of Conduct. Contract signature on Form A: Bid/Proposal from the Contractor signifies agreement to the Supplier Code of Conduct which comes into effect once the Contract starts.

D9.3 If there is a conflict between the Contract and the Supplier Code of Conduct – the Contract will prevail.

D10. UNFAIR LABOUR PRACTICES

D10.1 Further to C3.2, the Contractor declares that in bidding for the Work and in entering into this Contract, the Contractor and any proposed Subcontractor(s) conduct their respective business in accordance with established international codes embodied in United Nations Universal Declaration of Human Rights (UDHR) https://www.un.org/en/about-us/universal-declaration-of-human-rights International Labour Organization (ILO) https://www.ilo.org/global/lang--en/index.htm conventions as ratified by Canada.

D10.2 The City of Winnipeg is committed and requires its Contractors and their Subcontractors, to be committed to upholding and promoting international human and labour rights, including fundamental principles and rights at work covered by ILO eight (8) fundamental conventions and the United Nations Universal Declaration of Human Rights which includes child and forced labour.

D10.3 Upon request from the Contract Administrator, the Contractor shall provide disclosure of the sources (by company and country) of the raw materials used in the Work and a description of the manufacturing environment or processes (labour unions, minimum wages, safety, etc.).

D10.4 Failure to provide the evidence required under D10.3, may be determined to be an event of default in accordance with C18.

D10.5 In the event that the City, in its sole discretion, determines the Contractor to have violated the requirements of this section, it will be considered a fundamental breach of the Contract and the Contractor shall pay to the City a sum specified by the Contract Administrator in writing ("Unfair Labour Practice Penalty"). Such a violation shall also be considered an Event of Default, and shall entitle the City to pursue all other remedies it is entitled to in connection with same pursuant to the Contract.

D10.5.1 The Unfair Labour Practice Penalty shall be such a sum as determined appropriate by the City, having due regard to the gravity of the Contractor's violation of the above requirements, any cost of obtaining replacement goods/ services or rectification of the breach, and the impact upon the City's reputation in the eyes of the public as a result of same.

D10.5.2 The Contractor shall pay the Unfair Labour Practice Penalty to the City within thirty (30) Calendar Days of receiving a demand for same in accordance with D10.5. The City may

also hold back the amount of the Unfair Labour Practice Penalty from payment for any amount it owes the Contractor.

D10.5.3 The obligations and rights conveyed by this clause survive the expiry or termination of this Contract, and may be exercised by the City following the performance of the Work, should the City determine, that a violation by the Contractor of the above clauses has occurred following same. In no instance shall the Unfair Labour Practice Penalty exceed the total of twice the Contract value.

D11. FURNISHING OF DOCUMENTS

D11.1 Upon award of the Contract, the Contractor will be provided with 'issued for construction' Contract Documents electronically, including Drawings in PDF formal only.

SUBMISSIONS

D12. AUTHORITY TO CARRY ON BUSINESS

D12.1 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.

D13. SAFE WORK PLAN

D13.1 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.

D13.2 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, Purchasing Division website at http://www.winnipeg.ca/matmgt/Safety/default.stm

D13.3 Notwithstanding B13.4 at any time during the term of the Contract, the City may, at their 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.

D14. INSURANCE

D14.1 The Contractor shall provide and maintain the following insurance coverage:

(a) commercial general liability insurance, in the amount of at least five million dollars ($5,000,000.00) 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 supplies and/or materials intended to enter into and form part of any installation.

(d) Property insurance for all mobile offices, portable toilets, machinery, and equipment.

D14.2 Deductibles shall be borne by the Contractor.

D14.3 All policies shall be taken out with insurers duly licensed to carry on business in the Province of Manitoba.

D14.4 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.

D14.5 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.

D15. CONTRACT SECURITY

D15.1 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 amount of fifty percent (50%) of the Contract Price; and

(b) labour and material payment bond of a company registered to conduct the business of a surety in Manitoba, in an amount equal to fifty percent (50%) of the Contract Price.

D15.1.1 Bonds are available at:

(a) Performance Bond https://www.winnipeg.ca//media/4928/

(i) Performance Bond – Schedule A - Form of Notice https://www.winnipeg.ca/media/4831/

(ii) Performance Bond – Schedule B – Surety's Acknowledgement https://www.winnipeg.ca/media/4832/

(iii) Performance Bond – Schedule C – Surety's Position https://www.winnipeg.ca/media/4833/

(b) Labour & Material Payment Bond https://www.winnipeg.ca//media/4930/

(i) L&M Bond – Schedule A – Notice of Claim https://www.winnipeg.ca/media/4834/

(ii) L&M Bond – Schedule B – Acknowledgement of a Notice https://www.winnipeg.ca/media/4835/

(iii) L&M Bond – Schedule C – Surety's Position https://www.winnipeg.ca/media/4836/

D15.1.2 Where the contract security is a performance bond, it may be submitted in hard copy or digital format. If submitted in digital format the contract security must meet the following criteria:

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

(b) the version submitted by the Contractor 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 D15.1(b).

D15.1.3 Digital bonds failing the verification process will not be considered to be valid and may be determined to be an event of default in accordance with C18.1. If a digital bond fails the verification process, the Contractor may provide a replacement bond (in hard copy or digital format) within seven (7) Calendar Days of the City's request or within such greater period of time as the City in their discretion, exercised reasonably, allows.

D15.1.4 Digital bonds passing the verification process will be treated as original and authentic.

D15.2 The Contractor shall provide the Contract Administrator identified in D6 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.

D15.3 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 inD15.1(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.

D16. SUBCONTRACTOR LIST

D16.1 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.

D17. DETAILED WORK SCHEDULE

D17.1 The Contractor shall provide the Contract Administrator with a detailed work schedule 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.

D17.2 The detailed work schedule shall consist of the following:

(a) A critical path method (C.P.M.) schedule for the Work

(b) A Gantt chart for the work

all acceptable to the Contract Administrator

D17.3 Further to D17.2(a), the C.P.M schedule shall clearly identify the start and completion dates of all of the following activities/tasks making up the Work as well as showing those activities/tasks on the critical path.

(a) Mobilization(s) to site;

(b) Sewer cleaning, prep work, and pre-lining inspections;

(c) Sewer measurements and confirmation of design conditions;

(d) EPR's;

(e) Installation of CIPP liners;

(f) Manhole modifications and reconstruction;

(g) Restoration, and

(h) Planned breaks in construction in accordance with D21.7.

D17.4 Further to D17.2(b), the Gantt chart shall show the time on a weekly basis, required to carry out the Work of each trade, or specification division. The time shall be on the horizontal axis, and the type of trade shall be on the vertical axis.

D18. REQUIREMENTS FOR SITE ACCESSIBILITY PLAN

D18.1 The Contractor shall provide the Contract Administrator with an Accessibility 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.

D18.2 The Accessibility Plan shall demonstrate how the Contractor will accommodate the safe passage of pedestrians and cyclists in accordance with the Manual of Temporary Traffic Control, the Contract Drawings, Staging Plans, and Streets By-Law No. 1481/77 at all times for the duration of the Construction. Unless noted in the Contract, the Accessibility Plan must include a written plan for the following:

(a) How the Contractor will maintain at least one crossing in each direction for each intersection (one north/south crosswalk and one east/west crosswalk).

(b) How the Contractor will maintain access to bus stops within the site.

(c) How the Contractor will maintain access to pedestrian corridors and half signals.

(d) How the Contractor will maintain cycling facilities.

(e) How the Contractor will maintain access to residents and businesses unless otherwise noted in the Contract.

(f) Any required detour signage at adjacent crossings to facilitate sidewalk or active transportation pathway closures.

D18.3 The Accessibility Plan may also include figures, sketches, or drawings to demonstrate the proposed plan.

D18.4 The Accessibility Plan shall include written details on how the Contractor intends to review, maintain, and document all items related to the Accessibility Plan on-site during Construction, including, but not limited to:

(a) Signage

(b) Temporary Ramping

(c) Transit Stops

(d) Detour Signage

D18.5 At minimum, the Contractor shall review the site conditions on a daily basis to ensure that all features related to the Accessibility Plan are in place. The site review is intended to correct deficiencies as a result of unforeseen events such as wind, traffic, or the general public. Deficiencies that are direct result of the Contractors actions must be corrected immediately.

D18.6 Any changes to the Accessibility Plan must be approved by the Contract Administrator.

D18.7 Upon request from the Contract Administrator, the Contractor shall provide records demonstrating that the site has been maintained.

D18.8 Deficiencies as a direct result of actions by the Contractor that are not immediately corrected and/or failure to produce records that demonstrate that the site was maintained in compliance with the Accessibility Plan may result in a pay adjustment via the monthly Progress Payment. The rate of pay adjustment will be as per the following schedule:

(a) First Offence – A warning will be issued and documented in the weekly or bi-weekly site meeting.

(b) Second Offence – A field instruction to immediately correct the site will be issued by the Contract Administrator.

D18.9 Third and subsequent Offences – A pay reduction will be issued in the amount of $250.00 per instance and per day.

SCHEDULE OF WORK

D19. COMMENCEMENT

D19.1 The Contractor shall not commence any Work until they are in receipt of an award letter from the Award Authority authorizing the commencement of the Work.

D19.2 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 D12;
  (ii) evidence of the workers compensation coverage specified in C6.15;
  (iii) the Safe Work Plan specified in D13;
  (iv) evidence of the insurance specified in D14;
  (v) the contract security specified in D15;
  (vi) the Subcontractor list specified in D16;
  (vii) the Requirements for Site Accessibility Plan specified in D17; and
  (viii) the direct deposit application form specified in D30

(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.

(c) Preparation work such as sewer cleaning, pre-design inspections, and sewer preparation work may commence once conditions noted herein are satisfied.

(d) Rehabilitation work (liner installation) at all Sites may not commence until after September 1 of any given year.

(e) Rehabilitation work (liner installation) at Site 4 may not commence until third-party construction work at the Conway Pump Station is completed (est. June 2026). Refer to D20.

D20. WORK BY OTHERS

D20.1 Further to C6.25, the Contractor's attention is directed to the fact that other Contractors, the personnel of Utilities and the staff of the City may be working within the project limit, approach roadway, adjacent roadways or right-of-way. The activities of these agencies may coincide with the Contractors execution of Work and it will be the Contractor's responsibility to cooperate to the fullest extent with other personnel working in the area, and such cooperation is an obligation of the Contractor under the terms of Contract.

D20.2 Work by others on or near the Site will include but not necessarily be limited to:

(a) Tender No. 177-2024 - Conway Lift Station 2024 Upgrades:
  (i) Civil, structural, mechanical, and electrical upgrades to the Conway lift station and surrounding site.
  (ii) Coordination of work is not feasible due to site access conflicts.
  (iii) Expected completion date: June 2026

D20.2.1 Further to D20.1 the Contractor shall cooperate and coordinate all activities with all parties performing required Work by Others identified in D20.1 and accommodate the necessary area on Site required for the Work by Others to complete the Work

D21. WORKING DAYS

D21.1 Further to C1.1(tt), 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.

D21.2 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.

D21.3 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.

D21.4 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.

D21.5 Notwithstanding C1.1(tt), if the Contractor chooses to work on a Saturday, Sunday, or statutory or civic holiday and is able to complete at least seven (7) hours of work during the period between 7:00 a.m. Winnipeg time or the time the Contractor's operations normally commence, whichever is earlier, and 7:00 p.m. Winnipeg time the day shall be considered a Working Day.

D21.6 Working Days shall be incurred by the Contractor for every Working Day as defined herein. Working days shall be incurred starting on the date the Contractor commences work on site, or the date of commencement identified on the Contractors submitted schedule (D17), whichever occurs first.

D21.7 Planned Breaks in Construction

(a) The Contractor will be permitted planned suspensions of on-site construction to facilitate crew breaks and seasonal weather breaks where contract work is not completed. Working Days will not be incurred during these periods.

(b) All planned breaks in on-site construction activity must be clearly identified in the Contractors detailed construction schedule (D17) and notice must be provided in writing a minimum of two (2) Business Days prior to the planned suspension of work. Failure of the Contractor to provide adequate notice, in the opinion of the Contract Administrator, may result in Working Days being incurred.

(c) During these periods, the Site must be made secure, roadways completely operational, and all existing facilities and work in progress be protected from weather or other potentially harmful effects.

(d) Upon recommencement of site activities after long breaks (greater than 1 month), the Contractor shall provide an updated schedule and notification to the Contract Administrator a minimum of five (5) Business Days prior to recommencement of work.

(e) No changes to the Contract completion dates resulting from suspension of contract time as described herein will be considered.

D21.8 No additional costs associated with demobilization and remobilization resulting from suspension of contract time will be considered.

D22. SUBSTANTIAL PERFORMANCE

D22.1 The Contractor shall achieve Substantial Performance within eighty (80) consecutive Working Days of the commencement of the Work as specified in D19, or by March 1, 2027, whichever comes first.

D22.2 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.

D22.3 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.

D23. TOTAL PERFORMANCE

D23.1 The Contractor shall achieve Total Performance within ninety (90) consecutive Working Days of the commencement of the Work as specified in D19, or by June 30, 2027, whichever comes first.

D23.2 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.

D23.3 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.

D24. LIQUIDATED DAMAGES

D24.1 If the Contractor fails to achieve, Critical Stages, Substantial Performance or Total Performance in accordance with the Contract by the days fixed herein for same, the Contractor shall pay the City the following amounts per 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);

(b) Total Performance – nine hundred dollars ($900).

D24.2 The amounts specified for liquidated damages in D24.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve, Critical Stages, Substantial Performance or Total Performance by the days fixed herein for same.

D24.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D25. SUPPLY CHAIN DISRUPTION SCHEDULE DELAYS

D25.1 The City acknowledges that the schedule for this Contract may be impacted by the Supply Chain Disruption. Commencement and progress of the Work shall be performed by the Contractor with due consideration to the delivery requirements and schedule identified in the Contract in close consultation with the Contract Administrator.

D25.2 If the Contractor is delayed in the performance of the Work by reason of the Supply Chain Disruption, 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.

D25.3 A minimum of seven (7) Calendar Days prior to the commencement of Work, the Contractor shall declare whether a Supply Chain Disruption will affect the start date. The Contractor shall provide sufficient evidence that the delay is directly related to a Supply Chain Disruption, including but not limited to ordering of Material or Goods, production and/or manufacturing schedules or availability of staff as appropriate.

D25.4 For any delay related to Supply Chain Disruption and identified after Work has commenced, the Contractor shall within seven (7) Calendar Days of becoming aware of the anticipated delay

declare the additional delay and shall provide sufficient evidence as indicated in D25.3. Failure to provide this notice will result in no additional time delays being considered by the City.

D25.5 The Work schedule, including the durations identified in D21 to D23 where applicable, will be adjusted to reflect 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.

D25.6 Where Work not previously identified is being carried over solely as a result of delays related to Supply Chain Disruption, 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 Supply Chain Disruption, a partial consideration of the cost of temporary works will be considered by the Contract Administrator.

D25.7 Any time or cost implications as a result of Supply Chain Disruption and in accordance with the above, as confirmed by the Contract Administrator, shall be documented in accordance with C7.

D26. SCHEDULED MAINTENANCE

D26.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

(a) Landscaping as specified in CW 3510;

D26.2 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

D27. JOB MEETINGS

D27.1 Regular biweekly 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.

D27.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever they deem it necessary.

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

D28.1 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).

D29. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

D29.1 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 their sole discretion and acting reasonably, require updated proof of compliance, as set out in B13.4.

INVOICES & MEASUREMENT AND PAYMENT

D30. MEASUREMENT AND PAYMENT

D30.1 C12.2 is deleted and replaced with the following:

C12.2 The amounts to be paid by the City to the Contractor shall be as set out in the Payment Certification. In the event the Payment Certification does not align with the Contractor's Proper Invoice and payment by the City to the Contractor is not made, or not going to be made, for the invoiced amount within 28 Calendar Days of receipt of the Proper Invoice, the City will issue a notice of non-payment to the Contractor in accordance with the BLA.

C12.2.1 For unit price Contracts, such sums shall be determined by the Contract Administrator upon the basis of the unit prices for the various classes of the Work stated on Form B: Prices. The total amount to be paid to the Contractor for the Work will be the amount arrived at by measuring the amount of each class of the Work listed on Form B: Prices and performed in accordance with the Contract, and pricing the same, in accordance with the unit prices stated thereon.

C12.2.2 For lump sum Contracts, such sums shall be determined by the Contract Administrator upon the basis of the lump sum price stated on Form B: Prices, if applicable, but in any event the lump sum price broken down into the percentage completed for each portion of the Work, commonly referred to as detailed prices.

D30.2 C12.7 to C12.15 are deleted and replaced with the following:

C12.7 By the seventh (7) Calendar Day after the end of each month, the Contract Administrator shall issue to the Contractor a progress estimate indicating its opinion of the quantity and value of Work performed during the previous month. The Contractor may use the progress estimate to form part of its Proper Invoice as support of the type and quantity of Work performed. In the event the Contractor choses to produce its own documentation of the type and quantity of Work performed to form part of its Proper Invoice, the content shall be in accordance with C12.2 and the format of such documentation should follow that of a typical progress estimate, including all evidence and records of measurement that the Contract Administrator would require to certify payment. In either event the Contractor shall include such supporting documentation as part of its invoice.

C12.8 If the Contractor agrees with the progress estimate provided by the Contract Administrator it should indicate that on its Proper Invoice. If the Contractor does not agree with the progress estimate provided by the Contract Administrator it should attempt to reconcile the discrepancy, which could result in a revised progress estimate to be provided by the Contract Administrator or a revised invoice by the Contractor, so that the progress estimate and the Proper Invoice align. In the event that the discrepancy is not reconciled then the Contractor should detail the items within the progress estimate that it disagrees with in order that the value on the Proper Invoice aligns with and is supported by the progress estimate with noted discrepancies.

C12.9 Any payment made by the City to the Contractor on account of a Proper Invoice shall be less any holdback required to be made by The Builders' Liens Act, and such holdbacks or other amounts which the City is entitled to withhold pursuant to the Contract.

C12.10 If in the Contractor's opinion the Work performed during the previous month is minimal or does not warrant an invoice, the Contractor is permitted to not submit an invoice on the condition that the Contractor advises the Contractor Administrator in writing.

C12.11 Unless agreed to by the Contract Administrator, in writing, on an exception basis, the Contractor shall not submit invoices more frequently than monthly.

C12.12 Any reference to payment submittals or payment processes in the NMS Sections of the Contract are deleted and replaced with the payment submittals and payment processes within Section C12 of the General Conditions, as amended by the Supplemental Conditions.

FINAL PAYMENT

C12.13 The Contractor shall indicate on its invoice if it is the final invoice for Work performed under the Contract. Payment Certification, in response to receipt of the final Proper Invoice by the Contractor, shall be subject to the following conditions:

(a) issuance by the Contract Administrator of a certificate of Total Performance;

(b) receipt by the City of a certificate from the Workers Compensation Board stating that full payment has been made to the Board with respect to all assessments owing.

C12.14 Payment on account of the holdback made by the City pursuant to The Builders' Liens Act, shall be paid to the Contractor when the time for filing liens or trust claims has elapsed, unless the City is in receipt of a lien or trust claim.

C12.15 Neither the issuance of a certificate of Total Performance nor the payment of the final Proper Invoice shall relieve the Contractor from their responsibilities either under C13 or as a result of any breach of the Contract by the Contractor including, but not limited to, defective or deficient Work appearing after Total Performance, nor shall it conclude or prejudice any of the powers of the Contract Administrator or the Chief Administrative Officer hereunder.

C12.16 Subject to C12.17, acceptance by the Contractor of payment on account of the final Proper Invoice shall constitute a waiver and release by them of all claims against the City whether for payment for Work done, damages or otherwise arising out of the Contract.

C12.17 If the Contractor disputes a Payment Certification related to a notice of non-payment by the City to the Contractor in accordance with the BLA, the Contractor may appeal the determination of the Contract Administrator to the Chief Administrative Officer as provided for in C21. If prior to the appeal being concluded, the Contractor gives a notice of adjudication to the City pursuant to the BLA, the appeal process will be discontinued.

INVOICES

D30.3 Further to C12, the Contractor:

(a) shall submit invoices for Work performed during the previous calendar month in accordance with the instruction on the City's website at: https://www.winnipeg.ca/finance/corporate-accounts-payable.stm; and

(b) should copy the Contract Administrator on submission of its invoice.

D31. PAYMENT

D31.1 Further to C12, the City shall make payments to the Contractor by direct deposit to the Contractor's banking institution, and by no other means. Payments will not be made until the Contractor has made satisfactory direct deposit arrangements with the City. Direct deposit application forms are at https://winnipeg.ca/finance/files/Direct_Deposit_Form.pdf.

D31.2 Further to E6, no payment will be made for Cash Allowances other than as set out in E6.4.

D32. FUEL PRICE ADJUSTMENT

D32.1 The Contract is subject to a fuel price adjustment which will be calculated monthly based on eligible Work completed utilizing the following mathematical formulas;

(a) where the price of fuel has increased - ((CFI/BFI)-1.15) x Q x FF; and

(b) where the price of fuel has decreased - ((CFI/BFI)-0.85) x Q x FF; where

(i) BFI = base fuel index

(ii) CFI = current fuel index

(iii) FF = fuel factor

(iv) Q = monetary value of Work applied in the calculation.

D32.1.1 Eligible Work will be determined in accordance with D32.5.

D32.1.2 The base fuel index (BFI) will be the retail price of fuel identified on the Submission Deadline based on latest published "Monthly average retail prices for gasoline and fuel by geography" for Winnipeg, published by Statistics Canada, Table 18-10-0001-01. The BFI is a blended rate based on 15% regular unleaded gasoline at self-service filling stations and 85% diesel fuel at self-service filling stations.

D32.1.3 The current fuel index (CFI) based on the above blended rate will be determined for each monthly progress estimate and applied on the following progress estimate as a change order once rates are published by Statistics Canada.

D32.1.4 A Fuel Factor (FF) rate of the monetary value of all eligible Work completed that month based on the Contract unit prices will be used to calculate the assumed apportioned cost of fuel.

D32.2 Fuel cost adjustments may result in additional payment to the Contractor or credit to the City within the Contract by way of a monthly change order.

D32.3 The fuel escalation or de-escalation adjustment will not be applied if the CFI is within ±15% of the BFI.

D32.4 Fuel escalation adjustments will not be considered beyond the Substantial Performance/Critical Stages except where those dates/Working Days are adjusted by change order. Fuel de-escalation adjustments will apply for Work that extends beyond the dates/Working Days specified for Substantial Performance/Critical Stages.

D32.5 The Fuel Factor (FF) rates will be set as follows:

(a) The Fuel Factor rate shall be set at 1.2% of the monetary value of all Work based on unit prices except for the portions of the Contract identified below;

WARRANTY

D33. WARRANTY

D33.1 Warranty is as stated in C13.

DISPUTE RESOLUTION

D34. DISPUTE RESOLUTION

D34.1 If the Contractor disagrees with any opinion, determination, or decision of the Contract Administrator, the Contractor shall act in accordance with the Contract Administrator's opinion, determination, or decision unless and until same is modified by the process followed by the parties pursuant to D34.

D34.2 The entire text of C21.4 is deleted, and amended to read: "Intentionally Deleted"

D34.3 The entire text of C21.5 is deleted, and amended to read:

(a) If Legal Services has determined that the Disputed Matter may proceed in the Appeal Process, the Contractor must, within ten (10) Business Days of the date of the Legal Services Response Letter, submit their written Appeal Form, in the manner and format set out on the City's Purchasing Website, to the Chief Administrative Officer, and to the Contract Administrator. The Contractor may not raise any other disputes other than the Disputed Matter in their Appeal Form.

D34.4 Further to C21, prior to the Contract Administrator's issuance of a Final Determination, the following informal dispute resolution process shall be followed where the Contractor disagrees with any opinion, determination, or decision of the Contract Administrator ("Dispute"):

(a) In the event of a Dispute, attempts shall be made by the Contract Administrator and the Contractor's equivalent representative to resolve Disputes within the normal course of project dealings between the Contract Administrator and the Contractor's equivalent representative.

(b) Disputes which in the reasonable opinion of the Contract Administrator or the Contractor's equivalent representative cannot be resolved within the normal course of project dealings as described above shall be referred to a without prejudice escalating negotiation process consisting of, at a minimum, the position levels as shown below and the equivalent Contractor representative levels:

(i) The Contract Administrator;

(ii) Supervisory level between the Contract Administrator and applicable Department Head;

(iii) Department Head.

D34.4.1 Names and positions of Contractor representatives equivalent to the above City position levels shall be determined by the Contractor and communicated to the City at the pre-commencement or kick off meeting.

D34.4.2 As these negotiations are not an adjudicative hearing, neither party may have legal counsel present during the negotiations.

D34.4.3 Both the City and the Contractor agree to make all reasonable efforts to conduct the above escalating negotiation process within twenty (20) Business Days, unless both parties agree, in writing, to extend that period of time.

D34.4.4 If the Dispute is not resolved to the City and Contractor's mutual satisfaction after discussions have occurred at the final escalated level as described above, or the time period set out in D34.4.3, as extended if applicable, has elapsed, the Contract Administrator will issue a Final Determination as defined in C1.1(v), at which point the parties will be governed by the Dispute Resolution process set out in C21.

INDEMNITY

D35. INDEMNITY

D35.1 Indemnity shall be as stated in C17.

D35.2 Notwithstanding C17.1, the Contractor shall save harmless and indemnify the City in the amount of twice the Contract Price or five million dollars ($5,000,000), whichever is greater, against all costs, damages or expenses arising from actions, claims, demands and proceedings, by whomsoever brought, made or taken as a result of negligent acts or negligent omissions of the Contractor, their Subcontractors, employees or agents in the performance or purported performance of the Work, and more particularly from:

(a) accidental injury to or death of any person whether retained by or in the employ of the contractor or not, arising directly or indirectly by reason of the performance of the Work, or by reason of any trespass on or damage to property;

(b) damage to any property owned in whole or in part by the City, or which the City by duty or custom is obliged, directly or indirectly, in any way or to any degree, to construct, repair or maintain;

(c) damage to, or trespass or encroachment upon, property owned by persons other than the City;

(d) any claim for lien or trust claim served upon the City pursuant to The Builders' Liens Act;

(e) failure to pay a Workers Compensation assessment, or Federal or Provincial taxes;

(f) unauthorized use of any design, device, material or process covered by letters patent, copyright, trademark or trade name in connection with the Work;

(g) inaccuracies in any information provided to the City by the Contractor.

D35.3 Further to C17, The City shall save harmless and indemnify the Contractor in the amount of twice the Contract Price or five million dollars ($5,000,000), whichever is greater, against all costs, damages or expenses arising from actions, claims, demands and proceedings, by whomsoever brought, made or taken as a result of negligent acts or negligent omissions of the City, their employees or agents in the performance of its obligation under the Contract.

THIRD PARTY AGREEMENTS

D36. FUNDING AND/OR CONTRIBUTION AGREEMENT OBLIGATIONS

D36.1 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.

D36.2 Further to D36.1, in the event that the obligations in D36 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.

D36.3 For the purposes of D36:

(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.

D36.4 Modified Insurance Requirements

D36.4.1 If not already required under the insurance requirements identified in D14, 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 their Ministers, officers, employees, and agents shall be added as additional insureds.

D36.4.2 If not already required under the insurance requirements identified in D14, 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.

D36.4.3 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.

D36.4.4 Further to D14.4, 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.

D36.4.5 All policies must be taken out with insurers licensed to carry on business in the Province of Manitoba.

D36.5 Indemnification By Contractor

D36.5.1 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.

D36.5.2 The Contractor agrees that in no event will Canada or Manitoba, their respective officers, servants, employees or agents be held liable for any damages in contract, tort (including negligence) or otherwise, for:

(a) any injury to any person, including, but not limited to, death, economic loss or infringement of rights;

(b) any damage to or loss or destruction of property of any person; or

(c) any obligation of any person, including, but not limited to, any obligation arising from a loan, capital lease or other long term obligation;

in relation to this Contract or the Work.

D36.6 Records Retention and Audits

D36.6.1 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.

D36.6.2 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 D36.6.1 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.

D36.7 Other Obligations

D36.7.1 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.

D36.7.2 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.

D36.7.3 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.

D36.7.4 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.

D36.7.5 The Contractor represents and warrants that no current or former public servant or public office holder, to whom the Value and Ethics Code for the Public Sector, the Policy on Conflict of Interest and Post Employment, or the Conflict of Interest Act applies, shall derive direct benefit from this Contract, including any employment, payments, or gifts, unless the provision or receipt of such benefits is in compliance with such codes and the legislation.

D36.7.6 The Contractor represents and warrants that no member of the House of Commons or of the Senate of Canada or of the Legislative Assembly of Manitoba is a shareholder, director or officer of the Contractor or of a Subcontractor, and that no such member is entitled to any benefits arising from this Contract or from a contract with the Contractor or a Subcontractor concerning the Work.

ADJUSTMENTS FOR CHANGES IN LAWS, TAXES, OR TARIFFS

D37. ADJUSTMENTS FOR CHANGES IN LAWS, TAXES, OR TARIFFS

D37.1 Further to C12.4 and subject to C6.13, the Contract Price shall be adjusted if any change in a law or tax imposed under the Excise Act, the Excise Tax Act, the Customs Act, the Customs Tariff, The Mining Tax Act (Manitoba), or The Retail Sales Tax Act (Manitoba), by an act of the Congress of the United States of America, or by Executive Order by the President of the United States under the International Emergency Economic Powers Act of the United States of America or similar legislation:

(a) occurs after the Submission Deadline;

(b) applies to Material; and

(c) affects the cost of that Material to the Contractor.

D37.2 Further to C12.5, if a change referred to in C12.4 occurs, the Contract Price shall be increased or decreased by an amount equal to the amount that is established, by an examination of the relevant records of the Contractor, to be the increase or decrease in the cost incurred that is directly attributable to that change, and which the Contractor has proven to the Contract Administrator represents the minimum amount of increase necessary in order to obtain necessary Material or Plant. For the avoidance of doubt, the Contractor shall be required to provide satisfactory proof that it has investigated alternative options for obtaining equivalent Material or Plant and reducing or eliminating the increase in Contract Price, up to and including entering into purchase agreements with vendors located in other jurisdictions, in order for Contractor to be able to avail itself of the increase in Contract Price permitted.

FORM J: SUBCONTRACTOR LIST
(See D16)

2024 TRENCHLESS REHABILITATION OF NON-CIRCULAR COMBINED SEWERS – CONTRACT 4

Name	Address

FORM L: CONTRACTOR EXPERIENCE
(See B13)

2024 TRENCHLESS REHABILITATION OF NON-CIRCULAR COMBINED SEWERS – CONTRACT 4

Attach additional resumes and documents as required. Indicate whether Projects/Project Personnel are for the Bidder, Subcontractor, or Key Personnel.

Project References:

Project Client/Contact: _____
(Name)

_____
(Address)

_____
(phone) (email)

Year	Description of Project, including type of pipe	Value

Project References:

Project Client/Contact: _____
(Name)

_____
(Address)

_____
(phone) (email)

Year	Description of Project, including type of pipe	Value

FORM L: CONTRACTOR EXPERIENCE
(See B13)

2024 TRENCHLESS REHABILITATION OF NON-CIRCULAR COMBINED SEWERS – CONTRACT 4

Project Personnel:

Name and Title:_____
(Name)

Qualifications: (attach resume and fill out information below)

Year	Description of Past Project	For Whom Work Was Performed	Value

Project Personnel:

Name and Title: _____
(Name)

Qualifications: (attach resume and fill out information below)

Year	Description of Past Project	For Whom Work Was Performed	Value

Project Personnel:

Name and Title: _____
(Name)

Qualifications: (attach resume and fill out information below)

Year	Description of Past Project	For Whom Work Was Performed	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 their 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, Purchasing 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:

Appendix No.	Specification Title
A	Host Pipe Conditions and Inspections
B	Design Conditions
C	Traffic Control – General Requirements
D	Design Requirements for Unbonded Liners (WRc Type 2)
E	Combined Sewer Overflow Review
F	Record Drawings

Drawing No.	Drawing Name/Title
13632	Cover Sheet
13633	Index Page
13634	Jessie Avenue – Manhole at Guelph Street to Manhole at Harrow Street
13635	Jessie Avenue – Manhole at Wentworth Street to Manhole at Lilac Street
13636	Jessie Avenue – Manhole at Lilac Street to Manhole at Arbuthnot Street
13637	Portage Avenue – Manhole at Conway Street (E of CL) to 1st Manhole S of Portage Ave (CL)
13638	Miscellaneous Details - Sheet 1 of 2
13639	Miscellaneous Details - Sheet 2 of 2

E2. SHOP DRAWINGS

E2.1 Description

(a) This Specification shall revise, amend, and supplement the requirements of CW 1110 of the City of Winnipeg's Standard Construction Specifications.

(b) The term "Shop Drawings: means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data, which are to be provided by the Contractor to illustrate details of a portion of the Work.

E2.2 Submit all Shop Drawings in accordance with CW 1110 except as modified herein.

E2.3 The Contractor shall submit specified Shop Drawings to the Contract Administrator for review. All submissions must be in metric units. Where data is in imperial units, the correct metric equivalent shall also be shown on all Shop Drawings.

E2.4 Submit Shop Drawing submissions within five (5) Business Days of a request as indicated in E2 or receipt of Notice of Award in accordance with B19, whichever is earlier.

E2.5 Allow for a five (5) Business Days period for review by the Contract Administrator of each individual submission and re-submission, unless noted otherwise in the Contract Documents.

E2.6 Shop Drawings not meeting the requirements of CW 1100 or the requirements specified herein will be returned to the Contractor without review for resubmission.

E2.7 Shop drawing submissions will be limited to 2 reviews per shop drawing. This shall include a review of the initial submission and a review of the revised submission. Costs associated with subsequent reviews will be charged to the Contractor.

E2.8 Measurement and Payment

(a) The provision of Shop Drawings will be considered incidental to the Work and will not be measured for payment. No additional payment will be made.

E3. CONFINED SPACE ENTRY

E3.1 Description

(a) This Specification shall outline minimum requirements for confined space operations through the course of the work.

E3.2 General

(a) 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.

(b) 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 personal protective equipment (PPE).

(c) The Contractor is responsible for all safety and confined space support throughout the project.

E3.3 Methods

E3.3.1 Hazard Assessment

(a) In conjunction with securing the site and obtaining underground clearances, the Contractor shall conduct a hazard assessment for each site requiring work within a sewer or manhole. The assessment shall identify and evaluate the hazards, including but not be limited to review of the following as it pertains to the work to be performed:

(i) nature of the defect;

(ii) location of the defect in the sewer/manhole;

(iii) structural condition and amount of debris in the remaining sewer/manhole;

(iv) condition of the manholes up and downstream of the required repair;

(v) atmospheric conditions in the manholes up and downstream of the required repair;

(vi) condition of adjacent downstream sewers; and,

(vii) flow in the sewer.

(b) The hazard assessment shall be based on the Contractors review of video for the sewer(s) and site inspection of the manholes, sewers and external conditions. Prior to the inspection, the Contractor shall conduct the necessary atmospheric monitoring of the affected manholes and sewers to establish acceptable entry conditions.

(c) Based on the results of the hazard assessment the Contractor shall determine if they can perform the stabilization repairs in a safe manner. If the Contractor decides to proceed with the internal repairs, they shall prepare a Safe Work Plan complete with the necessary controls and procedures required to maintain a safe working environment for the repair. Otherwise they shall notify the Contract Administrator and jointly the Contractor and the Contract Administrator shall review the nature of the work and determine alternative means of completing the work are required.

E3.3.2 Safe Work Plan

(a) Subsequent to performing a hazard assessment the Contractor shall develop a safe work plan to address the potential hazards associated with each site. In addition to addressing the potential hazards the safe work plan shall address but not be limited to the following:

(i) guidelines for confined space entry work established by The Manitoba Workplace Safety and Health Act;

(ii) provision for emergency response;

(iii) training and duties for entry personnel;

(iv) rescue and emergency services;

(v) requirement for purging, ingesting, flushing and/or continuous ventilation to eliminate or control atmospheric hazards;

(vi) requirement for and provision of supplied air;

(vii) communication between members of the repair crew in the pipe and on the ground's surface;

(viii) current and forecasted weather conditions;

(ix) isolating the workspace by plugging of upstream sewers and monitoring of upstream flow levels;

(x) provision of back-up equipment;

(xi) method of ingress into the sewer; and,

(xii) method of egress out of the sewer – forward and backwards.

(b) The Contactor shall not enter the sewer or manholes to begin the work until they have completed a hazard assessment and safe work plan for the specific repair and reviewed the plans with their designated safety officer for acceptance. The safe work plan procedures and practices shall conform to all federal, provincial and municipal codes, regulations and guidelines including Manitoba Workplace Safety and Health Regulations.

E3.3.3 Enter the Manhole and Sewer

(a) The Contractor shall enter the manhole/sewer and complete the work in accordance with their safe work plan and requirements for the repair contained herein.

(b) If at any time during the repair the attendant and/or Contractor believes he cannot safely perform the work, they shall immediately stop the work and evacuate the sewer and manholes. The Contractor shall re-assess their safe work plan considering the reason for the work stoppage. The work shall only be resumed when the Contractor has deemed it safe to return by completing a re-assessment and safe work plan revision, where necessary.

(c) If the Contractor deems the work cannot be safely completed by internal stabilization, they shall notify the Contract Administrator and jointly the Contractor and the Contract Administrator shall review the nature of the defect and determine alternative means of completing the work are required.

E3.4 Measurement and Payment

E3.4.1 Confined Space Entry

(a) Performing hazard assessments, preparing a Safe Work Plans, and confined space entry support for the Work and inspections will be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

E4. WATERWAY BY-LAW COMPLIANCE

E4.1 The Contractor shall note that portions of the Work falls within approximately 107 meters of a riverbank are within the jurisdiction of the Waterway By-Law, and therefore will require a Waterways Permit. The Contract Administrator will apply and pay for required Waterway Permits for the project. The Contractor will strictly adhere to the conditions imposed by the approved permit and the by-law.

GENERAL REQUIREMENTS

E5. MOBILIZATION AND DEMOBILIZATION PAYMENT

E5.1 Description

(a) This Specification shall govern mobilization and demobilization from site.

E5.2 Measurement and Payment

E5.2.1 Mobilization and Demobilization

(a) Mobilization and demobilization will be measured on a lump sum basis and paid for at the Contract Lump Sum Price for “Mobilization and Demobilization”. Payment for Mobilization and demobilization shall include all costs associated with mobilization and demobilization, site set up, and cleanup. Payment will be made on the following schedule:

(i) 25% payment of the Mobilization and Demobilization lump sum price will be paid once sewer cleaning and preparation crews arrive on site and commence with cleaning and sewer preparation works.

(ii) 50% payment of the Mobilization and Demobilization lump sum price will be paid once lining crews arrive on site and commence sewer liner installations.

(iii) 100% of the Mobilization and Demobilization lump sum price will be paid subsequent to completion of the liner installation, liner repairs (if necessary), and site cleanup.

E6. CASH ALLOWANCE FOR ADDITIONAL WORK

E6.1 Additional Work may be necessitated due to unforeseen circumstances that may arise during the course of the project due to:

(a) Additions to the scope of Work by the Contract Administrator, beyond that defined herein.

E6.2 A cash allowance has been included on Form B: Prices.

E6.3 The City reserves the right to delete any or all of the Cash Allowance from the Contract if the Work intended to be covered by the Cash Allowance is not required, or if the Works intended are found to be more extensive than the provisional Cash Allowance.

E6.4 Cost of additional work shall be evaluated by the methods outlined in C7.4, and a Change Order prepared by the Contract Administrator. Cost of the Change Order will be paid on the Progress Estimate and deducted from the Cash Allowance. If the valuation of the authorized work exceeds the Value of the Cash Allowance, the Contract Value will be adjusted by the shortfall.

E6.5 Additional services and/or Work will not be initiated for:

(a) Reasons of lack of performance or errors in execution.

(b) Scheduling changes initiated by the City, where at least 24 hours' notice is given prior to the Contractors schedule time to be on Site.

E6.6 Should it be determined that additional material or services are required, the Contract Administrator shall approve the Work, prior to commencement of the additional Work.

E6.7 Material Mark-Up Factors in accordance with C7:

(a) The base cost is to be the wholesale cost of the material, regardless of the Contractor or Subcontractor supplying the material.

(b) In general, the party (Contractor or Subcontractor) supplying the material is the party that purchases the material from a supplier who does not perform any work on Site, unless otherwise determined by the Contract Administrator.

(c) Where the Contractor is supplying the material, the mark-up on the material is limited to fifteen percent (15%).

(d) Where the Contractor's immediate Subcontractor is supplying the material the total mark-up on the material including all Subcontractors and the Contractor is limited to twenty-five percent (25%)

(i) The Subcontractor's mark-up on the material is limited to fifteen percent (15%);

(ii) The Contractor's mark-up on the material is limited to ten percent (10%).

(e) A Third-Level Subcontractor is a Subcontractor of a Subcontractor of the Contractor.

(i) No Third-Level Subcontractors on this project are approved for additional mark-up.

(ii) In the event that a Third-Level Subcontractor is utilized, that is not approved for additional mark-up, the Contractor is responsible for coordinating the split of the maximum approved mark-up between the Contractor and Subcontractors.

E7. TRAFFIC CONTROL

E7.1 Further to clauses 3.6, 3.7 and 3.8 of CW 1130:

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

(b) In addition, the Contractor shall be responsible for removing, placing, and maintaining all regulatory signing including but not limited to:

(i) Parking restrictions,

(ii) Stopping restrictions,

(iii) Turn restrictions,

(iv) Diamond lane removal,

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

(vi) Traffic routed across a median,

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

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

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

E7.2 Further to E7.1(b), the Contractor shall make arrangement with the Traffic Services Branch of the City of Winnipeg to supply regulatory signs as required.

E7.3 Further to E7.1(b), the Contractor shall make arrangements with the Traffic Services Branch of the City of Winnipeg to reinstall the permanent regulatory signs after the Contract Work is complete. At this time the Contractor shall make arrangements to drop off the stockpiled materials to Traffic Services at 495 Archibald Street.

E7.4 Any changes to the approved traffic management plan must be submitted to the Contract Administrator a minimum of (five) 5 Working Days prior to the required change for approval.

E7.5 Submissions

E7.5.1 Traffic Management Plans

(a) The Contractor shall submit a detailed Traffic Management Plan for works at sites identified below. The traffic management plan shall be submitted a minimum of fifteen (15) Business Days prior to commencement of work on each site to allow sufficient time for review by the Contract Administrator and Traffic Management department. Traffic control plans shall include, but not necessarily be limited to, the following:

(i) Details of lane closures on regional and non-regional streets; detours; access accommodations for local businesses; and access accommodations for pedestrians throughout any and all stages of construction;

(ii) Traffic control coordination with flow bypass works, including traffic ramp locations;

(iii) construction and flow bypass staging/schedule.

(iv) bike route accommodation or detour plans, where required;

(b) Traffic Management Plans shall be submitted for the following locations:

(i) All Sites.

(c) Submitted traffic management plans are subject to review, comment, and approval by the Traffic Management Department.

(d) Any changes to an approved traffic management plan must be submitted to the Contract Administrator a minimum of five (5) Working Days prior to the required change for approval.

E7.5.2 Lane Closure Requests

(a) Further to Section 2.01 of the MTTC, the Contract Administrator will submit requests in the Lane Closure App on behalf of the Contractor (“Construction Agency” in the manual) unless otherwise approved by the Contract Administrator. The Contractor shall submit a detailed traffic control plan for works occurring at each separate site. The traffic control plan(s) shall be submitted a minimum of five (5) Business Days prior to commencement of work on each site. Where proposed traffic control plans include a full closure, directional closure, or median crossover on a Regional Street, the traffic control plan(s) shall be submitted a minimum of fifteen (15) Business Days prior to commencement of work on each site. Traffic control plans shall include, but not necessarily be limited to the following:

(i) Details of lane closures on regional and non-regional streets; detours; access accommodations for local businesses; and access accommodations for pedestrians throughout any and all stages of construction;

(ii) Traffic control coordination with flow bypass works, including traffic ramp locations;

(iii) Construction and flow bypass staging/schedule.

(b) Requests for lane closures shall include all required information for submission required by the City's online request system. This information includes, but is not limited to:

(i) Start and end dates/times of required lane closures;

(ii) Limits of required lane closures. When requesting limits, Contractor to account for space required for advance signage, tapers, lane shifts, and any other traffic control devices/signage in accordance with the latest version of the City of Winnipeg Manual of Temporary Traffic Control on City Streets;

(iii) Limits for any parking restrictions;

(iv) Confirmation of number of lanes and location of lanes to be closed;

(v) Any turning restrictions;

(vi) Any signal alterations; and

(vii) Any transit impacts, including stop ID numbers for stops impacted.

(c) A link to the City Lane Closures request site can be found here:

https://laneclosures.winnipeg.ca/login

(d) All submitted traffic control plans are subject to review and acceptance by City of Winnipeg Traffic Management and Traffic Services divisions. Depending on the requested closure requirements and street(s) being affected, the City may require proposed closures to be completed on weekends or at night.

(e) If the Contractor is requesting traffic control devices, signage or barricades to be installed by the City of Winnipeg Traffic Services, or due to the complexity of the closure the City requires City of Winnipeg Traffic Services to be used, the Contractor shall be responsible for contacting and coordinating timelines for installation of the required traffic control devices, signage or barricades. Note that if utilizing Traffic Services, the Contractor shall contact in advance to verify that City staff are available to meet proposed timelines for placement of traffic control devices, signage and barricades.

E7.6 General Requirements

E7.6.1 Further to Section 3.7 of CW 1130 of the General Requirements the Contractor shall be responsible to redirect and maintain traffic with appropriate signing in accordance with The City of Winnipeg, "Manual of Temporary Traffic Control in Work Areas on City Streets" at all times during construction.

E7.6.2 Intersecting private approach access shall be maintained at all times unless excavation operations require temporary closure.

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

E7.6.3 The Contractor shall maintain access to all businesses during business hours, except where written authorization has been provided by the business.

E7.6.4 The Contractor shall maintain access to all schools, community centres, and other public buildings at all times.

E7.6.5 Bus traffic must be maintained at all times or as accepted by the Contract Administrator and Winnipeg Transit. Winnipeg Transit shall have the authority to determine the level of accommodation at bus stops in work zones. Bus stops may be closed, relocated, or maintained in a work zone at Winnipeg Transit's discretion.

E7.6.6 Ambulance/emergency vehicle access must be maintained at all times.

E7.6.7 Designated, permanent, and/or temporary bicycle routes shall be safely maintained throughout the work, or temporary traffic control put in place to reroute bicycle traffic around the work area. Temporary traffic control chosen for the closure or modification of an active transportation route shall match the level of safety provided by the route that is being closed or modified.

E7.6.8 Further to Section 3.6 of CW 1130 of the General Requirements, the Contractor shall maintain safe pedestrian crossings at intersections at all times. If possible, only one pedestrian crossing at an intersection is to be blocked by construction at any one time. If more than one pedestrian crossing is blocked by construction at an intersection at the same time the Contractor shall provide flag persons to safely escort pedestrians across the intersection. The Contractor shall leave pedestrian crossing locations safe and free of equipment that may hamper pedestrians when no construction activities are being performed at a particular crossing location.

E7.6.9 Further to Clause 3.7 of CW 1130 of the General Requirements, should the Contractor be unable to maintain pedestrian or vehicular access to a residence or business, he/she shall review the planned disruption with the business or residence and the Contract Administrator, and take reasonable measures to minimize the impact. The Contractor shall provide a minimum of 24 hours notification to the affected residence or business and the Contract Administrator, prior to disruption of access.

E7.6.10 The Contractor is responsible for maintaining safe vehicular and pedestrian traffic through their work site as identified herein. The Contractor shall rectify any unsafe conditions immediately upon notification. This could include but is not limited to, providing flag persons, clearing debris and snow from sites, moving equipment, and erecting additional signage.

E7.6.11 During the project, temporary snow fence shall be installed adjacent to existing and temporary sidewalks as necessary to prevent access to the construction area and to provide separation from the excavation area. The Contractor shall be responsible for maintaining the snow fence in a proper working condition. No measurement for payment shall be made for this work.

E7.6.12 The Contractor shall not park company or private vehicles inside the barricaded work zone in a manner that will block sightlines for vehicles and pedestrians approaching and crossing intersections.

E7.6.13 Flag persons may be necessary to maintain the flow of traffic during certain work operations.

E7.6.14 Notwithstanding the requirements noted herein and CW 1130, the Contractor shall maintain the minimum site-specific traffic control requirements outlined in Appendix C and as indicated on the Drawings.

E7.7 Regional Streets

E7.7.1 Construction activities on Regional Streets shall be restricted to the approved closed lanes between 07:00 to 09:00 hours and 15:00 to 18:00 hours Monday to Friday and other hours as directed by the Contract Administrator, unless otherwise approved by Traffic Management.

E7.7.2 Regional Streets impacted by the work of this Contract are:

(a) Stafford Street

(b) Portage Avenue

E7.7.3 Notwithstanding the requirements noted herein and of CW 1130, the Contractor shall maintain the specific minimum requirements as outlined in Appendix C during the Work.

E7.7.4 The Contractor will have access to the open lane(s) of traffic provided flag persons are used in accordance with the most current edition of The City of Winnipeg Manual for Temporary Traffic Control on City Streets to maintain traffic safety.

E7.7.5 Further to E7.1, should the Contract Administrator require that Work on a Regional Street be carried out at night, on Sundays, on public holidays or that Work be restricted or suspended during peak traffic hours, the Contractor shall comply without any additional compensation being considered to meet these requirements.

(a) The following locations shall be completed outside of peak traffic hours:

(i) N/A

E7.7.6 The City reserves the right to restrict, reject, or cancel Regional Street lane closures at any time due to the occurrence of special events or conflicting third party work.

E7.8 Non-Regional Streets

E7.8.1 Traffic Control on Non-Regional Streets during construction shall be in accordance with the Manual of Temporary Traffic Control, and including but not limited to the following:

(a) Maintain one lane of traffic with street signed as “Road Closed – No Exit” where possible;

(b) Intersecting streets and private approaches will be maintained at all times; and

(c) Bus traffic will be maintained at all times.

(d) A minimum of one lane of traffic shall be maintained on one-way and dead end residential streets at all times.

(e) Where required, the Contractor shall provide notice of complete street shutdowns complete with dates and duration a minimum of five (5) Business Days prior to the street closures.

E7.8.2 Further to E7.1 and E7.8.1, should the Contract Administrator require that Work on a Non-Regional Street be carried out at night, on Sundays, on public holidays or that Work be restricted or suspended during peak traffic hours, the Contractor shall comply without any additional compensation being considered to meet these requirements.

(a) The following locations shall be completed outside of weekday peak hours:

(i) Work obstructing safe public access to Ecole Laverendrye on Lilac Street and Jessie Ave.

E7.9 Regulatory Signage

(a) Further to E7.1(b), the Contractor shall make arrangement with the Traffic Services Branch of the City of Winnipeg to supply regulatory signs as required.

(b) The Contractor shall remove and stockpile any regulatory signage not required during construction such as but not limited to parking restrictions, turn restrictions and loading restrictions.

(c) Further to E7.1(b)(iii) and E7.1(b)(iv) the Contractor shall make arrangements with the Traffic Services Branch of the City of Winnipeg to reinstall the permanent regulatory signs after the Contract Work is complete. At this time the Contractor shall make arrangements to drop off the stockpiled materials to Traffic Services at 495 Archibald Street.

E7.10 Maintenance of Traffic Control

(a) Upon request from the Contract Administrator, the Contractor shall provide records demonstrating that the Site has been maintained.

(b) If the Contract Administrator determines that the Contractor is not performing Traffic Control in accordance with this specification, Traffic Services Branch may be engaged to perform the Traffic Control. In this event the Contractor shall bear the costs associated charged to the project by the Traffic Services Branch of the City of Winnipeg in connection with the required Works undertaken by the Contractor.

E7.11 Measurement and Payment

(a) Unless indicated otherwise on Form B, traffic management as outlined herein will be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

(b) Where identified for payment in Form B, Traffic Control installation and maintenance will be measured and paid on a Lump Sum basis at the Contract Lump Sum price for each individual site. Payment shall include all rental costs, prep work, setup, maintenance, removal and any other efforts required to maintain the closure for the duration of the Work. No additional payments will be made for additional expenses incurred in the installation, maintenance, modification, or removal of the closure, including additional costs incurred due to delays in completing the sewer rehabilitation work resulting from the Contractor's means and methods.

(c) Payment for Traffic Control will be made in full upon completion of the work and removal of the lane closure to the satisfaction of the Contract Administrator and City of Winnipeg Traffic Management Dept.

E8. FLOW CONTROL

E8.1 Description

(a) This Specification shall cover flow control measures required for main line sewer and sewer services required to perform the work.

E8.2 Submittals

(a) Submit a written flow control plan for sewers to be lined for review by the Contract Administrator in accordance with E2, a minimum of five (5) Business Days prior to undertaking the work. Flow bypass plans shall meet the requirements outlined herein.

E8.3 Flow Control Plans

E8.3.1 Flow control plans shall include the following:

(a) A description and sketch detailing the arrangement of the proposed flow control measures.

(b) A list of the key components required for the flow control measures, including but not limited to the following:

(i) Cofferdams

(ii) Piping or hoses (where required)

(iii) Traffic Ramps (where required)

(iv) Pumps (where required)

(c) Identify suction and discharge manholes.

(d) A detailed procedure for installation and removal of the flow control measures.

(e) Monitoring plan (if required). Note: all plans shall include a 24 hr contact person.

(f) Means and methods for dealing with excessive flows or wet weather events.

(g) Means and methods for bypassing flows from apartment complexes and commercial buildings.

(h) Supply of temporary washroom facilities where required.

E8.3.2 A tabular flow control plan with multiple sewer locations is acceptable for assets 450 mm in diameter and smaller. All other submissions shall be prepared on an individual sewer/liner installation basis.

E8.3.3 Supplementary Submissions

(a) Where identified, supplementary flow control submissions shall be submitted in conjunction with the flow control plan. The supplementary submissions shall include system curves for the flow bypass arrangement demonstrating the ability of the

proposed arrangement to meet the identified flow requirements. The submission shall include the following minimum information:

(i) a sketch showing all major components of the flow bypass setup;

(ii) suction manhole depths;

(iii) a table showing bypass piping diameters, length, materials, fittings, static lift, etc., used to develop a system curve. The table shall be complete with minor loss coefficients; and

(iv) provision of the system curves plotted with the pump curves, demonstrating the pumping capacity of the proposed system, and inclusive of the pump name plate data complete with nominal capacity, total dynamic head, and power.

(b) The following locations require supplementary flow control submissions:

(i) "Site 4" – Portage Avenue.

E8.3.4 Flow control plans for the following locations shall be prepared and stamped by a professional Engineer, registered in the Province of Manitoba and experienced in the design and implementation of temporary flow bypass works:

(i) "Site 4" – Portage Avenue.

E8.3.5 Advanced Flow Control Plans

(a) Where the proposed flow control plan includes changes to the operation of the City's collection system, the Contractor shall submit their flow control plans a minimum of twenty (20) Business Days prior to commencement of the work to permit review by the Contract Administrator and the City. Changes to the City's collection system may include but are not limited to raising of outfall weirs, closure of outfall gates, or changes to City pump station operations. The Contractor shall be aware that changes to the operation of the City's collection system may require extensive review by both the Contract Administrator and the City and may result In the Contractor having to implement additional measures to maintain an acceptable operational risk profile for the City's collection system.

(b) The following locations require the submission of advanced flow control plans:

(i) "Site 4" – Portage Avenue.

E8.3.6 The Contractor shall be aware that flow control plans which deviate significantly from tendered flow control requirements and/or require a review of changes to the operation of the City's collection system can require significant review efforts by the Contract Administrator and City. Costs associated with these reviews may be charged back to the Contractor if the submitted plans are deemed to be a significant deviation from the tendered conditions. The Contractor Administrator will advise the Contractor prior to undertaking reviews for which costs will be charged back to the Contractor.

E8.4 Mainline Sewer Flows

E8.4.1 The Contractor shall ensure wet weather or excessive flow conditions can be pumped or otherwise accommodated through the work area. The Contractor shall schedule work requiring complete blockage of the sewer when the chances of wet weather events are minimized in accordance with E8.6.

E8.4.2 The Contractor shall determine appropriate sewer bypass flows for sewer assets meeting the following criteria.

(a) WWS smaller than 300 mm in diameter.

(b) CS 450 mm in diameter and smaller.

E8.4.3 For sewers larger than those listed in E8.4.2, the following estimated flows have been provided the purposes of designing flow bypass arrangements:

Location	Estimated Average Dry Weather Flow (L/s)
JESSIE AVE (S-MA60010557)	12.2
JESSIE AVE (S-MA60009676)	30.2
JESSIE AVE (S-MA70014425)	47.0
PORTAGE AVE (S-MA70019493)	21.4

E8.4.4 The estimated flows provided herein are based on the City's sewer collection system hydraulic model. The Contractor shall be responsible to confirm these flows prior to submission of the flow bypass plan and report any discrepancies to the Contractor Administrator.

E8.4.5 Notwithstanding E8.4.2 and 0 the following assets may exhibit intermittent flows resulting from the operation of upstream pump stations. The following information has been provided for the purposes of sizing bypass systems:

(a) N/A

E8.4.6 The following additional site-specific information is provided for the Contractors use and shall be reviewed and incorporated into the Contractor's flow control plans:

(a) A review of combined sewer overflow locations and elevations have been included in Appendix E. The Contractor shall take note of limited freeboard upstream of select sewers and incorporate appropriate control measures into their flow control plans.

(b) "Site 4" – Portage Avenue is located immediately upstream of the Conway Pump Station and overflow outfall to the Assiniboine River. The Contractor may make use of a bypass manhole (to be constructed as part of Tender No. 177-2024) on the station discharge force main for bypass pumping discharge.

E8.5 Sewer Services

E8.5.1 Intermittent/short term flow blockages (i.e. up to 1 day, intermittently) of live sewer services will be permitted on the proviso that building occupants are informed of the blockage and adequate steps are undertaken to ensure sewer service backups do not occur. The Contractor shall be responsible for any damages occurring from sewer service blockages in instances where inadequate or improper notice has been provided.

E8.5.2 Provide temporary indoor portable toilets for residential homes and for each apartment in small apartment buildings (10 or less apartments) instead of temporary sewer service bypass pumping where feasible and approved by the building owner and the Contract Administrator.

E8.5.3 Provide temporary indoor or outdoor toilet facilities for smaller commercial properties such as strip malls instead of temporary sewer service bypass pumping where feasible and approved by the building owner and the Contract Administrator. One toilet facility to be provided for each business in a strip mall.

E8.5.4 Provide necessary supplies for portable toilets and clean as often as required while in use. Remove portable toilets and outdoor toilets promptly once sewer service is reinstated.

E8.5.5 Expose sewer services for facilities with a high volume of effluent discharge that have no feasible means of intercepting the flow within the building or at a location outside the building agreed upon by the Contract Administrator and drain or pump the sewer service from that location until the sewer service is reinstated.

E8.5.6 Excavate for sewer service exposure in accordance with CW 2030. Repair and backfill exposed sewer services in accordance with CW 2130.

E8.6 Manholes

E8.6.1 Flow control may be required to isolate manholes to complete the manhole rehabilitation works. Flow control methods may include flow through inflatable plugs, flumes, or other means of conveying flows through the work zone.

E8.6.2 Any flow control methods employed must meet the flow capacity and any other performance requirements identified herein.

E8.7 Methods

E8.7.1 Provide necessary flow control measures for the main line sewer and sewer services required to perform the work. Diversion of wastewater flow directly or indirectly to the environment, land drainage sewers, or storm relief sewers will not be allowed.

E8.7.2 Maintain existing sewer flows from upstream sewers during construction around the sewers being lined.

E8.7.3 Where rehabilitation work will result in the complete blockage of a combined sewer for any period of time (e.g. CIPP liner installation) the Contractor shall provide a minimum bypass pumping capacity of 2.75 times the estimated average day flows as provided herein or measured by the Contractor.

E8.7.4 Erection of scaffolding overtop of active roadways will not be permitted for the purposes of flow control.

E8.7.5 Provide adequate temporary bypass pumping for live sewer services connected to the sewer being lined from when the service is blocked off until it is reinstated.

E8.7.6 Provide security personnel for locations where by-pass pumping requires normally secure or locked doors and access areas to be left open or unlocked.

E8.7.7 Ensure all flow control components and materials are removed from the sewer system upon completion of the work.

E8.7.8 The Contractor shall put in place measures to prevent the spill of wastewater and/or styrene laden water from CIPP installation operations to the environment. When working in LDS, near outfalls (all sewers), the Contractor shall ensure flow bypass methods prevent upstream levels from exceeding overflow levels. Where plugs and other methods are employed to prevent overflows, the Contractor shall have contingency plans in place for unexpected flow increases and undertake 24 hr monitoring of upstream levels while flow control measures are in place.

E8.7.9 The Contractor shall demonstrate that the installed flow bypass system operates as intended and is capable of conveying the incoming flows prior to lining.

E8.7.10 Storage in the upstream system will be limited to the obvert of the pipe immediately upstream of any manhole being used for pumping. Upstream storage as a means of buffering incoming flows is not an acceptable method of flow control.

E8.8 Weather

E8.8.1 Environment Canada shall be used as the baseline weather forecast for planning and scheduling of Work.

(a) Environment Canada for Winnipeg, MB: https://weather.gc.ca/city/pages/mb38_metric_e.html

(b) Please note the above hyperlink to Environment Canada is correct at the time of Tender issuance, however this may change during the course of the Contract.

E8.8.2 The Contractor can contact to the Contract Administrator to confirm any changes as necessary.

E8.8.3 The Contractor shall review the Environment Canada weather forecast at a minimum once daily, and prior to Work commencing on site each day.

E8.8.4 When forecasted wet weather exceeds 5 mm, delay installation of liners and/or secure existing work sites.

E8.8.5 Where wet weather equal to or less than 5 mm of rainfall is forecasted, Work may proceed under the following conditions:

(a) Mainline diameters equal to or less than 400 mm:

(i) The Contractor has reviewed the forecasted rainfall event and provides written confirmation to the Contract Administrator that the proposed flow control measures provided are able to accommodate anticipated flows.

(b) Mainline diameters greater than 400 mm:

(i) The Contractor demonstrates to the Contract Administrator via numerical calculations that the proposed bypass system is capable of accommodating anticipated flows.

(ii) Upon request, the Contract Administrator will provide the Contractor with a map of the estimated catchment area to aid in the assessment.

(iii) Catchment area maps can be provided within 3 Business Days of a request.

(iv) Estimated catchment maps, if provided, are based on readily available information. There is no guarantee regarding accuracy of the information.

E8.8.6 The Contractor shall advise immediately of any weather-related delays.

E8.8.7 The Contractor shall schedule Work according to the weather.

E8.8.8 Delay claims due to wet weather shall be communicated to the Contract Administrator within five (5) Business Days after the date of the wet weather event.

E8.8.9 The Contract Administrator will review all claims with regards to wet weather delays in accordance with the General Conditions. Claims shall be reviewed within five (5) Business Days of receipt and may include discussions with the Contractor to ascertain the costs and reasoning associated with the work delay. A Change Order will be processed upon approval of the delay. If further time is required for due consideration by the Contract Administrator, a timeline will be established with the Contractor where no additional claims shall be made outside of the agreed upon response window.

E8.9 Measurement and Payment

E8.9.1 Mainline Sewer Rehabilitation

(a) Flow control measures for mainline sewers will be measured on a unit basis based on the diameter of the sewer being lined, except where specific site locations have been identified for measurement on a lump sum basis. The number of units to be paid will be equal to the number of liner installations where flow control measures are utilized. Utilization of flow control shall constitute the deployment of pumps or hauling of sewage to bypass flows around a sewer being lined. Flow control will not be measured for payment where no flow control measures are utilized.

(b) Payment for “Flow Control” shall include, but is not limited to the following:

(i) Supply of flow control plans, drawings, and submissions;

(ii) Investigative work to confirm flows, manhole, and pipe configurations;

(iii) Supply, installation, and removal of cofferdams and flow diversions;

(iv) Supply, mobilization, monitoring, operation, and demobilization of pumps and hoses;

(v) Hydrovac, hauling, and disposal of sewage where required for flow control purposes;

(vi) Supply, installation, and removal of traffic ramps and associated materials required for flow control works;

(vii) Any and all other plant, materials, and labour required to complete the work as specified herein and identified on reviewed flow control plans.

(c) Only one unit of flow control will be paid for each sewer segment and will include all occurrences of mainline and sewer service flow control requirements for the sewer segment.

(d) Where flow control is measured and paid on a lump sum basis:

(i) 25% payment for the Contract Lump Sum price for each respective site will be paid when flow control measures have been mobilized to that site and are in operation.

(ii) 100% of the Contract Lump Sum price for each respective site will be paid subsequent to the completion of the liner installation and demobilization of flow control measures from that site.

(e) Where no flow control measures are undertaken, no payment will be made for this item of work.

(f) The supply of temporary washroom facilities and flow control measures for sewer services shall be considered incidental to installation of the liner and will not be measured for payment. No additional payment will be made.

(g) No additional payments will be made for additional Flow Control costs, including equipment, material, rentals, or labour, due to delays in the Work caused by the Contractor's own means and methods.

E9. SEWER INSPECTIONS

E9.1 Description:

(a) This specification describes the requirements for obtaining sewer measurements and CCTV inspections required to facilitate the specified rehabilitation work.

(b) This specification amends and supplements specification CW 2145.

E9.2 Methods

E9.2.1 Verification of Existing Sewer Dimensions

(a) Verify sewer dimensions and depths prior to design as follows:

(i) Measure the distance from the center of the start manhole to center of the finish manhole using a steel tape, laser distance finder, or similar suitable measuring process. Length measurements must be accurate as they will be utilized for evaluating liner designs, and for payment, where applicable.

- The Contract Administrator will review submitted lengths from the pre-design and/or pre-lining inspections in conjunction with the submitted inspections to determine payment lengths for all applicable length-based pay items as defined herein. These lengths will be reviewed with the Contractor for the first Progress Estimate and used for the remainder of the project except where noted.

(ii) Manhole invert depths (from the manhole rim) at the upstream, downstream, and any intermediate manhole.

(iii) Measure the diameter and cross-section of the sewer at the upstream and downstream manholes and at a minimum distance of 500 millimetres inside the sewer from each manhole.

(iv) Use calibrated callipers or other suitable measuring device capable of measuring accurately to +/- 1 mm to confirm cross section geometry at the following clock positions:

- 12:00 to 6:00
- 2:00 to 8:00
- 3:00 to 9:00
- 4:00 to 10:00

(v) Obtain additional measurements for large diameter (larger than 600 millimetres) and for non-circular sewers sufficient to define the cross section to meet the design objectives for the rehabilitation system being utilized, including but not limited to:

- The length of the inside perimeter (circumference) of the sewer at the upstream and downstream ends.
- Perform a pre-design inspection in accordance with E9.2.2(b) where specified in order to confirm the dimensions of the existing host pipe.

(b) Estimate the remainder of the sewer dimensional requirements based on dimensional checks and the CCTV sewer inspection videos.

(c) Submit host pipe lengths, depths, and dimensions to the Contract Administrator in conjunction with the design submission and pre-design inspection where required.

E9.2.2 Perform the following sewer inspections in accordance with CW 2145, E10, and as outlined herein:

(a) Pre-Repair Inspection (where specified and as deemed necessary):

(i) Perform prior to undertaking cleaning, repairs, or prep-work.

(ii) Except where identified in Appendix A, pre-repair inspections are not a pay item and shall be considered incidental to the cleaning and prep work operations.

(iii) Except where identified in Appendix A, submission of the pre-repair inspection is only required where sewer conditions differ from those identified during tendering and additional prep work was undertaken to complete the rehabilitation work.

(iv) Where identified in Appendix A, pre-repair inspections shall be completed and submitted to the Contract Administrator a minimum of forty (40) Business Days prior to lining, for review prior to undertaking repairs or prep-work on the identified assets.

(v) No coding of the submission will be required.

(b) Pre-Design Inspection (where specified):

(i) Perform where identified in Appendix A prior to preparing the liner design.

(ii) Sewer must be completely cleaned to facilitate inspection.

(iii) Intent is to confirm the continuous or discontinuous (every 5 metres minimum) measurement of the height and width of large diameter and non-circular sewers along the entire length of the sewer.

(iv) The following methods may be employed (the Contractor shall confirm an acceptable pre-design inspection method for the rehabilitation technology being employed):

- Hand measurements
- Laser profiling
- Templating (Rigid liner installation only)

(v) CCTV inspections involving hand measurements shall clearly show the dimensional measurements and distance of the measurement from the upstream manhole on the video. Distances based on CCTV cable measurement will be permitted.

(vi) Any change in sewer cross section shall be sufficiently dimensioned to permit design and post-lining assessment of liner dimensions. Where hand measurements are utilized, any changes in the sewers cross sectional shape shall be documented in accordance with E9.2.1.

(vii) CCTV inspections involving templating shall clearly show the passage of the template through the sewer. For templated sewers the dimensions of the template shall be measured visibly on the CCTV inspection and dimensions submitted for review with the pre-design inspection.

(viii) Laser profiling technology must have sufficient accuracy and replicability as per E9.7 and must capture the entire circumference of the pipe.

(ix) No coding of the submission will be required.

(c) Pre-Lining Inspection:

(i) Perform after sewer cleaning and preparation.

(ii) The Pre-Lining Inspection shall confirm:

- Necessary cleaning and pipe preparation work, including internal and external sewer repairs, have been satisfactorily completed.
- Condition of the sewer pipe is consistent with the design conditions and the Specifications. The Contractor shall 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 liner prior to commencing lining.

(iii) Provide the Pre-Lining CCTV inspection a minimum of five (5) Business Days prior to lining for approval to proceed with the liner installation.

(iv) No coding of the submission will be required.

(v) The sewer service report shall be submitted with the pre-lining inspection.

(d) Post-Lining Inspection:

(i) Perform immediately following installation of the liner, after completion of sewer service reinstatement, and while flow control measures are in place.

(ii) Perform Post-Lining Inspection where Regional Street lane closures are required within 24 hours of completing the installation of the liner.

(iii) Intent is to confirm the adequacy of sewer service reinstatements and the fit and finish of the liner.

(iv) Post-Lining inspection shall be submitted within fifteen (15) Business Days of completion of the liner installation. Total Performance for the project will not be granted prior to submission and acceptance of the Post-Lining inspection CCTV and associated reports.

(v) Full coding required.

(e) Post-Design Inspection (where specified):

(i) Perform where specified in Appendix A subsequent to installing the liner.

(ii) Intent is to confirm the continuous or discontinuous (every 5 metres minimum) measurement of the height and width of large diameter and non-circular liners along the entire length of the sewer to confirm that the liner is consistent with the expected post-lining diameter or dimensions.

(iii) The following methods may be employed:

- Hand measurements
- Laser profiling

(iv) Perform while flow control measures are in place.

(v) CCTV inspections involving hand measurements shall clearly show the dimensional measurements and distance of the measurement from the upstream manhole on the video. Distances based on CCTV cable measurement will be permitted.

(vi) Laser profiling technology must have sufficient accuracy and replicability as per E9.7 and must capture the entire circumference of the pipe.

(vii) Post-Design inspection shall be submitted within fifteen (15) Business Days of completion of the liner installation. Total Performance for the project will not be granted prior to submission and acceptance of the Post-Design inspection CCTV and associated reports.

(viii) No coding of the submission will be required.

(f) Warranty Inspection:

(i) Perform before expiration of the warranty period and final acceptance but not prior to 10 months after installation of the liner.

(ii) Sewer shall be completely cleaned to facilitate the inspection.

(iii) Intention is to confirm the fit and finish of the liner, the need for any remedial work, and acceptance of any repair work performed during the warranty period.

(iv) Undertake sewer cleaning in accordance with CW 2140 as required to obtain a satisfactory inspection.

(v) Full coding required.

E9.2.3 Submit all inspection videos to the Contractor Administrator for review in accordance with CW 2145 and as specified herein.

E9.3 Sewer Inspection Reports

(a) Provide the Contract Administrator with the following sewer inspection reports prepared in accordance with CW 2145.

(i) Pre- and post-lining inspection and reports before acceptance of the Work for Total Performance.

(ii) Warranty inspection report before Final Acceptance of the Work.

E9.4 Sewer Service Reports

(a) The Contractor is responsible to determine the usage and status of all service connections connected to the sewer to be rehabilitated. Confirm exact location of all sewer services connected to the sewer being lined by dye testing, tracing, or other methods. Any additional investigative and/or remedial work resulting from improper identification of connected services shall be borne by the Contractor.

(b) Submit a written Sewer Service Report for each liner location to the Contract Administrator with the pre-lining inspection. Pre-lining inspections will not be reviewed without submission of the sewer service report. Provide the following information for each sewer service including CB leads and utility manhole drains.

(i) Location of connection (chainage from upstream manhole and clock reference).

(ii) Diameter of sewer connection lateral.

(iii) Material type of sewer connection.

(iv) Observed condition of connection.

(v) Status of connection (active, inactive or unable to determine).

(vi) Property serviced including the address.

E9.5 Amendments and Supplements to CW 2145 for Sewer Inspections:

E9.5.1 The Contract drawings are based on information contained in the City's GIS database. If the Contractor has trouble interpreting the drawings, or if they believe them to be wrong, the Contract Administrator shall be approached for assistance/clarification.

(a) The Contractor shall assist the Contract Administrator in making any required measurements for the correction of errors found on the Drawings.

E9.5.2 Replace Clause 3.11.1 with: Capture the inspections in digital format in colour from the live video source on HDD to the following minimum requirements.

(a) For sewer diameters less than 1800mm in height the minimum camera lens and recording requirements will be:

(i) XDVD MPEG-2 or MPEG-4 format (MPEG-4 preferred).

(ii) Picture Size: NTSC 720 x 480 @ 29.97 frames per second.

(iii) Data/Bit Rate: 6.0 M-bits/sec.

(b) For sewer diameters 1800mm in height and larger, the minimum camera lens and recording requirements will be:

(i) XDVD MPEG-2 or MPEG-4 format (MPEG-4 preferred).

(ii) Picture Size: 024x768 (or greater) @ 29.97 (minimum) frames per second.

(iii) Data/Bit Rate: 6.0 M-bits/sec.

(c) The use of Side Wall Scanning technologies resolution shall be at a level of resolution as per E9.6.3 to ensure pipe wall loss clarity is provided within the imagery. Viewing software shall be provided at no cost to the City or the Contract Administrator to ensure the user has full autonomy when viewing the sewer pipe. Pre-recorded video shall also be submitted for Side Wall Scanning technologies in addition to specialty autonomous viewing software and data. No water droplets, debris marks or similar shall exist on the lens that would cause image blur or inhibit the clear and uninterrupted view of the pipe during the inspection. Side Wall Scanning technology platforms shall be used having sufficient illumination within given diameters as per the camera manufacturer's recommendations.

E9.6 Sewer Inspection Equipment

E9.6.1 In-Line sewer inspection equipment shall be comprised of a self-propelled track-mounted platform bearing multiple inspection sensors / technologies that can undertake simultaneous remote inspection in sewers of all diameter ranges.

E9.6.2 In areas where a self-propelled track-mounted platform is not possible to use during the inspections, the inspections shall be performed using a float or skid system. The Contractor shall notify the Contract Administrator prior to the use of a float or skid platform, tethered by use of flusher hosing capable at distances stated in E9.6.3.

E9.6.3 In-Line CCTV Inspection Platform Minimum Requirements

(a) Independently controlled drive tracks that enable the platform to manoeuvre around bends and climb over debris up to 300 mm in height.

(b) Operable under partially or fully submerged flow conditions, for distances up to 600 m upstream or downstream from a single access point.

(c) Operable in sewers of various cross-section, and constructed of standard pipe materials including brick, clay, concrete, PVC, HDPE, and steel.

(d) Tethered to facilitate the conveyance and extraction of the platform from the sewer, without causing damage to the sewer infrastructure, in the event the equipment fails or otherwise becomes uncontrollable within the sewer.

(e) Equipped with sufficient high intensity lighting to illuminate the sewer for visual inspection at the widest horizontal viewing angle and the pipe's side periphery.

(i) Lighting for the camera shall be waterproof and suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative and provide a clear picture in 100 percent humidity conditions.

(ii) An unclear picture due to excessive lighting (image flare), the lack of lighting or the presence of fog, steam, or excessive humidity will be considered unsatisfactory. The Contractor is responsible for identifying and implementing corrective actions to obtain suitable video quality, such as using fans or ventilation systems to dissipate the fog or by the heating of incoming air to mitigate fog.

(iii) Light heads shall be changed upon the request of the Contract Administrator.

(f) A blurred picture due to fats, oil or grease or a failure in one or all of the primary colour additives, Red, Green, Blue (RGB) visuals will be considered unsatisfactory. The Contractor is responsible for identifying and implementing corrective actions to obtain suitable video quality, such as cleaning the sewer mainline, having the camera lens cleaned prior to reinspection of the mainline.

(g) The Contractor is responsible for presenting issues regarding questionable video quality immediately to the attention of the Contract Administrator.

E9.7 Three-Dimensional (3D) Laser Scanning Inspection

E9.7.1 "Three-Dimensional (3D) Laser Scanning" is a technique to determine the surface profile of mainline pipes using a three-dimensional (3D) laser on the entire circumference above fluid level of the pipe.

E9.7.2 Three-Dimensional (3D) LASER scanning equipment shall provide an accurate determination of pipe geometry (features and defects) above the fluid level.

E9.7.3 Minimum equipment requirements are:

(a) The laser shall be Class 1; eye-safe for operator safety.

(b) Surface measurements accurate to 5mm at 3 metres in 1200mm pipes and larger.

(c) Precision ovality / deflection detailed range laser measurement scans accurate to ±1%.

(d) Laser scans shall produce a point cloud with a maximum distance between points of 10 mm in the transverse direction and 40 mm in the longitudinal direction. The rate of scan shall not exceed 9 m / minute.

E9.7.4 The provision of LASER scanning Internal Diameter and Deflection graphs will be used, as needed, to quantify internal pipe wall material loss/gain or deformation (ovality and deflection) at a given location. Pipe cross-sections obtained from high resolution scans will be used to provide quantitative information regarding internal pipe geometry, including ovality. Precision Scans are produced with multi-colour indication depicting deviations from as built conditions as well as localized material gain and/or loss.

E9.7.5 LASER scanning shall be conducted on identified sewer pipe entities and be conducted from access point to access point. LASER equipment shall be moved through the pipeline on a transport vehicle capable of supporting the LASER inspection equipment above the water level.

E9.8 Catch Basin Lead Inspections and Cleaning

E9.8.1 This specification shall cover the cleaning and inspection of catch basin leads connected to sewers included in this contract for the purpose of determining whether the catch basin lead requires repair work.

E9.8.2 The Contractor shall clean and inspect catch basin leads where indicated for repair on the drawings, and/or as directed by the Contract Administrator.

(a) Clean catch basin leads in accordance with CW 2140.

(b) Perform CCTV inspection from catch basin to mainline sewer in accordance with CW 2145. No coding of the submission will be required.

E9.8.3 Catch basin lead repairs in accordance with E12.

E9.9 Measurement and Payment

E9.9.1 Verification of Sewer Dimensions:

(a) Verification of existing sewer lengths, depths, and dimensions will be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

E9.9.2 Sewer and catch basin lead inspections will be measured and paid for in accordance with CW 2145 except as modified herein:

(a) The total length of inspection to be paid will be the total length of sewer inspected to the satisfaction of the Contract Administrator.

(i) The maximum length to be paid will be the manhole-to-manhole sewer length provided by the Contractor.

(ii) Where partial or incomplete inspections are submitted, the length of sewer inspected will be the length recorded by the Contractors calibrated inspection equipment or as determined by the Contract Administrator.

(b) Pre-lining, post-lining, and warranty inspections will not be paid for where re-inspections are required due to the need for additional work and further verification of the installed liner.

E9.9.3 Sewer Service Reports

(a) The provision of sewer service reports will be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

(b) The Contractor is responsible for rectifying any damages caused or additional inspection work resulting from incomplete or erroneous Sewer Service Reports.

E9.9.4 Sewer Inspection Reports

(a) The provision of sewer inspection reports will be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

E10. DIGITAL PANORAMIC MANHOLE INSPECTIONS

E10.1 Description:

(a) This Specification describes the requirements for obtaining digital panoramic manhole inspections.

E10.2 General

E10.2.1 Digital panoramic manhole inspections will be utilized for manhole rehabilitation with inspections following the format and intent outlined in E9.

E10.3 Digital Panoramic Manhole Inspection

E10.3.1 Notwithstanding CW 2145, inspect manholes using digital panoramic manhole inspection system such as the IBAK PANORAMO SI, RST Helix or equivalent shall meet the following criteria:

(a) The inspection camera system must be 100% digital, having submitted software that will provide and allow the autonomous viewing of the chamber to facilitate the Condition Assessment process. Any analog or NTSC video camera will be deemed unacceptable.

(b) Perform manhole condition coding in accordance with the requirements of the NASSCO MACP V7.00 or greater.

(c) Perform condition coding using operators who are certified in accordance with the National Association of Sewer Service Companies (NASSCO) having attained and retained their “Manhole Assessment Certification Program” (MACP) certification.

(d) Operators failing to meet the accuracy requirements on two occasions will not be permitted to code on the remainder of the contract until they can demonstrate to the Contract Administrator that they can code in accordance with the requirements of the NASSCO MACP V7.0.0 manual or greater.

(e) The inspection camera system must have two independently or simultaneously controlled digital cameras, one facing in the downward direction and one facing in the upward direction. Each camera must have a minimum of 185 degree field of view.

(f) The inspection camera system must provide sufficient illumination of the interior of the manhole to obtain proper exposure without introducing any motion blur. The light shall be positioned to distribute the light evenly onto the structure walls. The lighting must be able to illuminate manholes without the need of any auxiliary lighting having a recommended contrast set to less than 1.5.

(g) The inspection system shall produce individual images or frames with no more than 0.001 inches (0.025mm) of movement during image or frame exposure to produce crisp, clear images. Inspections showing evidence of corrupt or erroneous imagery, scratched lenses or protective glass plate or similar due to poor handling and application shall be rejected.

(h) The inspection camera must provide a minimum of 3000 line of vertical resolution in the side view and a minimum of 500 lines in the perspective view.

(i) Contractor is responsible for reviewing collected data, coding observations, however the City must have the ability to view the digital film file in the way that the contractor can view them, including full control of the virtual pan and tilt.

(j) The digital film files will be captured to a “High Quality” setting that must include an unfolded view of the manhole with a minimum of 3000 lines of vertical resolution, providing all front, back and wrapped images that will be, at a minimum height and width of 1040x1040 pixels, to a resolution of 96 dots per inch. Latest 4k technologies will also be reviewed for acceptance.

(k) The digital film files must include the capability to produce a three dimensional representation of the manhole structure. This data shall be used to perform geometric measurements. This file shall be exportable to common CAD programs for further analysis.

(l) The digital file files must include a distortion-free virtual pan and tilt allowing the review of the manhole structure from any angle from any depth. The virtual pan and tilt must be able to view 360 degrees in any direction. The virtual pan and tilt must consist of views from the top and bottom camera, any virtual pan and tilts that artificially create this view from a single camera will be deemed unacceptable due to distorted images on the direct side view.

(m) The virtual pan and tilt and unfolded views must be able to be viewable by the City with all the required executable software included for each disc and HDD at no additional cost to the Contract Administrator or the City of Winnipeg.

(n) The Contractor shall provide the database.

(o) The inspection system must descend to the lowest point within the manhole chamber to a depth that will facilitate accurate perpendicular measurements using the software’s measuring tools to occur.

(p) Any inspection exhibiting an incomplete descent having a distance greater than one (1) metre above the invert or water level resulting to data interpolation, will be rejected unless appurtenances or obstructions are present within the chamber and accepted by the Contract Administrator.

(q) All chambers that exhibit weir wall or spill pipe weir levels as observed within the field or identified, but not limited to control structures or manholes identified within the Construction Drawings, must be recorded as an MGO and its measurement from manhole rim to weir crest recorded within the remarks field.

(r) Manhole condition coding shall be submitted to the Contract Administrator as per E9.

E10.4 Amendments and Supplements to CW 2145 for Digital Panoramic Manhole Inspections:

E10.4.1 Inspection of manholes will use side scanning imagery and point cloud collection equipment only to NASSCO MACP Level 2 inspections for the purposes of assessing thoroughness of cleaning, observing and recording structural and service defects and construction features of existing manhole and control structure assets and to verify new and rehabilitated sewer construction prior to acceptance.

E10.4.2 Replace Clause 3.6 with:

(a) Perform NASSCO MACP V7.0.0 or greater manhole condition Level 2 inspection and coding in general accordance with E15 of this specification and with the following additional requirements.

(b) The following fields shall be used when completing the “Header” details in the manhole inspection header form. By default, Field 5 the “Owner” is City of Winnipeg and Field 6, the “Customer” will be the Contract Administrator identified in D6.

E10.4.3 Further to Section 3.6, Field 34-37 of the Measurements section shall be measured in whole numbers and expressed in millimetres.

E10.4.4 Further to Clause 3.17.8:

(a) A skilled and NASSCO MACP certified technician or supervisor who shall be located at the control panel in the mobile data collection studio shall control the operation of the digital panoramic inspection equipment. Perform manhole inspections in accordance with the following:

(i) From the top to the bottom of the manhole.

(ii) From the manhole frame to the center line elevation of the existing sewer.

(iii) Ensure the frame of the manhole is clearly visible at the start of the inspection.

(iv) Provide a chalk or dry-erase-board placed adjacent to the manhole cover, within the inspection imagery, noting the Date, Contract #, Manhole Asset ID # and physical measurement of manhole rim to invert dimension.

(v) Provide a second chalk or dry-erase-board placed adjacent to the manhole cover, within the inspection imagery, using an arrow to indicate where North is located.

(vi) Spray paint a mark (with a colour consistent for the duration of the project and a different color to the North point) indicating the 6 o'clock position that is in reference to the first outgoing pipe (taken from north in a clockwise direction, as per NASSCO MACP requirements) visible on the surface and within the manhole frame. Plastic templates placed on the surface may also be used to represent the North point and the 6 o'clock position.

(vii) Block ambient light during the inspection to minimize problems related to lens flare and poor contrast. Latest technologies now incorporate sun shields; where possible, ensure image capture surrounding the above ground environments for site familiarisation / orientation is completed.

(viii) Inspect the manhole to the lowest depth that will facilitate accurate perpendicular measurements using the software's measuring tools. Depth distances shall be provided in millimetres as per E15.5.

(ix) Complete all steel tape or calibrated footage counter measurements pertinent to mandatory MACP Level 2 measurements that are located at or around the cover and frame area. In accordance with NASSCO MACP standards, the Contractor shall measure the rim to invert using a steel tape or calibrated footage counter from the surface to validate the measurement available from the panoramic scan.

(x) No confined space entry shall be completed without Contract Administrators approval.

E10.4.5 Further to Clause 3.11.5 provide file names within the 360Player.exe software, manholes to be in alpha numeric order to ensure efficient reference.

E10.5 Measurement and Payment

E10.5.1 Digital panoramic manhole inspections will be measured and paid for in accordance with CW 2145 except as modified herein:

(a) Pre-lining, post-lining, and warranty inspections will not be paid for where re-inspections are required due to the need for additional work and further verification of the installed liner.

E10.5.2 Manhole Inspection Reports

(a) The provision of manhole inspection reports will be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

E11. EXCAVATIONS AND PIPELINE ACCESS

E11.1 Description

(a) This Specification shall cover excavations, shoring, and modifications to and construction of new manholes as required for pipeline access to facilitate the proposed rehabilitation work.

E11.2 Submittals

(a) A work plan shall be provided for each manhole slated for disassembly and/or reconstruction to facilitate liner installation. Work plans are not required where only the manhole frame and cover are being removed. The work plan shall include the following:

(i) Limits of excavation (width, length, depth);

(ii) means of shoring the excavation;

(iii) services to be disrupted. Means of maintaining or otherwise dealing with service flows;

(iv) manhole work to be undertaken; and

(v) other information required to describe the work.

(b) Shop Drawings for excavation shoring (where required) shall be prepared and submitted in accordance with E2 a minimum of five (5) Business Days prior to undertaking the excavation and shoring installation. Where required by Workplace Safety and Health regulation, shoring Shop Drawings shall be sealed by a Professional Engineer, registered in the Province of Manitoba, experienced in the design of excavation shoring systems.

E11.3 Shoring Design

(a) Shoring shall be provided for excavations in accordance with CW 2030.

(b) Excavation shoring shall be designed to accommodate the installation of the selected rehabilitation technology.

(c) All shoring systems shall comply with Manitoba Workplace Safety and Health requirements.

E11.4 Materials

(a) All materials shall conform to City of Winnipeg Standard Construction Specifications.

E11.4.1 Manhole Modifications to Facilitate Liner Installation

(a) If required to complete the work, the Contractor may choose to remove and replace the upper portions of the existing manholes to permit access to the existing sewers.

(i) The Contractor may reuse existing pre-cast concrete manhole components when found to be in good condition. The Contractor shall replace all other manhole components and pre-cast concrete manhole components found to be in a deteriorated condition.

(ii) Where manhole stacks are to be replaced and sizes are not noted on the drawings, the new manhole stack shall be the largest practical nominal size up to 1200 mm without exceeding the existing manhole base dimensions.

(iii) Select existing manholes and chambers may not be modified or excavated as shown on the Drawings.

(b) All manhole works shall conform to CW2130.

E11.4.2 Excavation

(a) The Contractor is responsible for locating the existing sewer and all other buried utilities and shall take all steps to locate the existing sewer prior to excavation and installation of shoring.

(b) Construction materials and excavation spoils shall not be stockpiled over pipelines.

(c) Carefully excavate to expose existing pipelines.

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

(e) The existing sewer shall be located prior to proceeding with excavations within 1.0 m of the pipe. Final excavation (within 300 mm of the pipe wall) shall be completed using soft dig or hand excavation methods to prevent damage to the pipe.

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

(g) Any services severed during excavation and shoring installation must be rerouted or otherwise bypassed in accordance with E8.5.

E11.4.3 Shoring Installation

(a) Piles (if used) shall be installed with a minimum of 500 mm of clear separation between the pile and the outside of the existing sewer wall.

(b) Piles (if used) shall be pre-bored to a depth below the invert of the sewer. Pre-bored holes shall be filled with a flowable low strength cementitious material after installation of piles to prevent movement of existing soils around the pipe, permit excavation/installation of shoring, and removal of piles.

(c) Excavation and shoring installation shall not initiate movement or otherwise destabilize soils sounding brick and concrete sewers greater than 1200 mm in diameter.

(d) Locate the extents of the existing sewer prior to pre boring and installing shoring using soft dig methods. Please note the wall thicknesses and outside diameter of the existing trunk sewers are unknown.

(e) Construction Vibrations

(i) The Contractor shall use means and methods that will limit vibrations at locations adjacent to utilities and structures.

E11.4.4 Demolition

(a) Carefully remove, expose, and demolish existing manholes and sewers as required. The use of pneumatic breakers is prohibited. Tops of sewers may be saw cut or removed using small hand held jack hammers. Final openings in the existing sewers shall be neatly cut square to the existing pipe.

E11.4.5 Trunk Sewer Closures

(a) Construct trunk sewer closures as shown on the drawings after completion of the liner installation.

(b) Complete cast-in-place concrete and reinforcing steel work as shown on the Drawings and in accordance with E16 and E17.

E11.4.6 New Manholes

(a) Construct new cast-in-place or pre-cast manhole bases as shown on the drawings after completion of the liner installation.

(b) Complete cast-in-place concrete and reinforcing steel work as shown on the Drawings and in accordance with E16 and E17.

(c) Manholes shall be constructed as shown on the Drawings and in accordance with CW2130.

E11.4.7 New Manhole Installation within Existing Excavation

(a) Should the Contractor choose to install pipeline access excavation within the middle of the pipe between upstream and downstream manholes where manhole modifications for pipeline access would otherwise not be required, the Contract Administrator may request the installation of a new manhole within the pipeline access excavation upon completion of the Work and prior to closure of the pipe and backfill of the excavation, if it is advantageous to the City.

(b) New manholes shall be installed in accordance with E12.4.6 and CW 2130.

(c) New manholes shall be the maximum practical size without exceeding the width of the existing host pipe.

E11.4.8 Shoring Removal

(a) Shoring systems shall be completely removed upon completion of the works.

(b) Care shall be taken to remove the shoring system and backfill the trench in such a way as to not create voids. If the shoring system requires removal after backfill is in place, resulting voids shall be filled with flowable cement slurry.

E11.4.9 Backfill

(a) Backfill within 1.0 m of existing and proposed pavements shall be completed to CW 2030, Class 1 standards. Granular Class 2 backfill shall extend to the underside of the stabilized fill.

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

E11.5 Measurement and Payment

E11.5.1 Pipeline Access

(a) Pipeline access will be paid on a Lump Sum basis for each identified asset at the Contract Unit Price for “Pipeline Access Modifications” as listed in the Form B: Prices.

(b) Payment for “Pipeline Access Modifications” will include all costs associated with providing access to the pipeline to accommodate sewer rehabilitation, including but not limited to: excavations, shoring, demolition of existing structures (if required), structural pipe arch reconstruction, backfill, and surface restoration. This shall include all materials, labour, and equipment required to complete the work as specified.

(c) Manhole reconstruction above the detailed sewer arch repair, where required or requested, will be paid in accordance with E12.7.5 “Provisional Manhole Installation Within Existing Excavation”.

(d) Payment will be made on the following schedule:

(i) 50% payment of the Pipeline Access lump sum price for each site or asset will be paid upon commencement of the liner installation for each site.

(ii) 100% payment of the Pipeline Access lump sum price for each site or asset will be paid upon completion and acceptance of backfill and temporary surface restoration at each site.

E11.5.2 Protection of Existing Trees

(a) The protection of existing trees shall be considered incidental to the Work and will not be measured for payment. No additional payment will be made.

E12. SEWER AND MANHOLE REPAIRS AND STABILIZATION

E12.1 Description

(a) Sewer and manhole stabilization shall mean the internal repair of sewers and manholes by man entry techniques. Repairs are varied and may consist of holes in sewers with voids, missing bricks in sewers, obstructions and manhole base or riser repairs. Sewer stabilization repairs shall be carried out in accordance with this specification and E13, prior to performing sewer lining.

(b) The scope of work involved in sewer stabilization is as follows:

(i) Secure the site and provide temporary traffic control.

(ii) Obtain all necessary underground clearances.

(iii) Conduct a hazard assessment, including identification and evaluation.

(iv) Develop a safe work plan.

(v) Implement the necessary procedures and controls to control hazards and maintain a safe working environment.

(vi) Enter the manhole/sewer and perform the required repairs.

(vii) Clean-up the site.

E12.2 Materials

E12.2.1 Concrete

(a) Concrete for large internal repairs to concrete and brick sewers and manholes and internal void filling shall be in conformance with Table CW 2160.1, Type B.

(b) Patching and grouting of repairs to concrete and brick sewers and manholes shall be with a fast hardening high strength concrete repairing compound designed for underwater use.

(i) Approved products: Duro-Crete by C Chemicals or approved equal in accordance with B7.

(c) Flowable cement-stabilized fill for external void filling from the ground surface shall be in conformance with Table CW 2160.1, Type D.

E12.2.2 Manhole components shall conform to CW2130.

E12.3 Sewer Repairs and Preparation Work

E12.3.1 Existing Sewer Design Conditions

(a) The assessment of the liner system design conditions and site-specific repairs required to accommodate lining were based on the conditions observed from sewer inspections that were performed as part of the City of Winnipeg's Sewer Inspection Program. Copies of these video inspections are available to the Contractor upon request by providing a portable hard disk drive (HDD) to the Contract Administrator. The Contract Administrator will copy the inspections onto the HDD and make available to the Contractor for review purposes.

(b) The Contractor shall be aware that the video inspections provided were completed immediately after sewer cleaning and the amount of sediment and debris present at the time of the Work of this Contract may not be the same. The Contractor shall be responsible to determine the actual amount of sediment and debris in the sewers included in this Work.

(c) Observed sewer defects and cleaning/preparation works evident in the existing sewer inspection videos have been provided in Appendix A.

(d) Refer to E12.3.3(b) for additional site-specific conditions.

E12.3.2 Sewer Cleaning

(a) Cleaning of sewers and manholes shall be completed in accordance with CW 2140 and this Specification.

E12.3.3 Notwithstanding E12.3.1(a), the following sewer stabilization, repairs, and preparation work can be reasonably assumed to be required and shall be completed prior to undertaking the identified rehabilitation work:

(a) General Preparation

(i) Remove loose debris, solid debris, roots, and grease in accordance with CW 2140.

(ii) Remove any remaining organic or biological materials.

(iii) Remove any loose or spalling concrete to a depth sufficient to provide a competent host pipe surface.

(iv) Remove any loose or damaged bricks and/or mortar.

(v) Remove wall encrustations throughout.

(vi) Remove encrustations at service connections.

(vii) Grout sewer services as required following encrustation removal.

(viii) Remove intruding sewer connections in accordance with CW 2140.

(ix) Reshape host sewer pipe invert to the original dimension and cross section at locations where the invert has completely deteriorated.

(b) Further to E12.3.3(a), the following site-specific repairs shall be completed prior to liner installation work:

(i) “Site 4” – Portage Ave: Temporary removal of flow monitoring equipment in and around manhole S-MH20004694.

(c) Further to E12.3.3(a), the following work shall be completed prior to the installation of CIPP liners:

(i) In accessible sewers (equal to or greater than 900 mm), prepare and fill all voiding, holes, and discontinuities in the host pipe wall greater than 50 mm in depth or 150 mm in diameter to provide a reasonably smooth surface against which to install the liner.

(ii) Fill voiding from any missing bricks with a cementitious repair product.

(iii) Repair any sources of infiltration to a level required to successfully complete the liner installation.

(d) Further to E12.3.3(a), the following work shall be completed prior to the installation of grouted GRP liners:

(i) Hard debris and host pipe features which hamper liner installation shall be removed sufficiently to permit installation of the GRP panels.

(ii) Where Type 1 Liners designs are utilized, the host pipe shall be thoroughly cleaned using water jetting or other acceptable methods prior to lining in accordance with WRc, Sewerage Rehabilitation Manual, Section 9.2.3 to maximize mechanical interlock and bond with the host pipe. The Contractor shall remove all organic materials, biological slim, roots, soft encrustation, and grease.

(iii) Where Type 1 Liners designs are utilized, all organic materials, biological slim, roots, soft encrustation, and grease shall be removed from the pipe prior to lining.

(iv) Repair any sources of infiltration to a level required to successfully complete the liner and grouting installation.

(v) Any repairs to the host pipe shall be completed with a competent cementitious material compatible with the host pipe, grout, and liner. Repairs shall not compromise the intended structural behaviour or performance of the rehabilitated structure.

E12.3.4 The above is the minimum work program required, specific installation requirements for the chosen rehabilitation technology may require additional work beyond what has been specified herein. The Contractor is encouraged to familiarize themselves with the available CCTV data during tendering. Claims for additional costs related to prep work required to complete the installation where conditions are found to be consistent with the tendered condition of the pipeline will not be considered.

E12.4 Construction Methods

E12.4.1 Equipment Set Up

(a) In accordance with the safe work plan for the repair, the Contractor shall set up the required safety equipment and controls to safely perform the work.

(b) Specialized equipment to perform the repair work, such as lights, pressure washers, drills and chipping hammers shall in no way adversely affect the operation of the safety equipment required to perform the work.

(c) Subsequent to completion of the repairs the Contractor shall remove all equipment form the sewers and manholes.

E12.4.2 Internal Sewer Repairs

(a) The Contractor shall repair the sewer fabric to restore the structural integrity of the sewer and provide a smooth flow surface conforming to the adjacent sewer/manhole cross-section and materials.

(b) Large concrete repairs shall include a reasonable and limited level of surface preparation, including removal of unsound material and cleaning of the edges of the repair area, and setting of the required formwork and bracing. Concrete placement and finishing shall be done in accordance with CW 2160. All formwork and bracing shall be removed from the sewer/manhole at the completion of the work.

(c) Concrete patching shall include a reasonable and limited level of surface preparation, including removal of unsound material and cleaning of the edges of the repair area. The Contractor shall apply the patching material in accordance with the manufacturer's printed instructions.

(d) Small voids in the backfill shall be filled with concrete or other approved material from the inside of the sewer prior to repairing the sewer fabric or by pressure grouting after completion of the repairs. The void shall be completely filled to prevent settlement of the backfill and provide a solid backing for the liner.

(e) Pressure grouting shall be done in accordance with the manufacturer's printed instructions.

(f) Large voids shall be filled from the ground surface after completion of the repairs. Holes shall be cored in the pavement or the pavement shall be saw cut and removed to permit vacuum excavation from the underside of the pavement to the void. The void shall then be completely filled with flowable cement-stabilized fill.

E12.4.3 External Point Repairs

(a) The Contractor shall provide CCTV video of any proposed EPRs for review and acceptance by the Contract Administrator prior to undertaking the work.

(b) Complete external point repairs in accordance with CW2130.

E12.4.4 Sewer Service Grouting

(a) Sewer service grouting prior to lining shall be completed using a non-shrink, watertight cement grout, an appropriate polyurethane grout compound, or other approved grouting product, compatible with the existing host pipe. Grouting shall create a watertight and smooth inner surface for the host pipe and sewer service.

(b) Sewer service grouting post lining shall fill voids between the sewer liner and the host pipe at sewer service openings with an appropriate polyurethane or other grouting system that is compatible with the liner system to form a smooth watertight connection.

E12.4.5 Post-Liner Installation Annulus Grouting for Tight Fit Liners

(a) Complete annulus grouting where voids are evident between the liner and the host pipe.

(b) Annulus grouting post lining shall be completed using an appropriate cementitious or polyurethane grouting system that is compatible with the liner system.

(c) A cementitious grout shall be used where grouting is required to achieve long term structural performance of the liner and host pipe. In all other applications, a polyurethane grout may be used to fill voids between the liner and host pipe.

(d) Cementitious grout shall conform to the requirements of CW 2130 and CW 2160.

(e) The Contractor shall ensure short-term buckling pressures of the installed liner are not exceeded during the grouting process.

(f) A detailed grouting plan shall be submitted for all grouting operations, including the following:

(i) Proposed grouting material complete with physical characteristics.

(ii) Grouting procedure complete with estimated grouting pressures.

(iii) Allowable grouting pressure based on the buckling capacity of the installed liner.

E12.4.6 Manhole Repairs, Modifications, and Installations

(a) Complete manhole repairs, modifications, and new installations identified in the Specifications or on the Drawings in accordance with the drawings and CW 2130.

(b) Manhole rungs removed to facilitate liner installation activities liner must be replaced with new manhole rungs meeting the requirements of CW 2130. New manhole rungs are only required to be installed where the existing manhole diameter is greater 1200 mm. Short sections of smaller diameter risers at pavement level, where the main diameter of the MH barrel is 1200 or larger shall have new manhole rungs installed where required. Review with the Contract Administrator on site prior to completing the work.

E12.5 Inspections

(a) Sewer preparation works shall be inspected in accordance with E9.

(b) Complete panoramic manhole inspections in accordance with E10 wherever manholes are modified or repaired through the course of the work.

E12.6 Quality Control

E12.6.1 Repair Acceptance

(a) Upon completion of the designated repair the Contractor shall clean and perform the pre-lining inspection.

(b) The Contractor shall not be responsible for defects in existing un-repaired sewer lines unless those defects are a direct result of the Contractor's operation.

E12.6.2 Correction of Deficiencies

(a) The Contractor shall correct deficiencies found in the sewer repair at their own cost including the cost of re-cleaning and re-inspection to confirm that the deficiencies are rectified in accordance with these specifications.

E12.7 Measurement and Payment

E12.7.1 Sewer Cleaning

(a) Sewer cleaning will be measured and paid in accordance with CW 2140, except as modified herein:

(b) The total length of cleaning to be paid will be the total length of sewer cleaned to the satisfaction of the Contract Administrator.

(i) The maximum length to be paid will be the manhole to manhole sewer length provided by the Contractor.

(ii) Where partial or incomplete cleaning is completed, the length of sewer cleaned will be the length recorded by the Contractors calibrated inspection equipment or as determined by the Contract Administrator.

E12.7.2 Sewer Preparation and Repairs Prior to Lining

(a) Sewer repairs and preparation for lining will be measured on a lump sum basis for each sewer asset and paid for at the Contract Lump Sum price for "Sewer Repairs and Preparation". Work measured for payment shall include repair of pipe wall defects, removal of intruding services, grease, roots, solid debris cutting, and any other materials, equipment, and labour or preparation work required to complete the rehabilitation work.

E12.7.3 Annulus Grouting

(a) Annulus voids due to the Contractor's method of lining, deficiencies in the liner installation, or any other reason related to the Contractor's workmanship or method of operations shall be filled at the Contractor's expense.

(b) Repair of defective or incomplete annulus grouting shall be at the Contractors own expense.

E12.7.4 Structural Modifications

(a) Manhole demolition, sewer arch modification, and sewer arch reconstruction to facilitate pipeline access will be measured and paid in accordance with E11.5.

E12.7.5 Provisional – New Manhole Installation Within Existing Excavation

(a) New manholes installed within existing pipeline access excavations will be measured on a unit basis and paid for at the Contract Unit Price for “Provisional Manhole Installation within Existing Excavation”. Number of units to be paid will be the total number of manholes installed of each respective size as indicated on Form B: Prices.

(b) Payment for provisional manhole installations shall include all materials, labour, equipment, and other efforts required to install the new manhole within an existing excavation in accordance with the drawings and Specifications. Payment shall exclude any and all Work related to pipeline access, manhole demolition, and sewer arch reconstruction as described, measured, and paid in accordance with E11.5.

E12.7.6 Provisional - Sewer Service Grouting

(a) Sewer service grouting will be measured on a unit basis and paid for at the Contract Unit Price for “Sewer Service Grouting (Sewer Diameter 900 mm and Greater)”. Number of units to be paid for will be the total number of sewer services grouted in accordance with this specification, accepted and measured by the Contract Administrator.

(b) If voids at sewer services are due to the Contractor’s method of reinstatement, deficiencies in the liner installation, or any other reason related to the Contractor’s workmanship or method of operations, grouting shall be completed at the Contractor’s expense.

E12.7.7 Provisional – Replacement of Manhole Rungs

(a) Replacement of existing manhole rungs will be measured and paid for in accordance with CW2130. Payment for replacement of existing manhole rungs shall include removal of existing rungs where required.

(b) Number of units to be paid for will be the total number of rungs instated in accordance with this specification, accepted and measured by the Contract Administrator.

E12.7.8 Provisional – Manhole Components

(a) The supply of replacement of existing manhole components will be measured and paid for on a unit basis for the component supplied at the applicable unit price in Form B. Payment for replacement manhole components shall include supply to site only, except where noted in Form B.

(b) Number of units to be paid for will be the total number of rungs instated in accordance with this specification, accepted and measured by the Contract Administrator.

E12.7.9 Cash Allowance for Provisional Sewer and Manhole Repairs

(a) The Cash Allowance for Provisional Sewer and Manhole repair is intended to be used for the out of scope construction and repair of sewers and manholes, where directed by the Contract Administrator. The Cash Allowance will not be used to pay for the construction of manholes identified on the drawings and within Form B or for the repair of manholes where provisional items exist in Form B.

(b) The City reserves the right to delete any or all of the Cash Allowance from the Contract if the Work intended to be covered by the Cash Allowance is not required, or if the Works intended are found to be more extensive than the provisional Cash Allowance.

(c) Cost of authorized manhole installations shall be evaluated by the methods outlined in C7.4, and a Change Order prepared by the Contract Administrator. Cost of the Change Order will be paid on the Progress Estimate and deducted from the Cash Allowance for Provisional Sewer and Manhole Repairs. If the valuation of the authorized Work exceeds the Value of the Cash Allowance, the Contract Value will be adjusted by the shortfall.

E13. SEWER REHABILITATION

E13.1 Description

E13.1.1 The contractor may choose to use one of the following technologies for rehabilitation of each respective site:

(a) Cured-In-Place Pipe Lining:
  (i) Site 1 – Jessie Ave (S-MA60010557)
  (ii) Site 2 – Jessie Ave (S-MA60009676)
  (iii) Site 3 – Jessie Ave (S-MA70014425)

(b) Sewer Lining using GRP Pipe Segments:
  (i) Site 1 – Jessie Ave (S-MA60010557)
  (ii) Site 2 – Jessie Ave (S-MA60009676)
  (iii) Site 3 – Jessie Ave (S-MA70014425)
  (iv) Site 4 – Portage Ave (S-MA70019493 & S-MA70019487)

E13.2 Materials and Construction Methods

E13.2.1 Sewer lining using Cured-In-Place Pipe shall be completed in accordance with E14.

E13.2.2 Sewer lining using GRP pipe segments shall be completed in accordance with E15.

E13.2.3 Transitions

(a) Transitions shall be completed using a polymer concrete grout compatible with the liner and grouting materials.

(b) Approved products:
  (i) Sikatop 123 as manufactured by Sika Canada Inc., or
  (ii) approved equal in accordance with B7.

(c) Transitions at Liner Termination
  (i) At transition terminations, the interface between the exterior surface of the liner and the host pipe shall be made watertight. The transition shall extend a minimum of 0.5 m into the host pipe from the end of the liner (unless otherwise shown on the Drawings) and provide a gradual transition from the host pipe to the lined section. Grouted transition shall match the internal dimension of the liner and taper to a thickness of no more than 13 mm where meeting the host pipe.
  (ii) Preparation of the host pipe and installation of the approved cementitious grouting product shall follow the manufacturer's recommendations.
  (iii) Transitions shall be constructed while flow bypass arrangements are in place and shall be permitted to cure sufficiently prior to exposure to sewage.

E13.3 Measurement and Payment

E13.3.1 Installation of Structural Sewer Liner

(a) Installation of CIPP liners will be measured and paid for in accordance with E14.8.

(b) Installation of GRP liners will be measured and paid for in accordance with E15.10.

E13.3.2 Reinstatement of Sewer Services

(a) Reinstatement of sewer services will be measured on a unit basis and paid for at the Contract Unit Price for "Reinstatement of Sewer Services". Number of units to be paid for will be the total number of units reinstated in accordance with this specification, accepted and measured by the Contract Administrator.

(b) Payment for sewer service reinstatement will occur after confirmation of sewer service reinstatement via review of the Post-Lining CCTV video. Payment will not be made until the Post-Lining inspection videos have been submitted and reviewed.

E13.3.3 Transitions

(a) Construction of transitions shall be considered incidental to the “Supply and Installation of Structural Sewer Liner” and will not be measured for payment. No additional payment will be made.

E14. SEWER LINING WITH CURED-IN-PLACE PIPE

E14.1 Description

(a) This specification covers the supply and installation of full segment, partial full segment (blind shot), and point repairs (TPR) using cured-in-place pipe (CIPP).

E14.2 Definitions

(a) Cured-in-place-pipe (CIPP) means trenchless sewer rehabilitation by installing a resin-felt composite structure which when cured will form a continuous-close fit liner within an existing sewer.

(b) Full segment CIPP means CIPP extending from manhole to manhole or manhole to node (wye or tee connection to another sewer).

(c) Partial full segment CIPP means CIPP extending from a manhole to an intermediate point within the sewer and will generally be longer than ten metres in length.

(d) Non-Reinforced CIPP liners will be considered any CIPP liner constructed from non-reinforced felt.

(e) Reinforced CIPP liners will be considered any CIPP liner constructed from either a carbon fibre or glass fibre reinforced felt.

(f) Minimum material requirements for CIPP shall conform to ASTM D5813 “Standard Specification for Cured-In-Place Thermosetting Resin Sewer Pipe” and the supplemental requirements are noted herein.

E14.3 Submittals

E14.3.1 Installation of CIPP Liners shall not commence prior to submission and review of the submissions identified herein by the Contract Administrator.

E14.3.2 Provide CIPP designs for review by the Contract Administrator in accordance with E2 and a minimum of five (5) Business Days prior to manufacturing of the CIPP liners. CIPP liner shop drawings shall include the following information:

(a) CIPP liner thickness designs using ASCE MOP 145 design methods shall be sealed by a Professional Engineer, registered in the Province of Manitoba, experienced in the design of liner rehabilitation systems. Liner designs using WRc design equations provided in Appendix D and in accordance with E14.4.7 are not required to be sealed.

(b) CIPP thickness computations including all specified design checks identified in E14.4. Identify design assumptions based on a review of the Sewer Maintenance Inspection that differ from the information provided in the Specifications for the existing sewer design conditions.

(i) Tabular design summaries are acceptable as a design submission for all small diameter liners (considered less than 450 mm in diameter). Tabular design submissions must meet all requirements outlined herein and include all design inputs and assumptions.

(ii) Design submissions for all large diameter sewers (considered equal to or greater than 450 mm in diameter) shall include all calculations and be submitted on individual calculation sheets.

(c) Name and manufacturer of the resin and felt tube proposed for each CIPP.

(d) Means of liner installation and curing method (e.g. air/steam, water, air/UV).

(e) CIPP material properties used for design.

(f) Host pipe measurements identified in E9.2.1 including the following:

(i) Sewer length;

(ii) Host pipe dimensions;

(iii) Sewer invert depths

(g) Liner sizing. Identify under-sizing from the measured circumference and anticipated liner stretch to form a close fit with the host pipe.

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

E14.3.3 Provide resin samples within five (5) Business Days of a request by the Contract Administrator. Samples shall be provided as follows:

(a) Arrange for the manufacturer of the resin to forward a reference sample of each type of resin proposed for use on the works to a test laboratory designated by the Contract Administrator to be used as a comparative reference sample for infrared spectrum testing.

(b) When requested by the Contract Administrator, provide a representative sample from each batch of resin to be used on the project before adding the catalyst at the wet-out facility.

(c) The Contract Administrator will arrange and pay for an infrared analysis of the samples, if required for the project.

E14.3.4 Submit a liner impregnation protocol that provides information on the following a minimum of five (5) Business Days prior to wet out of liners:

(a) Resin impregnation method.

(b) Designated location of the wet-out facility.

(c) Documentation that the resin to be used has not exceeded its shelf life as recommended by the manufacturer of the resin.

(d) Volume and weight of resin to be impregnated into each liner and repair section including the proposed excess allowance for polymerization and migration (typically 7%) into cracks and joints of the host pipe.

(e) Roller gap setting required to provide the final installed CIPP thickness based on the proposed volume of resin.

(f) Details of the wet-out procedure for internal point repair CIPP.

(g) Details of the field wet-out procedure for TPR's.

E14.3.5 Submit a liner installation protocol that provides information on the following a minimum of five (5) Business Days prior to installation of CIPP:

(a) Proposed main line and sewer service flow control arrangements in accordance with E8. Note, flow control plans may be submitted separate from the liner installation protocol.

(b) Installation and curing method complete with proposed equipment.

(c) A full curing protocol, including:

(i) Curing times (heat up, curing, cool down)

(ii) Curing temperatures

(iii) Inversion and cure pressures (maximum and minimum)

(iv) Rate of travel of the UV light train and amount of lamps in operation in the case of UV cures.

(d) Provide the maximum allowable axial and longitudinal tensile stress for the fabric tube and the arrangement for monitoring pull-in forces during installation if liner insertion is to be by pull-in methods.

(e) Number and location of heat source monitor gauges.

(f) Number and location of thermistors to be used for monitoring the temperature of the liner during the curing process.

(g) Estimated length of time required to reinstate the main line sewer and sewer services.

(h) Additional information may be required by the Contract Administrator for complex installations. This may include site setup details, over the hole wet-out procedures, and other information pertinent to the review and evaluation of the Contractors proposed construction methods.

(i) Submission Requirements:

(i) Tabular installation protocols showing multiple installations are acceptable for all small diameter liners (considered to be less than 450 mm in diameter), provided they meet all other requirements outlined herein.

(ii) Installation protocols for all large diameter sewers (considered equal to or greater than 450 mm in diameter) shall be submitted as individual submissions.

E14.3.6 Submit a sampling protocol a minimum of five (5) Business Days prior to installation of the first CIPP liner. The protocol shall include:

(a) Detailed procedure for preparing plate samples, including a sample plate sample preparation quality control form. The Contractor shall provide a filled out plate sample preparation form for each plate sample provided, signed off by the wet out supervisor and project manager affirming the correct preparation of the samples. The form shall include the dimensions of the sample, direction of the circumferential fibres, and date of preparation, location of preparation.

(b) Sampling procedures for plate samples, confined pipe samples.

(c) Description of confined pipe forms to be utilized.

(d) Procedure, complete with diagram for placement of heat sink (sand bags) for confined pipe samples.

(e) Sizes for all samples to be obtained.

(f) Liner repair products and procedures for direct cut samples.

E14.3.7 Submit a styrene management plan in accordance with E14.6.9 a minimum of five (5) Business Days prior to installation CIPP liners requiring styrene management. All styrene management plans shall include sufficient details on:

(a) Regulatory compliance considerations for discharge based on the Contractor's proposed resin selection, curing method, and discharge location for steam condensate or cure water, first flush, etc.

(b) The means, methods, and techniques employed to mitigate styrene levels to within acceptable limits for the site-specific application, including:

(i) Resin selection to eliminate or mitigate styrene levels;

(ii) Cure considerations to mitigate excessive styrene volatilization;

(iii) Handling considerations, post cure to mitigate levels discharged to aquatic or other environments that may be deleteriously impacted by excessive styrene levels.

E14.4 Design of CIPP Liners

E14.4.1 Design Objectives

(a) Maximizing the structural enhancement of the sewer by installing a close-fit CIPP.

(b) Maximise the internal diameter of the rehabilitated sewer with as little impact on the hydraulic capacity of the sewer as possible.

(c) Reducing infiltration and exfiltration.

(d) Preventing root intrusion.

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

(f) Minimizing sewer service disruption during rehabilitation.

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

(h) Minimizing disturbance to pavements and boulevards.

(i) Minimizing disruption to vehicular and pedestrian traffic.

(j) Minimizing the impact of construction on commercial, industrial, and institutional facilities.

(k) Additional design objectives for internal point repair CIPP include.

(i) Providing a smooth transition between the internal point repair CIPP and the host pipe to prevent the build-up of solids and minimize wear on the repair due to routine sewer cleaning and other maintenance activities.

(ii) Filling any existing voids outside the sewer at the point of repair.

(l) Select a CIPP product and construction approach for rehabilitation with the intent towards maximizing the achievement of these design objectives.

E14.4.2 General

(a) Chemical and mechanical properties of the liner based on the waste stream to establish and minimum design life of 50 years.

(b) Size CIPP in accordance with the design objectives to provide a close-fit to the host pipe with no annulus except for the maximum allowable diametric shrinkage due to curing permitted in ASTM D5813.

(c) Design features of internal point repair CIPP shall include:

(i) Design internal point repair CIPP as a gravity pipe in a fully deteriorated pipe condition and the depth of cover calculated based on the specific location of the repair in the sewer or sewer service.

(ii) Tapered end sections to promote a smooth transition from the repair to the host pipe.

(iii) A means to facilitate flow through by-pass of existing dry weather flow during the course of the repair.

(d) Long-term values for flexural modulus of elasticity and flexural strength will be considered to be the projected value at 50 years of a continuous application of the design load based on the specific resin and felt composite as established by ASTM D2990 (or equivalent ISO or otherwise accepted testing method) based on an applied stress level of 25% of the yield strength of the liner and approved for use in the pre-qualification process. A minimum test length of 10,000 hours is required. The Contractor shall provide supporting long term test data conforming to ASTM D2990 for any resin and felt composites not approved for use in the prequalification process. Where long-term flexural strength creep retention testing data is not available, long-term flexural modulus creep retention values shall be utilized for design for both properties.

(e) The Contractor shall also provide short term test data on the modulus of elasticity and flexural strength of the in place composite structure conforming to ASTM D790 for any resin and felt composites not approved for use in the prequalification process.

E14.4.3 CIPP Liner Thickness Requirements

(a) The contractor may, at their discretion, utilize one of the two design methods for the design of CIPP liners:

(i) Design methods outlined in the WRc Sewer Rehabilitation Manual. Refer to E14.4.7

(ii) Design methods outlined in ASCE MOP 145. Refer to E14.4.8.

E14.4.4 Hydraulic Design Checks

(a) Perform a design check to confirm that the full flow hydraulic capacity of the CIPP will be equal to or greater than the existing sewer. Use “Manning’s” formula with assumed ‘n’ value of 0.012 for the CIPP and 0.014 for the existing sewer. Report any sewers showing a decrease in post lining flow capacity from existing conditions.

E14.4.5 Design and Loading Parameters for Non-Circular Sewers

(a) Unless otherwise specified, the following parameters shall be used to determine the design pressures exerted on the exterior of the liner.

(b) External hydrostatic and soil loads shall be calculated as specified herein using the following parameters:

(i) Unless otherwise specified, the groundwater table shall be assumed to be 2.0 m below the existing ground surface.

(ii) External hydrostatic pressure shall in all circumstances be calculated to the invert of the existing host pipe.

(iii) Calculate soil loads based on saturated soil unit weight of 18.85 kN/m^3 (1922 kg/m^3).

(iv) A lateral earth pressure coefficient (K) of 0.33 shall be used to calculate pressures applied to vertical critical sections.

(c) The following live loads shall be included in the design:

(i) Sewers crossing beneath rail lines: Where identified, applied soil pressures from a Cooper E80 rail load shall be estimated and utilized in the design of the liner. Rail loads shall include a track allowance dead load of 297 kg/m. Applied rail loads at depth shall be calculated using the Boussinesq solution for distribution of soil stresses from surface point loads. Impact factors for rail loads shall be calculated in accordance with the AREMA Manual for Railway Engineering.

(ii) All other sewers: The applied soil pressures from an AASHTO HS 25 design truck unless a higher or lower value is indicated in the contract specifications shall be estimated and utilized in the design of the liner. Applied soil pressures from AASHTO design truck loads shall be estimated in accordance with AASHTO LRFD Bridge Design Specifications, Seventh Edition (2014).

(d) Unless otherwise specified, applied soil pressures at depth caused by superimposed surface loads shall be calculated using the Boussinesq solution for distribution of stresses from surface point loads.

(e) Soil Covers.

(i) The Contractor shall utilize the maximum invert depths identified in Appendix B and as verified on site for design purposes except where minimum soil covers are less than 1.5 m. Where minimum soil covers are less than 1.5 m, the Contractor shall complete design checks for both the minimum and maximum soil covers.

(ii) Where applicable, a minimum cover depth has been provided in Appendix B to be used for live load calculations.

(f) Modulus of soil reaction (E’s) will be assumed to be 6900 kPa unless otherwise specified.

E14.4.6 Existing Sewer Design Conditions

(a) The assessment of the liner system design conditions and site-specific repairs required to accommodate lining were based on the conditions observed from sewer inspections that were performed as part of the City of Winnipeg’s Sewer Inspection Program. Refer to E12.3.1(a) regarding obtaining copies of the existing inspections.

(b) The site-specific design conditions and repair requirements applicable to each CIPP lining location are shown in Appendix A and Appendix B.

(c) LASER scans of the sewers to be rehabilitated are not available as part of the Tender information. Should the Contractor wish to procure LASER profiling scans of the

existing sewers to facilitate liner design, this may be completed at the Contractor's expense as part of the Pre-Design Inspection and in accordance with E9.2.2(b) and E9.7. If ASCE MOP 145 design methods are chosen for the design of close-fit liners, LASER profiling of the sewer to determine critical host pipe geometry shall be required.

E14.4.7 WRc Sewer Rehabilitation Manual Design Requirements

(a) If selected, the selection of CIPP liner minimum thicknesses shall be completed in accordance with the appropriate design equations provided in Appendix D. The design equations provide thickness requirements based a range of long-term flexural strength and modulus values for the conditions noted in the design tables.

(b) The Contractor may utilize the WRc Type 2 Design curves for the following sewers:
  (i) All sewers.

(c) CIPP liners shall be designed to the following design condition:
  (i) Site 1 – Jessie Ave (S-MA60010557): Partially Deteriorated;
  (ii) Site 2 – Jessie Ave (S-MA60009676): Partially Deteriorated;
  (iii) Site 3 – Jessie Ave (S-MA70014425): Fully Deteriorated;

(d) The Contractor shall determine the required liner wall thickness using the following procedure:
  (i) Use the reviewed and accepted long-term flexural strength and modulus for the lining product proposed for use.
  (ii) Determine the depth and load conditions for the liner.
  (iii) Using the long-term flexural strength and modulus determine the minimum liner thickness from the respective design equation using applicable design conditions.
  (iv) The required minimum liner thickness shall be the greater of the thicknesses determined from the design equation for flexural modulus and flexural strength.
  (v) Select a nominal liner thickness greater than the minimum determined through the above method.

(e) Minimum material properties:
  (i) Material properties shall conform to the material requirements specified herein and fall within the range of material properties noted in Appendix D.

(f) The minimum liner thicknesses included herein relate to long term loading conditions only and have not considered short term installation loads. The Contractor is responsible for confirming the structural stability of the CIPP liner under the proposed grouting scheme.

(g) The Contractor shall confirm the design conditions stipulated with the design equations and advise the Contract Administrator of any conditions more adverse than those identified with the designs. If field conditions are found to be more adverse than those identified with the designs the Contract Administrator (designer) will provide new design curves for the design conditions measured on site. Increases to the liner thickness based on the discovery of more adverse design conditions will be considered a Change in Work as defined by the General Conditions.

E14.4.8 ASCE MOP 145 Design Requirements

(a) If selected, the Contractor shall design the lining system in accordance with ASCE MOP 145.

(b) Liner dimensions and geometry used in the design of close-fit liners must be consistent with the cross section of the existing host pipe. The critical cross section of the host pipe to be used in design must be determined via a pre-design inspection (E9.2.2(b)) using LASER profiling methods in accordance with E9.7 prior to design of the liner.

(c) Design shall utilize a LRFD design approach as specified in ASCE MOP 145. All load and resistance factors shall conform to ASCE MOP 145.

(d) Host Pipe Condition/Liner Design State for CIPP liners:
  (i) Site 1 – Jessie Ave (S-MA60010557): State II;
  (ii) Site 2 – Jessie Ave (S-MA60009676): State II;
  (iii) Site 3 – Jessie Ave (S-MA70014425): State II;

(e) Minimum annular gap for design: 1 mm

(f) Minimum long-term deflection for design: 5%

(g) The Contractor is responsible for confirming the adequacy of the liner for all short-term (installation) and long-term loading conditions.

E14.5 Materials

E14.5.1 Non-Reinforced CIPP Products

(a) Non-Reinforced CIPP products shall conform to the requirements of ASTM F1216 and D5813.

E14.5.2 Reinforced CIPP Products

(a) Reinforced CIPP products shall conform to the requirements of ASTM F2019 and D5813. Notwithstanding ATSM F2019, the fabric tube may be reinforced with either glass or carbon fibres, as required to achieve the desired short- and long-term material properties and may be installed via inversion methods.

(b) Reinforced CIPP systems utilizing UV curing methods may be utilized.

E14.6 Construction Methods

E14.6.1 Verification of Existing Sewer Dimensions

(a) Verify dimensional requirements of each sewer to be rehabilitated prior to manufacture of the CIPP tube in accordance with E9.2.1.

E14.6.2 Sewer Cleaning

(a) Remove loose debris, solid debris, roots, and grease in accordance with E12 and CW 2140 in order to adequately prepare the sewer for lining.

E14.6.3 Sewer Preparation and Repairs Prior to Lining

(a) Perform sewer preparation and repairs as indicated in the specification and drawings.

(b) Complete the following internal host pipe repairs as indicated in Appendix A - Host Pipe Conditions and Inspections in accordance with E12 of this specification.
  (i) Fill in holes and patch deteriorated sections of the host sewer pipe wall.
  (ii) Fill voids in the surrounding backfill flush with the inside surface of the sewer pipe.
  (iii) Reshape host sewer pipe invert to the original dimension and cross section at locations where the invert has completely deteriorated.
  (iv) Remove intruding sewer services in accordance with CW 2140.
  (v) Sewer service grouting in accordance with E12.

E14.6.4 Manhole and Catch Basin Modifications

(a) Remove and replace manhole frames, covers, rungs and risers required to facilitate the CIPP installation in accordance with E12 and CW 2130.

E14.6.5 Continuous Temperature Monitoring

(a) Where specified, the Contractor shall install the CIPP liners complete with a fibre optic thermal sensing cable (to be left in place) that is capable of continuously monitor curing temperatures along the entire length of CIPP liner. The cable and recording

equipment shall be capable of temperature readings every 450 mm in real time. Curing data logs shall be submitted to the Contract Administrator with the Quality Control records.

(b) Continuous temperature monitoring shall be utilized on the following installations:

(i) Air/steam installations 900 mm and greater in diameter;

(ii) water installations 1200 mm and greater in diameter; and/or

(iii) as specified in E14.7 and/or on the Drawings.

E14.6.6 Installation of CIPP

(a) Install liners by inversion methods in accordance with ASTM F1216 or by pull-in methods in accordance with ASTM F1743 or ASTM F2019.

(b) Full segment and partial full segment CIPP shall be cured by hot water, steam, or UV light sources.

(c) Carry out workmanship in accordance with ASTM D5813.

(d) Trim ends of CIPP neatly to fit flush with interior vertical surface and manhole benching and seal to make watertight.

(e) Fill annular spaces where the CIPP does not make an adequate seal with the host pipe at manholes, termination points and sewer services due to broken or misaligned pipe with a resin-rich mixture compatible with the CIPP.

(f) Extend limits for internal point repairs a minimum of 300 millimetres in each direction beyond the limits of the defect to be repaired. Extend internal point repairs that terminate at sewer service services a minimum distance of 300 millimetres beyond the limit of the service.

(g) Ensure termination points of internal point repairs provide a smooth and uniform flow transition to the host pipe for the full circumference of the repair.

E14.6.7 Reinstatement of Sewer Services

(a) Reinstate all active and indeterminate sewer services including CB leads and utility drains to 100% of the original cross-sectional area.

(b) Cut out openings for sewer services from inside the lined sewer by manual means or with a television camera and a remote-controlled cutting device.

(c) Remove sharp edges from opening cut outs and provide a smooth rounded lip.

(d) Sewer Service Grouting

(i) Sewer service grouting may be required if visible voiding is present at the service during the review of Post Lining Video Inspection.

(ii) Complete sewer service grouting in accordance with E12.

(e) Ensure that all cut-outs for sewer connections are removed from the sewer and are prevented from being washed into the sewer system downstream of the repair location. Damages resulting from failure to capture CIPP cut-outs will be the direct responsibility of the Contractor.

E14.6.8 Annulus Grouting

(a) Complete annulus grouting in accordance with E12 where identified by the Contract Administrator during the Post Lining Video inspection.

E14.6.9 Styrene Management

(a) Under no circumstances shall cure water or condensate containing styrene be discharged into a land drainage sewer or any other direct connection to surficial drainage courses or facilities.

(b) The Contractor shall develop and implement a styrene management plan for each site that could reasonably be impacted by planned or inadvertent discharge of styrene into the land drainage system, based on the site-specific conditions for the CIPP installation and boundary conditions at that site.

(c) The Contractor shall submit Styrene Management Plan(s) in accordance with E14.3.7 for each identified site a minimum of five (5) Business Days prior to lining.

(i) Styrene Management Plans are required for the following locations:

- N/A

(d) Irrespective of the need for a styrene management plan, the contractor shall not discharge styrene laden waters to a water course, land drainage sewer, or other surface drainage feature.

(e) The Contractor's Styrene Management Plans shall include at least one of the following methods of control:

(i) Use of styrene free resins;

(ii) Use of on-site treatment systems where hot water curing methods are utilized;

(iii) 100% condensate capture and off-site disposal to the WWS system;

(iv) On-site monitoring to verify no residual styrene is discharged to the environment where UV curing methods are used;

(f) The Contractor shall be responsible to undertake sufficient monitoring to confirm and demonstrate that discharge levels are consistent with the styrene management plan's stated discharge limit objectives. Provide a report on styrene monitoring results upon completion of the liner installation.

E14.6.10 Quality Control Records

(a) Maintain the following Quality Control records of the work and provide to the Contract Administrator after completion of the work.

(i) Summary of the resin impregnation process including:

- Volume of resin supplied.
- Excess quantity of resin added during the wet out to account for polymerization and migration into the host pipe.
- Roller gap setting.
- Resin catalyst(s) used.
- Time and location of the wet out.
- Means taken to store and transport the resin impregnated CIPP from the wet-out facility to the job site.

(ii) Means of curing liners.

(iii) Continuous log of pressure maintained in the liner during the curing period.

(iv) Pulling force used to pull or winch CIPP into place in the host sewer and measured liner elongation.

(v) Continuous log of temperature at boiler in and out and at all thermistors placed between the host pipe and the liner at all manholes during the initial cure, cure, and cool down periods.

(vi) Where specified, the Contractor shall install the CIPP liners complete with a fibre optic thermal sensing cable (to be left in place) that is capable of continuously monitor curing temperatures along the entire length of CIPP liner. The cable and recording equipment shall be capable of temperature readings every 450 mm in real time. Curing data logs shall be submitted to the Contract Administrator with the Quality Control records.

(vii) For UV cures, monitoring shall also include the rate of travel of the UV assembly and the amount of lamps in operation during the curing process.

(viii) Continuous temperature monitoring logs.

E14.6.11 CIPP Samples for Quality Assurance Purposes

(a) The Contract Administrator will coordinate and pay for CIPP sample testing to confirm the CIPP flexural strength, flexural modulus and thickness in accordance with the requirements of ASTM D5813, D790, and ASTM D3567.

(b) The Contractor shall provide the following samples from each CIPP liner:
  (i) Confined test sample in accordance with E14.6.11(j);
  (ii) Plate sample in accordance with E14.6.11(k).

(c) If it can be demonstrated that it is impractical to obtain confined test samples due to CIPP size and/or site-specific conditions, then results from test plate sample results modified in accordance with Clause E14.6.11(e) of this specification will be used to confirm flexural strength and flexural modulus.

(d) Schedule the installation of liners for which confined pipe samples are impractical to obtain after a minimum of three (3) previous CIPP linings on the same project have been completed and confined pipe and test plate samples have been secured to provide collaborative testing.

(e) Where plate sample test results are used for confirmation of CIPP physical strengths and/or design reconciliation purposes, they will be reduced by the statistical difference between plate and pipe sample testing results on the project as described in E14.6.11(d). Where no statistical correlation can be found due to poor testing results or lack of comparison samples, a 15% reduction will be applied to both flexural strength and modulus results obtained from plate sample testing.

(f) In larger sewer sizes where it is not possible to provide a full diameter confined test sample, and where requested by the Contract Administrator, the Contractor shall cut a sample directly from the installed CIPP liner in accordance with E14.6.11(l).

(g) Where confined test samples cannot be obtained, or where confined test samples forms do not match the inside dimensions of the host pipe, the Contractor shall obtain and provide the Contract Administrator with pre- and post-lining measurements taken in accordance with Clauses E14.6.1 and E9.2.1 of this specification to confirm in-place liner thickness.

(h) The Contract Administrator will review CIPP liner thickness results taken from test plates or unconfined samples on a case-by-case basis. Liner thickness results of test plate samples will not be considered where confined test samples have also been taken.

(i) All samples shall be clearly and legibly labelled as follows:
  (i) City of Winnipeg tender number
  (ii) City of Winnipeg asset number
  (iii) Date of installation
  (iv) Street name

(j) Confined Test Samples
  (i) Provide necessary forms of the same diameter as the host pipe and secure a minimum 300 millimetre long full diameter confined test sample from each CIPP and internal point repair. Large diameter CIPP liners utilizing reinforcing may require a longer sample length, confirm with the Contract Administrator.
  (ii) Locate the test sample from inside an intermediate manhole or at a termination point and invert through the form.
  (iii) Confined test sample forms shall be covered with sandbags or a similar medium to form a heat sink that approximates the install conditions of the CIPP liner in the host sewer.
  (iv) Cut the CIPP sample to coincide with multi-piece form if used for CIPP larger than 450 millimetres in diameter to facilitate removal from the manhole.
    - Identify the sewer where the liner sample is from on the form or sample itself if no form and provide to the Contract Administrator intact in the form.

(k) Test Plate Samples
  (i) Produce and provide to the Contract Administrator test plate samples of each CIPP liner installed.

(ii) Test plate samples shall be produced from a full thickness portion of the liner (where possible), shall contain the same resin and hardener ratios and volumes used in the CIPP liner wet-out. Ensure the test plate is clamped as close to the final installation thickness of the CIPP liner as possible.

(iii) For unreinforced liners the minimum dimension of test plate sample shall be 300mm x 300mm.

(iv) For reinforced liners the test plate sample shall be sized to accommodate a 32:1 span to depth (liner thickness) ratio. Circumferential reinforcing fibres shall be orientated in the long dimension of the test plate sample. Minimum dimensions for the test sample shall be as follows. Confirm the required test plate size for reinforced liners with the Contract Administrator prior to the CIPP installation.

- Width: 13 times the thickness of the liner
- Length: 35.2 times the thickness of the liner

(v) Prepare test plate samples on-site from the actual CIPP and cure in the following manner:

- For the full duration and comparable temperature as the liner being installed, and
- In a clamped mold placed in the downtube or manhole for water-cured liners, or
- In a clamped mold placed in a container filled with uniformly distributed steam from the installation manhole for steam-cured liners.

(l) Direct Samples

(i) Where directed by the Contract Administrator, the Contractor shall obtain a sample of the installed CIPP liner from within the host pipe.

(ii) Direct samples of the CIPP liner shall be a minimum of 300mm x 300mm for unreinforced liners.

(iii) For reinforced liners, the sample shall be sized to accommodate a 32:1 span to depth (liner thickness) ratio. Circumferential reinforcing fibres shall be orientated in the long dimension of the sample. Minimum dimensions for the test sample shall be as follows. Confirm the required sample size for reinforced liners with the Contract Administrator prior to obtaining the sample.

- Width: 13 times the thickness of the liner
- Length: 35.2 times the thickness of the liner

(iv) Cut the test sample from a location where no defects were noted in Appendix A – Host Pipe Conditions and Inspections and at the 10:00 o'clock or 2:00 o'clock position in circular sewers. Direct samples from reinforced liners shall be oriented with the long dimension vertically in the straightest portion of the sewer or as directed by the Contract Administrator. Confirm sampling locations with the Contract Administrator prior to work.

(v) For repairs up to 25 mm in thickness, grout the area where test sample was taken with a resin-rich repair product such as an epoxy-based repair system that is compatible with the liner system and specifically designed for the nature, size and thickness of the patch being repaired to form a smooth watertight patch flush with liner.

- For repairs over 25 mm in thickness, polymer modified cementitious grout compatible with the liner materials may be used.

(vi) Where direct samples are taken and repaired, the Contractor shall submit CCTV inspection video clearly showing the sample location repair.

E14.6.12 Infrared Spectroscopy

(a) The Contract Administrator may arrange for testing to compare the infrared spectrum of the resin field samples supplied from the wet-out to the reference spectrum

generated from the resin sample provided by the resin manufacturer to verify installed material acceptability at no cost to the Contractor.

E14.6.13 Post Construction Design Review and Reconciliation for Total Performance

(a) The Contract Administrator will review quality assurance testing results and inspection videos to confirm that the completed CIPP meets the 50-year design life structural requirements prior to issuance of Total Performance. The Contract Administrator will advise of any discrepancies between the constructed CIPP and the design requirements.

(i) Deficiencies in the physical testing results for CIPP liners indicating low material properties or thicknesses will be flagged for design reconciliation by the Contractor.

(ii) Defects in CIPP liners will be reviewed on a case-by-case basis by the Contract Administrator. The Contract Administrator will consult with the Contractor to assess the structural and performance ramifications of the defects, taking into account the condition of the host pipe prior to lining, the CIPP installation conditions, and the long-term use of the sewer.

(b) When any of the sample test results (flexural modulus, flexural strength or thickness) or defects in the installed liner are not in accordance with the design submissions, then the liner shall be deemed apparently deficient until the sample test results are reconciled, if possible, as described herein. If, after reconciliation, the liner is still found to be deficient, the Contractor shall provide a plan for remedial action that is acceptable to the Contract Administrator.

(c) Where a CIPP liner has been deemed deficient, the Contractor shall:

(i) Complete a design reconciliation in accordance with E14.6.13(d) for each installed liner where sample test results indicate material properties or installed liner thicknesses lower than the required minimums in the accepted design submissions.

(ii) Perform a review of the liner design conditions to confirm that the assumed design conditions are reflective of the actual installed conditions, such as confirmation of actual host pipe ovality, determination of a more representative groundwater elevation locally through monitoring, and/or supplemental strength testing and thickness measurements of the installed liner.

(iii) Repair sections of CIPP removed for supplemental testing by placing a full circumference internal point repair of the same thickness as the full segment liner over and extending 300 mm beyond each side of the cut section.

(iv) Install a supplemental CIPP of the required thickness to structurally enhance the installed CIPP if supplemental testing fails to confirm the CIPP will meet the 50-year design life requirement.

(v) Review all proposed remedial actions with the Contract Administrator prior to implementation.

(vi) The Contractor shall perform further testing, monitoring, reconciliation calculations and structural remediation at their own cost.

(d) Design Reconciliation

(i) The designs for each liner found to be apparently deficient shall be revisited using the reported material properties from the quality assurance testing.

(ii) Design reconciliation calculations shall be completed in accordance with the design requirements found herein, originally submitted designs, and the observed site conditions. Any deviations from previously accepted design conditions required to reconcile the design calculations shall be clearly identified and come complete with justification and backup for the deviation from the original design.

(iii) Short-term CIPP strength values shall be reduced to account for creep based on the creep retention values recommended in the pre-qualification

submissions to assess the suitability of the liner to meet the 50-year design life requirement. Refer to E14.4.2(d).

(iv) In all cases, testing results from pipe samples shall govern over the results from plate samples for a given liner. The results from plate sample testing shall be reduced as per E14.6.11(e) for reconciliation purposes.

(v) The use of full enhancement factors in this analysis will be limited to liners that are confirmed by visual classification to be close-fit liners based on the post-lining sewer inspection.

(vi) Design reconciliation calculations shall be submitted in accordance with E2 and sealed by a Professional Engineer licensed in the Province of Manitoba and experienced in the design of CIPP liners.

E14.7 Site Specific Design and Installation Considerations

E14.7.1 Site specific design and installation conditions have been identified for the assets listed below:

(a) Blind Shots - The following assets have been identified as terminating directly into the downstream sewer:

(i) N/A

(b) Existing Sewer Conditions – The following existing sewer conditions are drawn to the Contractor's attention:

(i) N/A

(c) Existing Site Conditions – The following site conditions and related controls are drawn to the Contractor's attention:

(i) N/A

E14.8 Measurement and Payment

E14.8.1 Verification of Existing Sewer and CIPP Dimensions

(a) Verification of existing sewer and CIPP dimensions shall be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

E14.8.2 Sewer Cleaning

(a) Sewer cleaning will be measured and paid for in accordance with E12.

E14.8.3 Sewer Preparation and Repairs Prior to Lining

(a) Internal sewer pipe repairs will be measured and paid for in accordance with E12 for the type of work done.

E14.8.4 CIPP Installation

(a) Liner installation will be measured on a length basis for each size and paid for at the Contract Unit Price for "Supply and Installation of Structural Sewer Liner (CIPP/GRP)". Length to be paid will be the total length of CIPP supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

(b) Full segment CIPP measurement will be made horizontally at grade, above the centerline of the pipe from center to center of manholes. The maximum length to be paid will be the manhole-to-manhole sewer length provided by the Contractor.

(c) Partial full segment CIPP measurement will be made from the center of one manhole to the termination point of the CIPP as measured by the post lining video inspection. Partial full segment CIPP installed beyond the limits identified by the Contract Administrator during review of the pre-lining video shall not be measured for payment.

(d) CIPP point repairs will be measured by the post lining video inspection. CIPP point repairs installed beyond the limits identified by the Contract Administrator during review of the pre-lining video shall not be measured for payment.

(e) Payment for CIPP lining will be made on the following schedule:

(i) 80% of the payment will be made upon satisfactory completion of the CIPP installation work for each liner.

(ii) The remaining 20% of the payment will be made upon confirmation of the CIPP strength and delivery and acceptance of all required submissions, shop drawings, and reports and rectification of all identified defects.

(f) Where CIPP liners are improperly installed due to negligence on the part of the Contractor, payment for the CIPP liner will be withheld until the identified issues have been rectified.

E14.8.5 Reinstatement of Sewer Services

(a) Reinstatement of sewer services will be measured and paid for in accordance with E13.3.2.

E14.8.6 Sewer Service and Annulus Grouting

(a) Sewer service and annulus grouting will be measured and paid for in accordance with E12 for the type of work done.

E14.8.7 Quality Control Records

(a) Preparation of quality control records will be considered incidental to the CIPP installation and will not be measured for payment. No separate payment will be made.

E14.8.8 Test Samples

(a) All work and materials required for the preparation, recovery, and repair of CIPP test samples will be considered incidental to the CIPP installation and will not be measured for payment. No separate payment will be made.

E14.8.9 Continuous Temperature Monitoring

(a) All work and materials required for the supply, preparation, installation, and operation of continuous temperature monitoring apparatus will be considered incidental to the CIPP installation and will not be measured for payment. No separate payment will be made.

E14.8.10 Styrene Management

(a) All work and materials required for the management of styrene will be considered incidental to the CIPP installation and will not be measured for payment. No separate payment will be made.

E15. SEWER LINING WITH GRP PIPE SEGMENTS

E15.1 Description

(a) This Specification shall govern the supply and installation of rigid GRP sewer liner segments.

(b) GRP lining may be used for both Partially Deteriorated and Fully Deteriorated host pipe conditions.

E15.2 References:

(a) WRc Sewerage Rehabilitation Manual, 4th Edition;

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

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

(d) CSA A23.2 – Test Methods and Standard Practices for Concrete; and,

(e) ASCE MOP 145 – Design of Close-Fit Liners for the Rehabilitation of Gravity Pipes.

E15.3 Submittals

E15.3.1 Installation of GRP panels shall not commence prior to submission and review of the submissions identified herein by the Contract Administrator.

E15.3.2 Provide GRP liner designs for review by the Contract Administrator in accordance with E2 a minimum of five (5) Business Days prior to manufacturing of the GRP panels. GRP liner shop drawings shall include the following information:

(a) GRP liner designs using ASCE MOP 145 design methods in accordance with E15.4.5 shall be sealed by a Professional Engineer, registered in the Province of Manitoba, experienced in the design of liner rehabilitation systems. Liner designs using WRc design equations provided in Appendix D and in accordance with E15.4.6 are not required to be sealed.

(b) GRP panel thickness computations including all specified design checks identified in E15.4. Identify design assumptions based on a review of the Sewer Maintenance Inspection that differ from the information provided in the Specifications for the existing sewer design conditions. Design submissions shall include all calculations and shall be submitted on individual calculation sheets for each liner;

(c) Name and manufacturer of the GRP panels;

(d) GRP material properties used for design. Include all relevant testing information stipulated herein to confirm long term material properties used in design;

(e) Grout mix design and relevant constituent properties for the grout mixture;

(f) Pipe joint assembly requirements;

(g) Panel blocking arrangement as it relates to short term buckling design checks;

(h) Short-term buckling checks for grouting operations;

(i) Host pipe measurements identified in E9.2.1, including the following:

(i) Sewer length;

(ii) Host pipe dimensions; and,

(iii) Sewer invert depths.

(j) Pre-design inspections were specified

(k) Shop drawings for the GRP panels showing dimensions, joint details, finished surface profiles, and any other information required to permit review of the design

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

E15.3.3 For Type 1 liners, submit demonstration shear bond testing results in accordance with E2 a minimum of five (5) Business Days prior to commencement of lining work.

(a) The testing report shall be submitted in accordance with IGN-4-34-02.

E15.3.4 Submit a construction protocol in accordance with E2 a minimum of ten (10) Business Days prior to commencement of lining work. The construction protocol shall include the following:

(a) Proposed main line and sewer service flow control arrangements in accordance with E8. Note, flow control plans may be submitted separate from the liner installation protocol.

(b) Pipe assembly details including joint assembly method, liner placement methods, and blocking arrangements;

(c) Required pipe assembly materials (joint adhesives and sealants);

(d) Bulkhead construction for grouting;

(e) Construction methods for tapered transitions; and,

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

E15.3.5 Submit a grouting protocol in accordance with E2 a minimum of five (5) Business Days prior to commencement of liner installation. The grouting protocol shall include the following:

(a) Grout sample testing results in accordance with E15.6.1.

(b) Minimum and maximum grouting pressures as confirmed by submitted design calculations;

(c) maximum allowable liner deflection/deformation as confirmed by submitted design calculations;

(d) quality assurance and quality control program to verify grout physical characteristics;

(e) grout supplier;

(f) grouting equipment; and,

(g) grouting procedures, including injection points, grout lift heights, means of confirming grout placement and complete filling of the annular space.

E15.4 GRP Liner Design

E15.4.1 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 during the rehabilitation process.

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

(h) Minimizing disturbance to pavements and boulevards.

(i) Minimizing disruption to vehicular and pedestrian traffic.

(j) Minimizing the impact of construction on commercial, industrial, and institutional facilities.

E15.4.2 General

(a) Utilize materials with chemical and mechanical properties that are capable of providing a minimum design life of 50 years based on the waste stream present.

(b) Long-term values for flexural modulus of elasticity, flexural strength, and tensile strength will be considered to be the projected value at 50 years of a continuous application of the design load based on the specific product based on an applied stress level of 25% of the yield strength of the liner. Verified long and short-term values for flexural modulus, long term flexural strain (measured in the hoop direction), long term tensile strength, and shear bond strength, all tested in accordance with IGN-4-34-02 or ASTM/ISO equivalent. The Contractor shall provide supporting short- and long-term test data.

(c) Size GRP Segments in accordance with the design objectives to minimize annulus size and to maximise hydraulic capacity; with due consideration to meet reasonable constructability considerations.

(d) Final internal sewer dimensions shall not be less than those identified herein.

E15.4.3 GRP Liner Thickness Requirements

(a) The contractor may, at their discretion, utilize one of the two design methods for the design of GRP liners:

(i) Design methods outlined in ASCE MOP 145. Refer to E15.4.5.

(ii) Design methods outlined in the WRc Sewer Rehabilitation Manual. Refer to E15.4.6.

E15.4.4 General Design and Loading Parameters

(a) Unless otherwise specified, the following parameters shall be used to determine the design pressures exerted on the exterior of the liner.

(b) External hydrostatic and soil loads shall be calculated as specified herein using the following parameters:

(i) Unless otherwise specified, the groundwater table shall be assumed to be 2.0 m below the existing ground surface.

(ii) External hydrostatic pressure shall in all circumstances be calculated to the invert of the existing host pipe.

(iii) Calculate soil loads based on saturated soil unit weight of 18.85 kN/m^3 (1922 kg/m^3).

(iv) A lateral earth pressure coefficient (K) of 0.33 shall be used to calculate pressures applied to vertical critical sections.

(c) The following live loads shall be included in the design:

(i) Sewers crossing beneath rail lines: Where identified, applied soil pressures from a Cooper E80 rail load shall be estimated and utilized in the design of the liner. Rail loads shall include a track allowance dead load of 297 kg/m. Applied rail loads at depth shall be calculated using the Boussinesq solution for distribution of soil stresses from surface point loads. Impact factors for rail loads shall be calculated in accordance with the AREMA Manual for Railway Engineering.

(ii) All other sewers: The applied soil pressures from an AASHTO HS 25 design truck unless a higher or lower value is indicated in the contract specifications shall be estimated and utilized in the design of the liner. Applied soil pressures from AASHTO design truck loads shall be estimated in accordance with AASHTO LRFD Bridge Design Specifications, Seventh Edition (2014).

(d) Unless otherwise specified, applied soil pressures at depth caused by superimposed surface loads shall be calculated using the Boussinesq solution for distribution of stresses from surface point loads.

(e) Soil Covers.

(i) The Contractor shall utilize the maximum invert depths identified in Appendix B and as verified on site for design purposes except where minimum soil coves are less than 1.5 m. Where minimum soil covers are less than 1.5 m, the Contractor shall complete design checks for both the minimum and maximum soil covers.

(ii) Where applicable, a minimum cover depth has been provided in Appendix B to be used for live load calculations.

(f) Modulus of soil reaction (E’s) will be assumed to be 6900 kPa unless otherwise specified.

E15.4.5 ASCE MOP 145 Design Requirements

(a) If selected, the Contractor shall design the lining system in accordance with ASCE MOP 145.

(b) GRP liners designed in accordance with ASCE MOP 145 design methods shall be sealed by a Professional Engineer, registered in the Province of Manitoba, experienced in the design of liner rehabilitation systems.

(c) Liner dimensions and geometry used in design must be consistent with the cross section of the proposed liner. The proposed cross section must be confirmed via a pre-design inspection (E9.2.2(b)) prior to design of the liner.

(d) Design shall utilize a LRFD design approach as specified in ASCE MOP 145. All load and resistance factors shall conform to ASCE MOP 145.

(e) Host Pipe Condition/Liner Design Sate:

(i) Site 1 – Jessie Ave (S-MA60010557): State II;

(ii) Site 2 – Jessie Ave (S-MA60009676): State II;

(iii) Site 3 – Jessie Ave (S-MA70014425): State II;

(iv) Site 4 - Portage Ave (S-MA70014425 & S-MA70019487): State II.

(f) Minimum annular gap for design: 1 mm

(g) Minimum long-term deflection for design: 5%

(h) The Contractor is responsible for confirming the adequacy of the liner for all short-term (installation) and long-term loading conditions.

E15.4.6 WRc Sewer Rehabilitation Manual Design Requirements

(a) If selected, the selection of GRP liner minimum thicknesses shall be completed in accordance with the appropriate design equations provided in Appendix D. The design equations provide thickness requirements based a range of long-term flexural strength and modulus values for the conditions noted in the design tables.

(b) The Contractor may utilize the WRc Type 2 Design curves for the following sewers:

(i) All sewers.

(c) The Contractor may utilize the WRc Type 1 Design curves for the following sewers:

(i) N/A

(d) Liners shall be designed to the following design condition:

(i) Site 1 – Jessie Ave (S-MA60010557): Partially Deteriorated;

(ii) Site 2 – Jessie Ave (S-MA60009676): Partially Deteriorated;

(iii) Site 3 – Jessie Ave (S-MA70014425): Fully Deteriorated;

(iv) Site 4 - Portage Ave (S-MA70014425 & S-MA70019487): Partially Deteriorated.

(e) The Contractor shall determine the required liner wall thickness using the following procedure:

(i) Use the reviewed and accepted long-term flexural strength and modulus for the lining product proposed for use.

(ii) Determine the depth and load conditions for the liner.

(iii) Using the long-term flexural strength and modulus determine the minimum liner thickness from the respective design equation using applicable design conditions.

(iv) The required minimum liner thickness shall be the greater of the thicknesses determined from the design equation for flexural modulus and flexural strength.

(v) Select a nominal liner thickness greater than the minimum determined through the above method.

(f) Minimum material properties:

(i) Material properties shall conform to the material requirements specified herein and fall within the range of material properties noted in Appendix D.

(ii) For Type 1 Designs:

- Minimum shear bond between the grout and exterior of the liner shall be 0.68 MPa.

(g) The minimum liner thicknesses included herein relate to long term loading conditions only and have not considered short term installation loads. The Contractor is

responsible for confirming the structural stability of the GRP liner under the proposed grouting scheme.

(h) The Contractor shall confirm the design conditions stipulated with the design equations and advise the Contract Administrator of any conditions more adverse than those identified with the designs. If field conditions are found to be more adverse than those identified with the designs the Contract Administrator (designer) will provide new design curves for the design conditions measured on site. Increases to the liner thickness based on the discovery of more adverse design conditions will be considered a Change in Work as defined by the General Conditions.

E15.4.7 Minimum Final Sewer Dimensions

(a) The Contractor shall ensure that the GRP liner has internal dimensions equal to or greater than the following:

(i) Site 1 – Jessie Ave (S-MA60010557): 1020 x 755 mm

(ii) Site 2 – Jessie Ave (S-MA60009676): 1540 x 1140 mm

(iii) Site 3 – Jessie Ave (S-MA70014425): 1720 x 1270 mm

(iv) Site 4 - Portage Ave (S-MA70014425 & S-MA70019487): 2125 x 1570 mm

E15.5 Materials

E15.5.1 GRP Composite Liner Product

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

(b) Joints:

(i) Joints shall meet the requirements of IGN 4-34-02, Section 7.

(ii) Joints shall be capable of withstanding internal and external hydrostatic pressures. Assume both internal and external water levels at ground surface for the purposes of joint hydrostatic integrity.

(iii) Longitudinal joints shall be rigid and assembled using a structural adhesive permitting full transference of tensile forces.

(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) GRP Liners shall meet the greater of the Performance Requirements noted in Table 1 of Section 8 of IGN No. 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 and long term properties in Table 1 (Section 9, Clauses 9.2, 9.3, 9.4, 9.5, and 9.6), while production run tests are also required to substantiate short term properties for short term flexural modulus and strength.

(e) For Type 1 liners, shear bond testing shall be carried out on production run pipe samples in accordance with E15.6.2. The Contractor shall provide a minimum of ten (10) 150 x 150 mm samples of the liner meeting the requirements of IGN No. 4-34-02, clause D3.2 for the purposes of completing the shear bond testing. Any samples not used for the initial shear bond testing shall be available for casting shear bond samples on site in accordance with E15.6.2(e).

(f) Approved Manufacturers:

(i) Channeline International;

(ii) Hobas Pipe;

(iii) Thompson Pipe Group; or,

(iv) approved equal in accordance with B7.

E15.5.2 Annular Grout

(a) The proposed annular grout shall have material properties that permit grouting to occur without voiding within the annulus and has sufficient mechanical properties to achieve the desired structural intent where Type 1 liners are proposed.

(b) Grouts shall conform to the requirements of ACI 229.

(c) Grout parameters and mechanical properties shall be provided through demonstration testing in accordance with E15.6.1.

E15.6 Quality Assurance/Quality Control (QA/QC) and Testing

E15.6.1 Quality control for cementitious grouting materials shall conform to CSA A23.2, expect as modified herein:

(a) Confirm the viscosity of the grout mixture in accordance with CSA A23.2, Test Method 1B to ensure conformance with the submitted grouting plan and shear bond tests. Flow properties of grout shall be checked a minimum of once per production run, for every 25 m3, or once per 30 minutes, whichever is more frequent.

(b) Confirm the density of the grout mixture in accordance with CSA A23.2, Test Method 6C. Grout density shall be measured and recorded once per production run, for every 25 m3, or once per 30 minutes, whichever is more frequent. The density shall be maintained within +/- 10 % of the design density.

(c) Prepare and test quality control samples for compressive strength and density in accordance with CSA A23.2, Test Method 1B. Prepare a minimum of two (2) test cubes for each production run, or every 25 m3, whichever is more frequent. The Contractor shall arrange to have test cubes tested at an approved testing facility in accordance with CSA A23.2, Test Method 1B.

E15.6.2 Shear Bond Testing (Type 1 Liners)

(a) Shear bond testing for Type I liner designs shall be undertaken in accordance with Appendix D of IGN-4-34-02. Shear bond testing is only required for Type I GRP liner designs. Intent of shear bond testing is to verify the shear bond values used in the GRP liner design. Shear bond testing is not required for Type 2 liners.

(b) One set of shear bond testing as per Clause D.3.2 of IGN No. 4-34-02 for each combination of grout and liner product.

(c) Test samples shall be cast with the same grout mix and constituent materials as those proposed in the grouting submission. The grout mixture used for the shear bond testing shall be tested in accordance with E15.6.1 and results included in the shear bond testing report.

(d) A shear bond testing report shall be prepared and submitted to the Contract Administrator in accordance with E15.3.3.

(e) Where inconsistences are present with the proposed grout, the grout used for the shear bond testing, or the quality control tests completed in the field the Contract Administrator may require shear bond samples to be cast during the grouting operation or cores taken for the purposes of shear bond testing.

E15.6.3 Quality Control Records

(a) Maintain the following Quality Control records of the work and provide to the Contract Administrator after completion of the work.

(i) Summary of the GRP Segment manufacturing records, including:

- All QA/QC testing carried out in accordance with IGN 4-34-02; and,
- A certificate of compliance in accordance with Appendix H of IGN 4-34-02 for each GRP liner design.

(ii) A grouting summary including all QA testing reports identified herein; and,

(iii) Results of any additional shear bond testing in accordance with E15.6.2.

E15.7 Sewer Preparation

E15.7.1 Sewers shall be prepared for lining in accordance with E12.3.

E15.8 Installation of GRP Liners

E15.8.1 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 the 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.

(d) The contractor shall take every effort to prevent the accumulation of debris and sewage between the liner and the host pipe. Sewer services shall not be permitted to discharge into the annulus at any time.

E15.8.2 Annulus Grouting

(a) Where a Type I liner is proposed, all debris and contaminates between the liner and the host pipe shall be removed via flushing or other acceptable methods prior to grouting.

(b) Carry out annulus grouting in accordance with approved grouting protocol submission. Monitor the liner during grouting operations to ensure short-term deflections do not exceed the allowable maximums and that the liner is not displaced during grouting operations.

(c) The Contractor is responsible for confirming that annulus is fully grouted.

(d) Temporary wooden plugs may be used to plug grouting ports during grouting. Upon completion, the holes shall be repaired using a resin-rich repair product such as an epoxy-based repair system that is compatible with the liner system and specifically designed for the nature, size and thickness of the patch being repaired to form a smooth watertight patch flush with liner.

(e) General grouting requirements:

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

(ii) By-pass or pump through any sewer flows that occur during grouting operations;

(iii) Minimize infiltration (or its effects) to the extent required to successfully complete the grouting operations;

(iv) Inject from the downstream end of the renovated section;

(v) Inject from the invert towards the crown;

(vi) Provide air vents at the high points;

(vii) Monitor and record the injection pressures;

(viii) Inspect the lining for signs of distortion or flotation;

(ix) Monitor and record the volume of grout injected and compare with the estimate (with due consideration of an overfill allowance); and,

(x) 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 estimated grout take.

(f) The volume to be grouted at any one time can be varied to suit the various constraints such as the workability of the grout, design of the lining (including flotation), capacity of the mixing and pumping equipment, rate of installation of the lining, and the necessity for over pumping.

(g) Grout should either be injected through a minimum of three 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 1800 mm consideration should be given to the provision of more grout holes.

(h) Bulkheads:

(i) Bulkheads shall be constructed at the termination of the liner to facilitate lining and shall be temporary or permanent in nature.

(ii) If permanent, the bulkhead shall be constructed from cementitious materials consistent with the design of the rehabilitation system and the liner termination transitions.

(iii) Bulkheads shall include ports, located at regular intervals around the circumference of the host pipe for the purposes of confirming complete grouting of the annulus. Ports shall be located at the following minimum locations:

- 4 and 8 o'clock position (max of 0.5 m above invert)
- Springline of the host pipe
- 2 and 10 o'clock position
- Crown of the host pipe

(iv) Grout inspection ports shall be removed upon completion of the lining works and adequately plugged using fittings compatible with the port (HDPE or PVC) or a suitable cementitious product. Construction of the liner termination transition shall completely envelope the grout inspection ports such that no portion of the ports is visible upon completion of the work.

E15.8.3 Reinstatement of Sewer Connections

(a) Reinstate sewer connections in a watertight manner that precludes leakage or infiltration at the connection between the host pipe and the liner.

(b) Reinstate live sewer connections to 100% of the original cross-sectional area.

(c) Remove sharp edges from opening cut outs and provide a smooth rounded lip.

(d) Sewer service connections shall be terminated flush with the interior surface of the lined sewer.

(e) Sewer Service Grouting

(i) Fill voids between the liner and the host pipe at sewer service openings with a non-shrink, watertight cementitious or resin rich grout compatible with the liner system, or other approved grouting product to form a smooth watertight connection.

E15.8.4 GRP Closures

(a) GRP closures shall be constructed from full segment GRP panels and shall result in a uniform interior surface.

(b) The obvert of the host pipe or manhole shall be restored as shown on the Drawings and in accordance with E11. The cast-in-place concrete closure shall be cast directly against the new GRP liner panel.

E15.9 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 all reported Quality Control testing records provided in accordance with E15.6.3.

(b) The Contract Administrator will advise of any discrepancies between the constructed GRP and the design requirements. The Contractor shall take all required steps to rectify deficiencies with the installed liner system.

(c) Defects in GRP liners will be reviewed on a case-by-case basis by the Contract Administrator. The Contract Administrator will consult with the Contractor taking into account installation conditions, and the long-term use of the sewer to assess the structural and performance ramifications of the defects.

(d) The Contractor shall perform further testing, monitoring, calculations, and install structural enhancements at their own cost. Review remedial action with the Contract Administrator prior to implementation.

E15.10 Measurement and Payment

E15.10.1 Sewer Cleaning

(a) Sewer cleaning will be measured and paid for in accordance with CW 2140 and E12.7.1.

E15.10.2 Sewer Preparation and Repairs Prior to Lining

(a) Sewer repairs and preparation for lining will be measured and paid for in accordance with E12.7.2.

E15.10.3 GRP Lining

(a) Liner installation will be measured on a length basis for each sewer to be lined and paid for at the Contract Unit Price for “Supply and Installation of Structural Sewer Liner (CIPP/GRP)”. Length to be paid for will be the total length of GRP liner supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

(b) Measurement will be made horizontally at grade, above the centreline of the pipe from centre to centre of manholes or termination of the liner where termination is not at a manhole location.

(c) Payment for the supply and installation of GRP liners shall include but is not limited to the following:

(i) Verification of existing sewer dimensions;
(ii) Submission of all specified submittals;
(iii) Shear bond testing;
(iv) Supply and installation of GRP liner;
(v) Grouting of GRP liner;
(vi) Transitions at liner termination;
(vii) Provision of test samples;
(viii) Quality control testing and records; and,
(ix) Any other materials and labour as specified herein.

(d) Payment for the supply and installation of GRP liners will be made on the following payment schedule;

(i) 30% payment upon delivery of the GRP panels to Winnipeg and inspection/acceptance by the Contract Administrator.
(ii) 80% payment upon installation and completion of the grouting operations.
(iii) 100% payment upon completion of all work incidental to the GRP liner installation, confirmation of QA testing results, delivery and acceptance of all required submissions, shop drawings, and reports, rectification of all identified defects, and acceptance by the Contract Administrator.

E15.10.4 Reinstatement of Sewer Services

(a) Reinstatement of sewer services will be measured and paid for in accordance with E13.3.2.

E15.10.5 Quality Control Records

(a) Preparation of quality control records shall be considered incidental to "Supply and Installation of Structural Sewer Liner (CIPP/GRP)" and will not be measured for payment. No separate payment shall be made.

E15.10.6 Quality Control Sampling and Testing

(a) All work and materials required for the preparation and recovery of samples, repair of GRP liners, supply of grouting test samples, and QA testing as specified shall be considered incidental to "Supply and Installation of Structural Sewer Liner" and will not be measured for payment. No separate payment shall be made.

E16. CAST-IN-PLACE CONCRETE

E16.1 Description

(a) This Specification shall cover the construction of cast-in-place concrete trunk sewer closures and manhole reconstructions.

(b) All cast-in-place concrete shall be carried out in accordance with CW 2160 and CSA A23.1, except as amended or supplemented herein

E16.2 Submissions

E16.2.1 Construction Method Submission

(a) No Work shall commence until after the Contract Administrator's review of the Contractor's Construction Method submission.

(b) The Contractor shall prepare for the Contract Administrator's review a Construction Method submission detailing:

(i) Construction sequence to be followed including all methods to be employed to ensure no damage occurs to existing structures or adjacent properties within or adjacent to excavation.

(ii) Proposed method of construction.

(iii) Specialized equipment to be used.

(iv) Any design revisions proposed to accommodate the Contractor's proposed construction method.

(v) Flow control considerations including details on the Contractor's proposed method of flow control.

(vi) The Contractor shall respond to any concerns that may be raised by the Contract Administrator after review of the Construction Method submission.

E16.3 Materials

(a) Structural Concrete Mix Design

(i) Provide concrete mixed in accordance with requirements of CW 2160 and CSA-A23.2. Concrete shall conform to requirements of Type A concrete in accordance with Table CW 2160.1.

(ii) Structural concrete design shall be in accordance with performance specification having the following properties:

- Class of Exposure: S-1
- Minimum Compressive Strength @ 28 days: 35 MPa

(b) Polyurethane sealant for manhole construction

(i) Shall be non sag, polyurethane sealant; Sikaflex 2C NSL, or approved equal in accordance with B7. Colour: Precast.

(c) Hydrophilic Waterstop

(i) One-part polyurethane, extrudable swelling waterstop (bentonite-free). Sikaswell S-2 or approved equal in accordance with B7.

E16.4 Construction Methods

E16.4.1 Forming

(a) The Contractor shall be responsible for the design and installation of all necessary shoring, bracing and formwork.

(b) All shoring shall conform to CW 2160, CSA S269.3 and CSA C23.1.

E16.4.2 Cast-in-Place Concrete

(a) All cast-in-place concrete shall conform to CW 2160, and CSA A23.1.

E16.5 Measurement and Payment

(a) Supply and placement of cast-in-place concrete shall be considered incidental to “Pipeline Access Modifications” and will not be measured for payment. No separate payment will be made.

E17. REINFORCING STEEL

E17.1 Description

(a) This Specification shall cover all reinforcing steel work, in accordance with Specification CW 2160, except as amended or supplemented herein.

E17.2 Submittals

(a) The Contractor shall submit reinforcing steel Shop Drawings in accordance with E2 a minimum of ten (10) Business Days prior to the fabrication of any reinforcing steel.

E17.3 Materials

E17.3.1 Reinforcing Steel

(a) Further to CW 2160 Sentence 2.6 Materials: Reinforcing Steel, all reinforcing steel shall conform to the requirements of CSA G30.18, Grade 400.

E17.3.2 Bar Accessories

(a) Bar accessories shall be of type approved by the Contract Administrator. They shall be made from a non-corroding material, and they shall not stain, blemish, or spall the concrete surface for the life of the concrete. Bar chairs are to be PVC; galvanized bar chairs are not acceptable.

(b) Bar accessories shall include bar chairs, spacers, clips, wire ties, wire (18 gauge minimum), or other similar devices that may be approved by the Contract Administrator. Bar accessories are not shown on the Contract Drawings. The supply and installation of bar accessories shall be considered incidental to the supply and placing of reinforcing steel.

E17.4 Construction Methods

E17.4.1 Placing of Reinforcing Steel

(a) Placement of reinforcing steel shall be completed in accordance with CW 2160, CSA A23.1, and CSA A23.3.

(b) Lap splices in accordance with CSA A23.3

(c) Reinforcing steel shall be placed accurately in the positions shown on the Contract Drawings. Carefully adjust the location of reinforcing steel adjacent to openings to frame those openings in accordance with good practice, and maintain the bar spacing intent.

(d) Splices in reinforcing steel shall be made only where indicated on the Contract Drawings. Prior approval of the Contract Administrator shall be obtained where, in the opinion of the Contractor, other splices must be made. All splices shall have laps of at least 40 bar diameters. Welded splices shall not be used.

(e) A minimum of twenty-four (24) hours notice shall be given to the Contract Administrator prior to the pouring of any concrete to allow for inspection of reinforcing steel.

E17.4.2 Quality Control

(a) The Contractor shall provide, without charge, the samples of reinforcing steel required for quality control tests and provide such assistance and use of tools and construction equipment as is required.

E17.5 Measurement and Payment

(a) Supply and placement of reinforcing steel shall be considered incidental to "Pipeline Access Modifications" and will not be measured for payment. No separate payment will be made.

E18. SUSPENSION OF WORK ACTIVITIES WHEN SEWER CONTROL GATES ARE ACTIVATED DURING PERIODS OF HIGH RIVER LEVELS

E18.1 The Contractor is advised that as the elevation of the Red and Assiniboine Rivers rise from the normal winter or summer levels due to spring runoff or periods of heavy rainfall the City is required to close various control gates located on sewer system outfalls. Similarly, as the elevation of the rivers drop to normal levels, the City is required to open the control gates that have been closed. Control gates begin to be closed when river levels reach elevation 224.51 (James Avenue 9.0). As well, higher river levels can cause the level of flow in sewers to be higher than normal.

E18.2 In the event the Red and Assiniboine Rivers rise to an elevation where the City has to begin closing control gates, the Contract Administrator will direct that work activities in any sewers affected by the gate closure be suspended and the risk of runoff causing flooding in the sewer evaluated. Work will continue to be suspended as long as there is a risk of the sewer being flooded while the control gate is closed unless the Contractor provides flow control measures approved jointly by the Contract Administrator, City of Winnipeg Collection System and Flood Control Branch and Local Services Branch.

E18.3 Similarly, as river elevations drop and the City has to open control gates that have been closed, the Contract Administrator will direct that work activities in any sewers affected by the control gate opening be suspended due to the risk of the river flooding the sewer once the gate is opened. Work will continue to be suspended as long as the sewer is being flooded from the river unless the Contractor provides flow control measures approved jointly by the Contract Administrator, City of Winnipeg Collection System and Flood Control Branch and Local Services Branch.

E18.4 The Contractor will have no claim for extra Work or compensation as a result of suspension of Work due to the City closing and opening control gates during periods of rising and dropping river levels. If in the opinion of the Contract Administrator the suspension will cause the completion of the Work to occur after the specified date for Substantial Performance and the Contractor's schedule would have reasonably permitted completion of the Work before the required date, the date for Substantial Performance will be adjusted accordingly.

E18.5 The flood activation elevations for each site will be available upon request prior to construction.

E19. WATER SUPPLY

E19.1 Further to Section 3.14 of CW 2140 and Section 3.7 of CW 1120 of the General Requirements water supply for the Work may be taken from City of Winnipeg hydrants.

E19.2 The Contractor shall make the following arrangements for hydrant turn on and turn off.

(a) Contact City of Winnipeg Water Services Division (WSD) for hydrant turn on and turn off required between 0800 hours and 1500 hours Monday to Friday. Notice for turn on and turn off shall be provided on the previous business day.

(b) Contact Emergency Services Branch (986-2626) with a minimum of 2 hours notice for hydrant turn on and turn off required outside of the above hours.

(c) The Contractor shall wait at the hydrant from the requested turn on or turn off time until City staff arrives to turn on or turn off the hydrant.

E19.3 Hydrants shall be considered to be “in the Contractor’s control” from the time the City has turned the hydrant on until the City has turned the hydrant off.

E19.4 Between November 1 and April 30 of any year the Contractor shall take all necessary precautions to prevent freezing of hydrants and related appurtenances for hydrants in their control and shall be responsible to pump out hydrants turned off by Emergency Services.

E19.5 If a hydrant or appurtenance is damaged due to freezing or improper turn on or turn off procedures while in the Contractor’s control, WSD will assess the damage and determine if WSD will repair the damage or if the Contractor will be responsible to repair the damage. Costs for repairs completed by WSD will be deducted from payments owing the Contractor. Repairs completed by the Contractor will be at the Contractor’s expense.

E19.6 The Contractor shall provide a traffic ramp for hydrant connection hoses that cross roadways. The ramp shall be designed and constructed to not present a hazard to vehicles travelling over it and to ensure that no part of the hose is run over by a motor vehicle. Traffic ramps shall be satisfactory to the Contract Administrator.

E19.7 Measurement and Payment

(a) Charges incurred for the permits and water meters shall be paid for by the Contractor when the permit is taken out. The Contractor shall forward the invoice to the Contract Administrator for reimbursement. The billing for water usage sent to the Contractor shall be forwarded to the Contract Administrator for payment. The Bid Opportunity number shall be noted on each permit.

(b) All other costs associated with sourcing construction water will be considered incidental to the Work and will not be measured for payment. No additional payment will be made.

E20. TEMPORARY RESTORATION

E20.1 Description

E20.1.1 This Specification shall cover the temporary restoration roadways and boulevards. Temporary restoration is required to facilitate construction staging. Temporary restoration shall be completed as specified herein.

E20.2 General

E20.2.1 The Contractor is responsible for maintaining the roadway in an acceptable condition for traffic at all times while the Site is under the control of the Contractor. Temporary restoration of the roadway to permit traffic between completion of the sewer renewal work and permanent restoration shall be done in such a manner as to allow normal vehicle traffic. The Contractor shall be responsible for all maintenance of said temporary restoration works.

E20.2.2 Should portions of the Site be turned over to the City after completion of the sewer renewal for completion of roadway renewals in the subsequent calendar year, the restoration identified herein must be completed.

E20.2.3 In all cases, boulevards and roadways must be made safe for vehicles and pedestrians whenever the contractor is not actively working on site.

E20.3 Construction Methods

E20.3.1 Further to Clause 3.3 of CW 1130, the Contractor shall temporarily restore surfaces to the following minimum standards:

(a) Backfill and level boulevards and grassed areas to match existing surface elevations.

(b) Cap excavations in street pavement with 100 mm thick layer of “Concrete for Temporary Restoration of Utility Pavement Cuts” as specified in CW 3310.

(c) Cap excavations in sidewalk pavement with a 50 mm thick layer of “Concrete for Temporary Restoration of Utility Pavement Cuts” as specified in CW 3310 or 50 mm of asphalt paving in accordance with CW 3410.

(d) Where curb has been removed as part of the pavement cut, pour temporary curb using “Concrete for Temporary Restoration of Utility Pavement Cuts” as specified in CW 3310.

E20.3.2 Insulate temporary concrete where required during 24 hour curing period.

E20.3.3 Remove all temporary pavements prior to permanent restorations.

E20.3.4 The Contractor shall monitor and maintain temporarily restored surfaces as required until permanent restoration is complete.

E20.3.5 If, in the opinion of the Contract Administrator, temporarily restored surfaces are not being adequately maintained or were not properly constructed and pose a danger to the public, maintenance or reconstruction will be done by the City forces with no advance notification the Contractor. All costs associated with the maintenance or reconstruction of temporary pavement incurred by the City shall be deducted from future payments to the Contractor.

E20.4 Measurement and Payment

E20.4.1 Completion of all temporary restoration shall be considered incidental to the Work and will not be measured for payment. No separate payment will be made.

E21. PERMANENT RESTORATIONS

E21.1 Description

(a) This Specification shall cover the permanent restoration of all work sites.

E21.2 Further to Section 3.3 of CW 1130 of the General Requirements, permanent surface restorations including sodding and pavement works for each sewer section to be lined shall be completed within ten (10) Working Days from the date an external point repair, manhole repair/modification/replacement, or CIPP liner is completed on each sewer section.

E21.3 Where excavations are to be restored with 24-hour early opening concrete, as requested by the Contract Administrator, the Contractor shall make it their first priority to backfill the excavation; pour the 24-hour concrete; where required, lay asphalt as soon as the 24-hour curing period is up, and open the lane to traffic.

E21.4 Restoration Works

(a) Reconstruct concrete pavements in accordance with CW 3230, CW3310, and SD-213A.

(b) Reconstruct asphalt pavements and overlays in accordance with CW3410 using a Type 1A asphaltic concrete pavement.

(c) Sidewalks:

(i) Reconstruct existing asphalt sidewalks with 75 mm of Type 1A asphaltic concrete pavement conforming to CW3410. The sidewalk shall be constructed with 50 mm (min) of compacted base material and 150 mm (min) of sub-base material.

(ii) Reconstruct existing non-reinforced concrete sidewalks with a 100 mm non-reinforced concrete conforming to CW3325 and SD-228A. The sidewalk shall be constructed with 100 mm (min) of compacted base material.

(iii) Reconstruct of the existing reinforced concrete sidewalks with a 150 mm reinforced concrete conforming to CW3235 and SD-237. The sidewalk shall be constructed with 100 mm (min) of compacted base material. To be used for private approaches.

(d) Reconstruct concrete barrier curbs in accordance with CW3240 and SD-206A.

(e) Sod all maintained grassed areas in accordance with CW3510.

E21.5 Pavement Restoration

E21.5.1 The Contractor shall follow the City of Winnipeg Street By-law No. 1481/77 and current revision of the City of Winnipeg "Street Cuts Manual" found at https://winnipeg.ca/publicworks/permitsApprovals/pdf/Street-Cuts-Manual.pdf and for all pavement restoration unless otherwise shown on the drawing or specifications or as directed by the Contract Administrator.

E21.5.2 All street segments within the work area impacted by the Work shall be maintained and restored with the following additional requirements:

(a) Review and record the condition of each street segment with the Contract Administrator and a City Representative from Public Works prior to the initiation of the work. The surface restoration required for each street segment will be agreed upon at this time.

E21.5.3 The street material and condition within the project work area are classified as follows:

Street	Block	Pavement Type	Condition
Jessie Ave	Guelph St to Harrow St	Concrete	Good
Jessie Ave	Wentworth St to Lilac St	Concrete	Poor
Jessie Ave	Lilac St to Arbuthnot St	Concrete	Poor
Portage Ave Westbound	Moorgate St to Mount Royal Rd	Asphalt Over Concrete	Good
Portage Ave Eastbound	Mount Royal Rd to Moorgate St	Asphalt Over Concrete	Fair

E21.6 Permanent pavement restoration shall be in accordance with the City of Winnipeg Street Cuts Manual (2022) for each applicable pavement type.

(a) Construct partial slab patches in accordance with CW 3230.

(b) Construct miscellaneous concrete slab renewals in accordance with CW 3235.

(c) Construct concrete curb renewal in accordance with CW 3240.

(d) Construct asphaltic concrete patches (Type 1A) in accordance with CW 3240. Notwithstanding CW 3410, there will be no maximum width for an asphalt patch.

E21.7 Measurement and Payment

(a) Surface restoration will be considered incidental the Work and will not be measured for payment. No separate payment will be made.

(b) Where restoration is delayed a holdback may be applied to subsequent progress estimates until such a time that restoration has been completed and accepted.

E22. PROTECTION OF EXISTING TREES

E22.1 The Contractor shall take the following precautionary steps to prevent damage from construction activities to existing boulevard trees within the limits of the construction area. Contact the City of Winnipeg Forestry Branch at 204-986-2004 for further information on these specifications:

(a) For trees greater than 100 mm in diameter, attach wood strapping material having a minimum thickness of 25 millimetres and minimum length of 2440 millimetres around tree trunks in a manner that will not harm the trees. Do not use nails or other fasteners that

penetrate into trees. The width of strapping should suit the size of the tree being protected. Length of strapping may be reduced to suit tree being protected as approved by the Contract Administrator.

(b) For trees less than 100 mm in diameter, install snow fencing around the tree to a 2.0 meter radius complete with installation hardware. The 2.0 meter radius of the snow fencing may be reduced to suit the tree being protected as approved by the Contract Administrator.

(c) Operation of equipment within the dripline of the trees shall be kept to the minimum required to perform the work. Equipment shall not be parked, repaired, refueled; construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines of the trees. The dripline of a tree shall be considered to be the ground surface directly beneath the tips of its outermost branches. The Contractor shall ensure that the operations do not cause flooding or sediment deposit on areas where trees are located.

(d) Repair, replace and maintain tree protection material during construction of the Work.

(e) Remove snow fencing and strapping material without harming trees as soon as the construction and restoration work is complete.

E22.2 Obtain approval from the Contract Administrator to excavate within 2.0 meters of a tree.

E22.3 Excavate in a manner to minimize damage to root systems. Keep exposed roots in excavations and trenches moist or shaded.

E22.4 Prune exposed roots with equipment such as trenchers, chain saws, root cutters or other methods acceptable to the Contract Administrator in a manner that will leave a neat, clean root end.

E22.5 Take precautions to ensure tree limbs overhanging the Site are not damaged by construction equipment. Consult the Forestry Branch on pruning of overhanging or damaged limbs and branches and other unanticipated problems with trees during construction of the Works.

E22.6 Elm trees are not to be pruned between April 1st and August 1st under provisions of The Dutch Elm Disease Act.

E22.7 All damage to existing trees caused by the Contractor’s activities shall be repaired as required by the Contract Administrator and the Forestry Branch. Damages must be repaired by an individual with a Manitoba Arborist license or by the Forestry Branch.

E22.8 The Forestry Branch will remove and replace any trees deemed to have died or that are dying due to damage from carelessness during construction. Removal and replacement costs will be determined by size and market price. The market price will be a comparable transplantable tree of the same or different species or may be the appraised value of the existing tree, as determined by an evaluation procedure presently used by Forestry Branch in conjunction with City Claims Branch. The evaluation procedure is in accordance with current International Society of Arboriculture evaluation procedure.

E22.9 Measurement and Payment

E22.9.1 Protection of existing trees, repair of trees and pruning of damaged limbs will be considered incidental to the Work and will not be measured for payment. Removal and replacement of existing trees by the Forestry Branch deemed to have died or that are dying due to damage from carelessness during construction will be at the Contractor’s cost and will be invoiced or deducted from any payments owing.

PART F - SECURITY CLEARANCE

F1. SECURITY CLEARANCE

F1.1 Each individual proposed to perform the following portions of the Work:

(a) any Work on private property;

(b) any Work within City facilities other than:

(i) an underground structure such as a manhole;

(ii) in areas and at times normally open to the public;

(c) communicating with residents and homeowners in person or by telephone;

F1.1.1 Each Individual shall be required to obtain a Police Information Check from the police service having jurisdiction at their place of residence. Or

(a) 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

(b) Commissionaires (Manitoba Division), forms to be completed can be found on the website at: https://www.commissionaires.ca/en/manitoba/home; or .

(c) FASTCHECK Criminal Record & Fingerprint Specialists, forms to be completed can be found on the website at: https://myfastcheck.com

F1.2 Prior to the award of Contact, and during the term of the Contract if additional or replacement individuals are proposed to perform Work, the Bidder/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 such Work.

F1.3 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 specified in F1.1.

F1.4 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.

F1.5 Notwithstanding the foregoing, at any time during the term of the Contract, the City may, at their 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 specified in F1.1.