THE CITY OF WINNIPEG

BID OPPORTUNITY

BID OPPORTUNITY NO. 604-2011

WAVERLEY WEST ARTERIAL ROADS PROJECT, PART 1 – KENASTON BOULEVARD EXTENSION – NORTHBOUND LANES, FROM NORTH TOWN ROAD TO BISHOP GRANDIN BOULEVARD – NEW ROAD CONSTRUCTION AND ASSOCIATED WORKS

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 Waverley West Arterial Roads Project, Part 1 – Kenaston Boulevard Extension – Northbound Lanes, from North Town Road to Bishop Grandin Boulevard – New Road Construction and Associated Works

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, July 29, 2011.

B2.2 Bids determined by the Manager of Materials to have been received later than the Submission Deadline will not be accepted and will be returned upon request.

B2.3 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

B3. SITE INVESTIGATION

B3.1 Further to C3.1, the Contract Administrator or an authorized representative will be available at the Site from 1:30 P.M. to 3:00 P.M. on July 22, 2011 to provide Bidders access to the Site. All in attendance shall meet at west approach of the old railway crossing at the north limits of southbound lanes.

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

B4. ENQUIRIES

B4.1 All enquiries shall be directed to the Contract Administrator identified in D3.1.

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

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

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

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

B5. ADDENDA

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

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

B5.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/bidopp.asp

B5.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

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

B6. SUBSTITUTES

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

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

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

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

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

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

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

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

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

B6.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.

B6.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, only to the Bidder who requested approval of the substitute.

B6.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely responsible for disseminating information regarding the approval to any person or persons he wishes to inform.

B6.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.

B6.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B15.

B6.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B6.10 Notwithstanding B6.2 to B6.9, in accordance with B7.6, deviations inconsistent with the Bid Opportunity document shall be evaluated in accordance with B15.1(a).

B7. BID COMPONENTS

B7.1 The Bid shall consist of the following components:

(a) Form A: Bid;

(b) Form B: Prices, hard copy;

(c) Bid Security;

(i) Form G1: Bid Bond and Agreement to Bond, or
Form G2: Irrevocable Standby Letter of Credit and Undertaking, or
a certified cheque or draft;

B7.2 Further to B7.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B6.

B7.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely, to constitute a responsive Bid.

B7.4 The Bid shall be submitted enclosed and sealed in an envelope clearly marked with the Bid Opportunity number and the Bidder's name and address.

B7.4.1 Samples or other components of the Bid which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the Bid Opportunity number, the Bidder's name and address, and an indication that the contents are part of the Bidder’s Bid.

B7.4.2 A hard copy of Form B: Prices must be submitted with the Bid. If there is any discrepancy between the Adobe PDF version of Form B: Prices and the Microsoft Excel version of Form B: Prices, the PDF version shall take precedence.

B7.5 Bidders are advised not to include any information/literature except as requested in accordance with B7.1.

B7.6 Bidders are advised that inclusion of terms and conditions inconsistent with the Bid Opportunity document, including the General Conditions, will be evaluated in accordance with B15.1(a).

B7.7 Bids submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.

B7.8 Bids shall be submitted to:

The City of Winnipeg
Corporate Finance Department
Materials Management Division
185 King Street, Main Floor
Winnipeg MB R3B 1J1

B8. BID

B8.1 The Bidder shall complete Form A: Bid, making all required entries.

B8.2 Paragraph 2 of Form A: Bid shall be completed in accordance with the following requirements:

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

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

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

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

B8.2.1 If a Bid is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B8.2.

B8.3 In Paragraph 3 of Form A: Bid, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.

B8.4 Paragraph 12 of Form A: Bid shall be signed in accordance with the following requirements:

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

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

(c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, shall be affixed;

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

B8.4.1 The name and official capacity of all individuals signing Form A: Bid should be printed below such signatures.

B8.5 If a Bid is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

B9. PRICES

B9.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.

B9.1.1 For the convenience of Bidders, and pursuant to B7.4.2 and B15.4.3, an electronic spreadsheet Form B: Prices in Microsoft Excel (.xls) format is available along with the Adobe PDF documents for this Bid Opportunity on the Bid Opportunities page at the Materials Management Division website at http://www.winnipeg.ca/matmgt

B9.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.

B9.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

B9.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B10. QUALIFICATION

B10.1 The Bidder shall:

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

B10.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

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

B10.3 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);

B10.4 Further to B10.3(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) a valid COR certification number under the Certificate of Recognition (COR) Program administered by the Manitoba Construction Safety Association or by the Manitoba Heavy Construction Association's Safety, Health and Environment Program; or

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

B10.5 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B10.6 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B11. BID SECURITY

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

(a) a bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in the form included in the Bid Submission (Form G1: Bid Bond and Agreement to Bond); or

(b) an irrevocable standby letter of credit, in the amount of at least ten percent (10%) of the Total Bid Price, and undertaking issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form

included in the Bid Submission (Form G2: Irrevocable Standby Letter of Credit and Undertaking); or

(c) a certified cheque or draft payable to "The City of Winnipeg", in the amount of at least fifty percent (50%) of the Total Bid Price, drawn on a bank or other financial institution registered to conduct business in Manitoba.

B11.1.1 If the Bidder submits alternative bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.

B11.1.2 All signatures on bid securities shall be original.

B11.1.3 The Bidder shall sign the Bid Bond.

B11.1.4 The Surety shall sign and affix its corporate seal on the Bid Bond and the Agreement to Bond.

B11.2 The bid security of the successful Bidder and the next two lowest evaluated responsive and responsible Bidders will be released by the City when a Contract for the Work has been duly executed by the successful Bidder and the performance security furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

B11.2.1 Where the bid security provided by the successful Bidder is in the form of a certified cheque or draft pursuant to B11.1(c), it will be deposited and retained by the City as the performance security and no further submission is required.

B11.2.2 The City will not pay any interest on certified cheques or drafts furnished as bid security or subsequently retained as performance security.

B11.3 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Bid Opportunity.

B12. OPENING OF BIDS AND RELEASE OF INFORMATION

B12.1 Bids will be opened publicly, after the Submission Deadline has elapsed, in the office of the Corporate Finance Department, Materials Management Division, or in such other office as may be designated by the Manager of Materials.

B12.1.1 Bidders or their representatives may attend.

B12.1.2 Bids determined by the Manager of Materials, or his designate, to not include the bid security specified in B11 will not be read out.

B12.2 Following the submission deadline, the names of the Bidders and their Total Bid Prices (unevaluated, and pending review and verification of conformance with requirements) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt

B12.3 After award of Contract, the name(s) of the successful Bidder(s) and the Contract amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt

B12.4 The Bidder is advised that any information contained in any Bid may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B13. IRREVOCABLE BID

B13.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid.

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

B14. WITHDRAWAL OF BIDS

B14.1 A Bidder may withdraw his Bid without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B14.1.1 Notwithstanding C23.3, the time and date of receipt of any notice withdrawing a Bid shall be the time and date of receipt as determined by the Manager of Materials.

B14.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Bid or the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid, and only such person, has authority to give notice of withdrawal.

B14.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:

(a) retain the Bid until after the Submission Deadline has elapsed;

(b) open the Bid to identify the contact person named in Paragraph 3 of Form A: Bid and the Bidder's authorized representatives named in Paragraph 12 of Form A: Bid; and

(c) if the notice has been given by any one of the persons specified in B14.1.3(b), declare the Bid withdrawn.

B14.2 A Bidder who withdraws his Bid after the Submission Deadline but before his Bid has been released or has lapsed as provided for in B13.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

B15. EVALUATION OF BIDS

B15.1 Award of the Contract shall be based on the following bid evaluation criteria:

(a) compliance by the Bidder with the requirements of the Bid Opportunity, or acceptable deviation therefrom (pass/fail);

(b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B10 (pass/fail);

(c) Total Bid Price;

(d) economic analysis of any approved alternative pursuant to B6.

B15.2 Further to B15.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid 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.

B15.3 Further to B15.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his Bid or in other information required to be submitted, that he is responsible and qualified.

B15.4 Further to B15.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.

B15.4.1 If there is any discrepancy between the Total Bid Price written in figures, the Total Bid Price written in words and the sum of the quantities multiplied by the unit prices for each item, the sum of the quantities multiplied by the unit prices for each item shall take precedence.

B15.4.2 Further to B15.1(a), in the event that a unit price is not provided on Form B: Prices, the City will determine the unit price by dividing the Amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

B15.4.3 The electronic Form B: Prices and the formulas imbedded in that spreadsheet are only provided for the convenience of Bidders. The City makes no representations or warranties as to the correctness of the imbedded formulas. It is the Bidder's responsibility to ensure the extensions of the unit prices and the sum of Total Bid Price performed as a function of the formulas within the electronic Form B: Prices are correct.

B16. AWARD OF CONTRACT

B16.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

B16.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Bids are determined to be responsive.

B16.2.1 Without limiting the generality of B16.2, the City will have no obligation to award a Contract where:

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

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

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

(d) only one Bid is received; or

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

B16.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B15.

B16.3.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his Bid upon written request to the Contract Administrator.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

C0.1 The *General Conditions for Construction* (Revision 2006 12 15) are applicable to the Work of the Contract.

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

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

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

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

D2. SCOPE OF WORK

D2.1 The Work to be done under the Contract shall consist of:

(a) Construction of 2 new northbound lanes of concrete pavement for Kenaston Boulevard from North Town Road to Bishop Grandin Boulevard (1300 m north);

(b) Construction of 2 new westbound to northbound lanes for Bishop Grandin Boulevard and Kenaston Boulevard from the Waverley Automall to Scurfield Boulevard;

(c) Construction of intersection improvements at Kenaston Boulevard and Bishop Grandin Boulevard;

(d) Extension of concrete box culvert for Lot 16 Drain crossing of Kenaston Boulevard;

(e) Construction of embankments for future flyover;

(f) Landscaping of Kenaston Boulevard and Bishop Grandin Boulevard.

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

(a) Construction of 2 new northbound lanes of concrete pavement for Kenaston Boulevard from North Town Road to Bishop Grandin Boulevard (1300 m north)

(i) Clearing and grubbing;
(ii) Stripping and stockpile of topsoil;
(iii) Excavation;
(iv) Placing suitable site material;
(v) Installation of subdrains;
(vi) Compaction of existing sub-grade;
(vii) Installation of catch basins and connection pipe;
(viii) Placement of separation/reinforcement fabric;
(ix) Placement of sub-base and base course materials;
(x) Construction of 230 mm concrete pavement (plain-dowelled) utilizing slip-form paving equipment;
(xi) Construction of 100 mm asphalt shoulder;
(xii) Placement of new surfacing material;
(xiii) Adjustment of existing manholes and catch basins;
(xiv) Construction of 120mm (integral) mountable curb utilizing slip-form paving equipment;
(xv) Construct concrete and asphalt multi-use sidewalk;
(xvi) Boulevard grading and seeding;
(xvii) Ditch grading and sloping;
(xviii) Landscaping.

(b) Construction of 2 new westbound to northbound lanes for Bishop Grandin Boulevard and Kenaston Boulevard from the Waverley Automall to Scurfield Boulevard

(i) Removal of existing pavement;
(ii) Curb removal;
(iii) Excavation;
(iv) Placing suitable site material;
(v) Installation of subdrains;
(vi) Cleaning of existing subdrains
(vii) Compaction of existing sub-grade;
(viii) Placement of separation/reinforcement fabric;
(ix) Installation of catch basins and connection pipe;
(x) Placement of sub-base and base course materials;
(xi) Construction of 230 mm concrete pavement (plain-dowelled) utilizing slip-form paving equipment;
(xii) Construction of 100 mm asphalt shoulder;
(xiii) Placement of new surfacing material;
(xiv) Adjustment of existing manholes and catchbasins;
(xv) Construction of 120mm (integral) mountable curb utilizing slip-form paving equipment;
(xvi) Construct concrete and asphalt multi-use sidewalk;
(xvii) Boulevard grading and seeding;
(xviii) Ditch grading and sloping;
(xix) Landscaping; and,
(xx) Traffic diversions.

(c) Construction of intersection improvements at Kenaston Boulevard and Bishop Grandin Boulevard
(i) Removal of existing pavement;
(ii) Curb removal;
(iii) Excavation;
(iv) Preparation of existing roadway;
(v) Installation of subdrains;
(vi) Compaction of existing sub-grade;
(vii) Placement of separation/reinforcement fabric;
(viii) Installation of catch basins and connection pipe;
(ix) Placement of sub-base and base course materials;
(x) Construction of 230 mm concrete pavement (plain-dowelled) utilizing slip-form paving equipment;
(xi) Adjustment of existing manholes and catch basins;
(xii) Construction of 120 mm (integral) mountable curb utilizing slip-form paving equipment;
(xiii) Construct concrete and asphalt multi-use sidewalk;
(xiv) Boulevard grading and seeding;
(xv) Ditch grading and sloping; and,
(xvi) Landscaping.

(d) Extension of concrete box culvert for Lot 16 Drain crossing of Kenaston Boulevard

(i) Implement water control plan to allow for the construction of the culvert works;
(ii) Excavate and install shoring as required to expose the inlet and outlet of the existing culvert;
(iii) Demolish a portion of the existing culvert inlet and outlet;
(iv) Place and compact sub-base and free draining backfill material;
(v) Construction of the concrete culvert extensions, headwalls and retaining wall;
(vi) Installation of subdrains;
(vii) Place and compact backfill material;
(viii) Place riprap;
(ix) Remove shoring;
(x) Complete rough grading of the Site; and,
(xi) Remove water control plan works.

(e) Construction of embankments for future flyover
(i) Stripping of top soil;
(ii) Completion of a 300 mm deep excavation for drainage material;
(iii) Placement of drainage material; and,
(iv) Placement of embankment material.

(f) Landscaping of Kenaston Boulevard and Bishop Grandin Boulevard
(i) Touch-up grading;
(ii) Placement of top soil;
(iii) Placement of seed and sod;
(iv) Planting of trees and plants; and,
(v) Maintenance of landscaping.

D3. CONTRACT ADMINISTRATOR

D3.1 The Contract Administrator is Stantec Consulting Ltd., represented by:

Vilko Maroti, CET, P.Eng.
Senior Transportation Engineer
100-1355 Taylor Ave
Winnipeg, MB R3M 3Y9

Telephone No. (204) 928-8834
Facsimile No. (204) 284-4795

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

D4. CONTRACTOR'S SUPERVISOR

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

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

D5. NOTICES

D5.1 Except as provided for in C23.2.2, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the Contractor shall be sent to the address or facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid.

D5.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D5.3, D5.4 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the address or facsimile number identified in D3.1.

D5.3 Notwithstanding C21., all notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following facsimile number:

The City of Winnipeg
Chief Financial Officer

Facsimile No.: (204) 949-1174

D5.4 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following address or facsimile number:

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

Facsimile No.: (204) 947-9155

D6. FURNISHING OF DOCUMENTS

D6.1 Upon award of the Contract, the Contractor will be provided with five (5) complete sets of the Bid Opportunity. If the Contractor requires additional sets of the Bid Opportunity, they will be supplied to him at cost.

SUBMISSIONS

D7. AUTHORITY TO CARRY ON BUSINESS

D7.1 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.

D8. SAFE WORK PLAN

D8.1 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.

D8.2 The Safe Work Plan shall be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/safety/default.stm

D9. INSURANCE

D9.1 The Contractor shall provide and maintain the following insurance coverage:

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

(b) automobile liability insurance for owned automobiles used for or in connection with the Work in the amount of at least two million dollars ($2,000,000.00) at all times during the performance of the Work and until the date of Total Performance;

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

D9.2 Deductibles shall be borne by the Contractor.

D9.3 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in the C4.1 for the return of the executed Contract.

D9.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D10. PERFORMANCE SECURITY

D10.1 The Contractor shall provide and maintain performance security until the expiration of the warranty period in the form of:

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

(b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or

(c) a certified cheque or draft payable to “The City of Winnipeg”, drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.

D10.1.1 Where the performance security is in the form of a certified cheque or draft, it will be deposited by the City. The City will not pay any interest on certified cheques or drafts furnished as performance security.

D10.2 If the bid security provided in his Bid was not a certified cheque or draft pursuant to B11.1(c), the Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site and in no event later than the date specified in the C4.1 for the return of the executed Contract.

D11. SUBCONTRACTOR LIST

D11.1 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 or prior to a pre-construction meeting, or 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 C4.1 for the return of the executed Contract.

D12. EQUIPMENT LIST

D12.1 The Contractor shall provide the Contract Administrator with a complete list of the equipment which the Contractor proposes to utilize (Form K: Equipment List) at or prior to a pre-construction meeting, or 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 C4.1 for the return of the executed Contract.

D13. DETAILED WORK SCHEDULE

D13.1 The Contractor shall provide the Contract Administrator with a detailed work schedule (Form L: Detailed Work Schedule) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in the General Conditions for the return of the executed Contract.

D13.2 The detailed work schedule shall consist of the following:

(a) Form L: Detailed Work Schedule; and

(b) a Gantt chart for the Work

all acceptable to the Contract Administrator.

D13.3 Further to D13.2(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.

SCHEDULE OF WORK

D14. COMMENCEMENT

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

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

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

(i) evidence of authority to carry on business specified in D7;

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

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

(iv) the Safe Work Plan specified in D8;

(v) evidence of the insurance specified in D9;

(vi) the performance security specified in D10;

(vii) the subcontractor list specified in D11;

(viii) the equipment list specified in D12; and,

(ix) the detailed work schedule specified in D13.

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

D14.3 The Contractor shall commence the Work on the Site within seven (7) Working Days of receipt of the letter of intent.

D14.4 The City intends to award this Contract by August 19, 2011.

D14.4.1 If the actual date of award is later than the intended date, the dates specified for Critical Stages, Substantial Performance, and Total Performance will be adjusted by the difference between the aforementioned intended and actual dates.

D15. WORKING DAYS

D15.1 Further to C1.1(gg);

D15.1.1 The Contract Administrator will determine daily if a Working Day has elapsed and will record his assessment. On a weekly basis the Contract Administrator will provide the Contractor with a record of the Working Days assessed for the preceding week. The Contractor shall sign each report signifying that he agrees with the Contract Administrator's determination of the Working Days assessed for the report period.

D15.1.2 Work done to restore the Site to a condition suitable for Work, shall not be considered "work" as defined in the definition of a Working Day.

D15.1.3 When the Work includes two or more major types of Work that can be performed under different atmospheric conditions, the Contract Administrator shall consider all major types of Work in determining whether the Contractor was able to work in assessing Working Days.

D16. RESTRICTED WORK HOURS

D16.1 Further to clause 3.10 of CW 1130, the Contractor shall require written permission forty-eight (48) hours in advance from the Contract Administrator for any work to be performed between 2000 hours and 0700 hours, or on Saturdays, Sundays, Statutory Holidays and / or Civic Holidays.

D17. WORK BY OTHERS

D17.1 Work by others on or near the Site will include but not necessarily be limited to:

(a) Manitoba Hydro - Relocation of the existing 24 kV line and installation of new 66 kV line on wooden poles along the south limit of the Manitoba Hydro right of way. The Contractor is expected to cooperate with Manitoba Hydro to facilitate construction.

(b) Manitoba Hydro - Relocation of the existing street lighting along Kenaston Boulevard and Bishop Grandin Boulevard within the construction limits and installation of new street lighting along the new south extension of Kenaston Boulevard will be completed by Manitoba Hydro. The Contractor is expected to cooperate with Manitoba Hydro to facilitate construction.

(c) Manitoba Hydro - Relocation of the existing 115 kV tower at the southeast corner of the intersection of Kenaston Boulevard and Bishop Grandin Boulevard will be completed by Manitoba Hydro. The Contractor is expected to cooperate with Manitoba Hydro to facilitate construction.

(d) City of Winnipeg Traffic Signals - Installation of traffic signals at the intersection of Kenaston Boulevard and Bishop Grandin Boulevard. The Contactor is expected to cooperate with City of Winnipeg Traffic Signals to facilitate construction.

(e) City of Winnipeg Traffic Services Department – Replacement of signs and paint lines. The Contactor is expected to cooperate with City of Winnipeg Traffic Services to facilitate construction.

(f) The Manitoba Housing Renewal Corporation Bridgwater Centre Phase 1 & Kenaston LDS Outfall Contract which includes installation of the LDS. The Contractor is expected to cooperate with The Manitoba Housing Renewal Corporation to facilitate construction.

(g) Manitoba Hydro Gas – The Contractor is expected to cooperate with Manitoba Hydro Gas to facilitate the following activities on Site:

(i) Relocation and abandonment of 1 natural gas checkpoint;

(ii) Safety watch for all construction activities within 4.0 m of the high pressure natural gas main;

(iii) Excavation and rock wrapping for any excavation within 450 mm of a high pressure natural gas main.

D18. SEQUENCE OF WORK

D18.1 Further to C6.1, the sequence of work shall be as follows:

D18.1.1 The Work shall be divided into six phases.

(a) **Stage 1A** - Construction of 2 new northbound lanes of concrete pavement for Kenaston Boulevard from North Town Road to Bishop Grandin Boulevard (1300 m north);

(b) **Stage 1B** - Construction of embankments for future flyover;

(c) **Stage 2** - Extension of the existing concrete box culvert for the Lot 16 Drain crossing of Kenaston Boulevard;

(d) **Stage 3** - Construction of new concrete pavement for the westbound lanes of Bishop Grandin Boulevard and northbound lanes of Kenaston Boulevard from the Waverley Automall access to Scurfield Boulevard;

(e) **Stage 4** - Construction of intersection improvements at Kenaston Boulevard and Bishop Grandin Boulevard;

(f) **Stage 5** - Landscaping of Kenaston Boulevard and Bishop Grandin Boulevard.

D18.1.3 Immediately following the completion of the each Phase, the Contractor shall clean up the Site and remove all plant, surplus material, waste and debris, other than that left by the City or other Contractors.

D19. CRITICAL STAGES

D19.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

(a) Stage 1A shall be complete by November 18, 2011;

(b) Stage 1B shall be complete by November 18, 2011;

(c) Stage 2 shall be complete by March 15, 2012;

(d) Stages 3, 4, 5, and any other outstanding works shall be started by May 31, 2012, or as directed by the Contract Administrator, and be substantially performed by September 14, 2012.

D19.2 The Contractor shall achieve the critical stages of the Work while adhering to the phasing described in E7, or as directed by the Contract Administrator.

D19.3 When the Contractor considers the Work associated with critical stages listed in D19.1 to be completed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Completion. 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 re-inspected.

D19.4 The date on which the concrete box culvert Work has been accepted by the Contract Administrator as being completed to the requirements of the Contract is the date on which completion of concrete box culvert has been achieved.

D20. SUBSTANTIAL PERFORMANCE

D20.1 The Contractor shall achieve Substantial Performance by September 14, 2012.

D20.2 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 re-inspected.

D20.3 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.

D21. TOTAL PERFORMANCE

D21.1 The Contractor shall achieve Total Performance by October 5, 2012.

D21.2 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 re-inspected.

D21.3 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.

D22. LIQUIDATED DAMAGES

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

(a) Critical Stage – Three-thousand five-hundred dollars ($3,500);

(b) Substantial Performance – Three-thousand five-hundred dollars ($3,500);

(c) Total Performance – One-thousand dollars ($1,000).

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

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

D23. SCHEDULED MAINTENANCE

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

(a) Reflective Crack Maintenance During two Year Maintenance Warranty Period as specified in CW 3250-R6 ;

(b) Landscaping Maintenance as specified in E29 to E32, E44, and E45.

D23.2 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

D24. JOB MEETINGS

D24.1 Regular weekly job meetings will be held at the Site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, one representative of the City, and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City, and the Contractor

respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.

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

D25. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D25.1 Further to C6.24, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

MEASUREMENT AND PAYMENT

D26. PAYMENT

D26.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D27. WARRANTY

D27.1 Notwithstanding C13.2, the warranty period shall begin on the date of Substantial Performance and shall expire two (2) years thereafter, unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.

D27.2 Notwithstanding C13.2 or D27.1, the Contract Administrator may permit the warranty period for a portion or portions of the Work to begin prior to the date of Substantial Performance if:

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

(b) Substantial Performance has been achieved.

D27.2.1 In such case the date specified by the Contract Administrator for the warranty period to begin shall be substituted for the date specified in C13.2 for the warranty period to begin.

FORM H1: PERFORMANCE BOND
(See D10)

KNOW ALL MEN BY THESE PRESENTS THAT

_____
(hereinafter called the "Principal"), and

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

_____

_____ dollars ($_____.____)

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

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

BID OPPORTUNITY NO. 604-2011

Waverley West Arterial Roads Project, Part 1 – Kenaston Boulevard Extension – Northbound Lanes, from North Town Road to Bishop Grandin Boulevard – New Road Construction and Associated Works
which is by reference made part hereof and is hereinafter referred to as the “Contract”.

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

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

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

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

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

_____ day of _____ , 20____ .

SIGNED AND SEALED
in the presence of:

_____
(Witness as to Principal if no seal)

_____
(Name of Principal)

Per: _____ (Seal)

Per: _____

_____
(Name of Surety)

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

FORM H2: IRREVOCABLE STANDBY LETTER OF CREDIT
(PERFORMANCE SECURITY)
(See D10)

_____
(Date)

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

RE: PERFORMANCE SECURITY – BID OPPORTUNITY NO. 604-2011

Waverley West Arterial Roads Project, Part 1 – Kenaston Boulevard Extension – Northbound Lanes, from North Town Road to Bishop Grandin Boulevard – New Road Construction and Associated Works

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

_____ ,
(Name of Contractor)

_____
(Address of Contractor)

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

_____

_____ Canadian dollars.

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

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

Partial drawings are permitted.

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

_____
(Address)

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

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

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

_____ .
(Date)

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

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

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

_____
(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

FORM J: SUBCONTRACTOR LIST
(See D11)

Waverley West Arterial Roads Project, Part 1 – Kenaston Boulevard Extension – Northbound Lanes, from North Town Road to Bishop Grandin Boulevard – New Road Construction and Associated Works

Portion of the Work	Name	Address
SURFACE WORKS		
Supply of Materials		
Concrete		
Asphalt		
Base Course & Sub-Base		
Geotextile Materials		
Trees/Shrubs/Ground Cover		
Top Soil/Sod/Seed		
Installation/Placement:		
Concrete		
Asphalt		
Base Course & Sub-Base		
Geotextile Materials		
Landscaping		
UNDERGROUND WORKS:		
Supply of Materials:		
Pipes		
Subdrains		
Precast Concrete Catch Basins/Manholes/Ring Section		
Catch Basins/Manholes Frames, Covers and Boxes		
Connecting and Sewer Service Pipe		
Installation/Placement:		
Pipes		
Subdrains		
Precast Concrete Catch Basins/Manholes/Ring Section		

FORM J: SUBCONTRACTOR LIST
(See D11)

Waverley West Arterial Roads Project, Part 1 – Kenaston Boulevard Extension – Northbound Lanes, from North Town Road to Bishop Grandin Boulevard – New Road Construction and Associated Works

Portion of the Work	Name	Address
Catch Basins/Manholes Frames, Covers and Boxes		
Connecting and Sewer Service Pipe		
OTHERS:		
Excavation:		
Landscaping		

FORM K: EQUIPMENT
(See D12)

Waverley West Arterial Roads Project, Part 1 – Kenaston Boulevard Extension – Northbound Lanes, from North Town Road to Bishop Grandin Boulevard – New Road Construction and Associated Works

1. Category/type:Removal of Underground Works and Installation of LDS

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

2. Category/type: Earthmoving / Excavation

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

3. Category/type: Compaction and Grading

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

FORM K: EQUIPMENT
(See D12)

Waverley West Arterial Roads Project, Part 1 – Kenaston Boulevard Extension – Northbound Lanes, from North Town Road to Bishop Grandin Boulevard – New Road Construction and Associated Works

4. Category/type: Concrete Paving (Slip Form)

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

5. Category/type: Asphalt Paving

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

6. Category/type: Miscellenous

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

Make/Model/Year: _____ Serial No.: _____

Registered owner: _____

FORM L: DETAILED WORK SCHEDULE

(See D13)

Waverley West Arterial Roads Project, Part 1 – Kenaston Boulevard Extension – Northbound Lanes, from North Town Road to Bishop Grandin Boulevard – New Road Construction and Associated Works

For each item of Work, indicate the proposed date that each cumulative percentage to be completed will be achieved.					
Items of Work	Percentage of Work Completed				
	Start	25%	50%	75%	100%
Stage 1A – Construction of 2 new northbound lanes of concrete pavement for Kenaston Boulevard from North Town Road to Bishop Grandin Boulevard (1300 m north).					11/18/11
Stage 1B – Construction of embankments for future flyover.					11/18/11
Stage 2 – Extension of existing concrete box culvert for Lot 16 Drain crossing of Kenaston Boulevard.					03/15/12
Stage 3 – Construction of new concrete pavement for westbound lanes of Bishop Grandin Boulevard and northbound lanes of Kenaston Boulevard from the Waverley Automall access to Scurfield Boulevard.					09/14/12
Stage 4 – Construction of intersection improvements at Kenaston Boulevard and Bishop Grandin Boulevard.					09/14/12
Stage 5 – Landscaping of Kenaston Boulevard and Bishop Grandin Boulevard.					09/14/12

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

E1.1 These Specifications shall apply to the Work.

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

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

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

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

E1.3 The following are applicable to the Work:

Drawing No.	Drawing Name/Title	Drawing (Original) Sheet Size
P-3316-00	Cover Sheet	A1
P-3316-01	Site Plan – Limit of Works	A1
P-3316-02	Site Plan – Earth Works/ Road Works	A1
P-3316-03	Site Plan – Earth Works/ Road Works	A1
P-3316-04	Road Works Removals	A1
P-3316-05	Construction and Widening of Substructure Material	A1
P-3316-06	Horizontal Geometry – Control Lines A1, A2, A3 & A6	A1
P-3316-07	Horizontal Geometry – Control Lines A4 & A5	A1
	Phasing Drawings	
P-3316-08	Site Plan – Construction Phasing – Phase 1	A1
P-3316-09	Site Plan – Construction Phasing – Phase 2	A1
P-3316-10	Site Plan – Construction Phasing – Phase 3	A1
P-3316-11	Site Plan – Construction Phasing – Phase 4	A1
	Horizontal and Vertical Geometry	
P-3316-12	Horizontal & Vertical Alignment A1 – Kenaston Blvd. SB – STA 1+342.3 to STA 1+625	A1
P-3316-13	Horizontal & Vertical Alignment A1 – Bishop Grandin Blvd. EB – STA 1+625 to STA 1+875	A1
P-3316-14	Horizontal & Vertical Alignment A1 – Bishop Grandin Blvd. EB – STA 1+875 to STA 2+125	A1
P-3316-15	Horizontal & Vertical Alignment A1 – Bishop Grandin Blvd. EB – STA 2+125 to STA 2+400	A1
P-3316-16	Horizontal & Vertical Alignment A1 – Bishop Grandin Blvd. EB – STA 2+375 to STA 2+725	A1
P-3316-17	Horizontal & Vertical Alignment A2 – Kenaston Blvd. NB – STA 0+825 to STA 1+125	A1
P-3316-18	Horizontal & Vertical Alignment A2 – Kenaston Blvd. NB – STA 1+125 to STA 1+375	A1
P-3316-19	Horizontal & Vertical Alignment A2 – Kenaston Blvd. NB – STA 1+375 to STA 1+625	A1
P-3316-20	Horizontal & Vertical Alignment A2 – Bishop Grandin Blvd. WB – STA 1+625 to STA 1+875	A1
P-3316-21	Horizontal & Vertical Alignment A2 – Bishop Grandin Blvd. WB	A1

Drawing No.	Drawing Name/Title	Drawing (Original) Sheet Size
	– STA 1+875 to STA2+125	
P-3316-22	Horizontal & Vertical Alignment A2 – Bishop Grandin Blvd. WB – STA 2+125 to STA 2+375	A1
P-3316-23	Horizontal & Vertical Alignment A3 – Kenaston Blvd. NB – STA 1+300 to STA 1+525	A1
P-3316-24	Horizontal & Vertical Alignment A3 – Kenaston Blvd. NB – STA 1+525 to STA 1+758.2	A1
P-3316-25	Horizontal & Vertical Alignment A6 – Bishop Grandin/ Kenaston Blvd. STA 1+779 to STA 2+059	A1
P-3316-26	Horizontal & Vertical Alignment A4 – Kenaston Blvd. NB/SB STA 4+975 to STA 5+210	A1
P-3316-27	Horizontal & Vertical Alignment A4 – Kenaston Blvd. S – STA 5+210 to STA 5+475	A1
P-3316-28	Horizontal & Vertical Alignment A4 – Kenaston Blvd. S – STA 5+475 to STA 5+725	A1
P-3316-29	Horizontal & Vertical Alignment A4 – Kenaston Blvd. S – STA 5+725 to STA 5+975	A1
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E2. GEOTECHNICAL REPORT

E2.1 Further to C3.1, the geotechnical report is provided to aid the Contractor's evaluation of the pavement structure and/or existing soil conditions. The geotechnical report is contained in Appendix 'A'.

E2.2 The above Test Holes were used by the Contract Administrator as a reference during the design of the proposed Works. It does not constitute part of the Contract Document and its recommendations shall not be construed as a requirement of the proposed Works.

E2.3 It is the responsibility of bidders using the information in the Test Holes to ensure it is suitable for their purposes and to supplement it as they consider necessary.

E2.4 Any test borings made by the Contractor shall be done in accordance with the requirements of the appropriate authorities of the City of Winnipeg. The Contractor shall notify the Contract Administrator prior to starting any soil boring operation.

E3. OFFICE FACILITIES

E3.1 The Contractor shall supply office facilities meeting the following requirements:

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

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

(c) The building shall have a minimum floor area of 25 square metres, a height of 2.4 m with two windows for cross ventilation and a door entrance with a suitable lock.

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

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

(f) The building shall be furnished with two desks, one drafting table, two 3 m x 1.2 m tables, one four drawer legal size filing cabinet, one mini-fridge, and a minimum of 15 chairs.

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

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

E3.2 The Contractor shall be responsible for all installation and removal costs, all operating costs, and the general maintenance of the office facilities.

E3.3 The office facilities will be provided from the date of the commencement of the Work to the date of Substantial Performance.

E3.4 On a one time basis, where directed by the Contract Administrator, the Contractor shall relocate the office facilities to a location more convenient for the remaining Work.

E4. PROTECTION OF EXISTING TREES

E4.1 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:

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

(b) Trees identified to be at risk by the Contract Administrator are to be strapped with 25 x 100 x 2400mm wood planks, or suitably protected as approved by the Contract Administrator.

(c) Excavation shall be performed in a manner that minimizes damage to the existing root systems. Where possible, excavation shall be carried out such that the edge of the excavation shall be a minimum of 1.5 times the diameter (measured in inches), with the outcome read in feet, from the closest edge of the trunk. Where roots must be cut to facilitate excavation, they shall be pruned neatly at the face of excavation.

(d) Operation of equipment within the dripline of the trees shall be kept to the minimum required to perform the work required. Equipment shall not be parked, repaired, refuelled; construction materials shall not be stored, and earth materials shall not be stockpiled within the driplines of trees. The dripline of a tree shall be considered to be the ground surface directly beneath the tips of its outermost branches. The Contractor shall ensure that the operations do not cause flooding or sediment deposition on areas where trees are located.

(e) Work on-site shall be carried out in such a manner so as to minimize damage to existing tree branches. Where damage to branches does occur, they shall be neatly pruned.

E4.2 All damage to existing trees caused by the Contractor's activities shall be repaired to the requirements and satisfaction of the Contract Administrator and the City Forester or his designate.

E4.3 No separate measurement or payment will be made for the protection of trees.

E4.4 Except as required in clause E4.1(c) and E4.1(e), Elm trees shall not be pruned at any time between April 1 and July 31.

E5. TRAFFIC CONTROL

E5.1 Further to clauses 3.6 and 3.7 of CW 1130:

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

(b) In accordance with the Manual of Temporary Traffic Control in Work Areas on City Streets, the Contractor ("Agency" in the manual) shall make arrangements with the Traffic Services Branch of the City of Winnipeg to place all temporary regulatory signs. The Contractor shall bear all costs associated with the placement of temporary traffic control devices by the Traffic Services Branch of the City of Winnipeg in connection with the works undertaken by the Contractor.

(c) The Contractor shall provide and maintain flagmen in accordance with the above mentioned manual.

(d) The Contractor shall take all other safety measures necessary to cope with any peculiar or unusual circumstances that have not been set out in the above-mentioned manual and shall, at all times, ensure that maximum protection is afforded to the road user and that his operations in no way interfere with the safe operation of traffic.

(e) Improper signing will be sufficient reason for the Contract Administrator to immediately shut down the entire job.

(f) Barricades shall be supplied and installed by the Contractor and include the telephone number(s) at which he can be reached twenty-four (24) hours per day, seven (7) days per week.

(g) During the hours when the Contractor is not working, equipment and stockpiled materials shall be left in such a location so as not to interfere with or present hazard to motorists or pedestrians.

E6. TRAFFIC MANAGEMENT

E6.1 Further to clause 3.7 of CW 1130-R2:

E6.1.1 Northbound / southbound traffic on Kenaston Boulevard and eastbound / westbound traffic on Bishop Grandin Boulevard shall be maintained during construction with a minimum of two lanes of traffic in each direction during the peak morning and afternoon hours on weekdays (Monday to Friday, 7:00 – 9:00 and 15:30 – 17:30).

E6.1.2 Northbound / southbound traffic on Kenaston Boulevard and eastbound / westbound traffic on Bishop Grandin Boulevard shall be maintained during construction with a minimum of one lane of traffic in each direction during off-peak hours.

E6.1.3 Eastbound / westbound traffic on Scurfield Boulevard shall be maintained during construction with a minimum of one lane of traffic in each direction.

E6.1.4 A minimum of one turning lane in each direction at the intersection of Kenaston Boulevard and Scurfield Boulevard must be maintained during the peak morning and afternoon hours on weekdays (Monday to Friday, 7:00 – 9:00 and 15:00 – 18:00).

E6.1.5 Access to the Waverley Automall shall be maintained at all times, unless written permission is obtained from the Contract Administrator.

E6.1.6 The multi-use pathway south of Bishop Grandin Boulevard and west of Kenaston Boulevard shall be closed between Waverley Street and Scurfield Boulevard for the duration of construction, or as directed by the Contract Administrator.

E6.1.7 Pedestrian and ambulance / emergency vehicle access must be maintained at all times.

E6.1.8 No lane closures or pedestrian / Active Transportation route closures other than those specified will be permitted unless written permission is obtained from the Contract Administrator a minimum of 48 hours prior to the proposed time the closure is to come into effect.

E6.1.9 Should the Contractor be unable to maintain pedestrian or vehicular access to a residence or business, he 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. TRAFFIC DIVERSION

E7.1 The diversion of northbound / southbound traffic on Kenaston Boulevard and eastbound / westbound traffic on Bishop Grandin Boulevard shall be performed as shown on drawings Kenaston Boulevard South Extension / Site Plan – Construction Phasing 1, 2, 3 & 4, drawings P-3316-08, P-3316-09, P-3316-10, and P-3316-11, respectively.

E7.2 Construction of the north-south roadway detour areas shall take place according to the following schedule:

(a) Phase 1 will involve construction of the new northbound lanes of Kenaston Boulevard, with the exception of Area A over the existing culvert. Both northbound and southbound traffic will continue to use the existing lanes of Kenaston Boulevard.

(b) Phase 2 will involve construction of the temporary detours north and east of the intersection of Kenaston Boulevard and Bishop Grandin Boulevard. In this configuration, northbound Kenaston Boulevard traffic will be switched to the new northbound lanes and southbound Kenaston Boulevard traffic will continue to use the existing southbound lanes.

(c) Phase 3 will start when detours constructed under Phase 2 are complete. In this configuration, northbound Kenaston Boulevard traffic will continue to use the new northbound lanes and southbound Kenaston Boulevard traffic will be switched to the existing northbound lanes.

(d) Phase 4 will begin following completion of the new southbound lanes of Kenaston Boulevard. In this configuration, southbound Kenaston Boulevard traffic will be switched to the new southbound lanes.

E7.3 The Contractor shall be responsible for removal of existing curbs, medians, and median areas as indicated on the drawings. The Contractor shall be responsible for the installation of a minimum of 100 mm of asphalt pavement in the median areas for the switching of traffic.

E7.4 After completion of the diversion, the Contractor shall be responsible for the re-installing the curb, monolithic median and median areas.

E7.5 The Contractor shall be responsible for providing the necessary traffic control and signage to ensure the actual project site is continuously fenced with both barricades on the existing streets and snow fencing along the medians and sidewalks. All costs for the items of Work described including removal and installation of concrete and roadway Works shall be paid at various unit price items.

E7.6 All other costs for the diversions including signing and assisting city forces will be paid as "Traffic Diversion" in Form B Prices.

E8. PEDESTRIAN SAFETY

E8.1 During the project, a temporary snow fence shall be installed at open excavations. The Contractor shall be responsible for maintaining the snow fence in a proper working condition. No measurement for payment shall be made for this work.

E8.2 If any pedestrian traffic is disrupted or rerouted at the site, the Contractor shall be responsible for supplying and installing all necessary signs and protection to the satisfaction of the Contract Administrator.

E9. WATER OBTAINED FROM THE CITY

E9.1 Further to clause 3.7 of CW 1120, the Contractor shall pay for all costs, including sewer charges, associated with obtaining water from the City in accordance with the Waterworks and Sewer By-laws.

E10. SURFACE RESTORATIONS

E10.1 Further to clause 3.3 of CW 1130, when Total Performance is not achieved in the year the Contract is commenced, the Contractor shall temporarily repair any Work commenced and not completed to the satisfaction of the Contract Administrator. The Contractor shall maintain the temporary repairs in a safe condition as determined by the Contract Administrator until permanent repairs are completed. The Contractor shall bear all costs associated with temporary repairs and their maintenance.

E11. INFRASTRUCTURE SIGNS

E11.1 The Contractor shall obtain infrastructure signs from the Traffic Services Sign Shop at 421 Osborne Street. The Contractor shall mount each sign securely to a rigid backing material approved by the Contract Administrator. The Contractor shall fasten each sign to a suitable support and erect and maintain one sign at each location as directed by the Contract Administrator. When the Contract Administrator considers the Work complete, the Contractor shall remove and dispose of the signs and supports. No measurement for payment will be made for performing all operations herein described and all other items incidental to the work described.

E12. SUPPLY AND INSTALL DETECTABLE WARNING SURFACE TILES

DESCRIPTION

E12.1 This specification covers the supply and installation of detectable warning surface tiles in sidewalk ramps and multi-use path ramps.

SPECIFICATIONS AND DRAWINGS

E12.2 Referenced Standard Construction Specifications and Standard Details

(a) CW 3235 - Renewal of Existing Miscellaneous Concrete Slabs
(b) CW 3240 - Renewal of Existing Curbs
(c) CW 3310 - Portland Cement Concrete Pavement Works
(d) CW 3325 - Portland Cement Concrete Sidewalk
(e) SD-229C - Curb Ramp for Concrete Pavement
(f) SD-229D - Curb Ramp for Asphalt Overlay

E12.3 SDE Drawings

(a) SDE-229A - Curb Ramp Layout for Intersections
(b) SDE-229AA - Detectable Warning Surface Tile in Curb Ramps for Intersections, Layout Option 1
(c) SDE-229AC – 300x300 Detectable Warning Surface Tile, Layout Option 3
(d) SDE-229AD – 300x300 Detectable Warning Surface Tile, Layout Option 3 DETAIL
(e) SDE-229AE – Curb Ramp for Pedestrian Corridor with a Traffic Control Device
(f) SDE-229AF – Detectable Warning Surface Tile Orientation for Offset Intersections
(g) SDE-229BB – Detectable Warning Surface Tile in Curb Ramps for Medians
(h) SDE-229E - Curb Ramp Depressed Curb

MATERIALS

E12.4 Acceptable Detectable Warning Surface Tile product is:

(a) 610 x 1220mm (2'x 4') Cast in Place (Federal Yellow).
(b) 300 x 300mm (1'x1') Cast in Place (Federal Yellow).

Manufacturer - ADA Solutions Inc.,
Supplier -
Brock White Canada
879 Keewatin Street
Winnipeg, Manitoba

Attention: Bernie Giesbrecht
Ph: 204-479-8089

or

Manufacturer - Armor Tile Tactile Systems
Supplier –
Alsip's Building Products
1 Cole Avenue
Winnipeg, Manitoba

Attention: Jason Alsip
Ph. 204-667-3330

E12.4.1 Detectable warning surface tiles shall be Federal Yellow (USA); or Safety Yellow (Canada).

E12.4.2 Detectable warning surface tiles shall be cast in place type with ribs. (Anchored type is not allowed)

E12.4.3 Truncated domes on detectable warning surface tiles shall be in accordance with ADA Accessibility Guidelines (ADAAG).

CONSTRUCTION METHODS

E12.5 Selection of Layout Options

E12.5.1 Select the appropriate design layout for detectable warning surface tiles according to the following prioritized order:

E12.5.2 Layout Option One – Install detectable warning surface tiles in accordance with SDE-229A and SDE-229AA.

E12.5.3 If two 610mm x 1220mm tiles would physically overlap each other, or would be within 150mm of each other, or if one tile would lie within the circulation path towards the other tile, then install the detectable warning surface tiles according to the following order, Layout Option Two(2) or Three(3).

E12.5.4 Layout Option Two – Separate the tiles by moving either one or both tiles along the curb line in opposite directions, in accordance with this Specification, and keeping the ramp and pedestrian road crossing as perpendicular to the road as is possible, as directed by the Contact Administrator.

E12.5.5 Layout Option Three – Install detectable warning surface tiles in accordance with SDE-229AC and SDE-229AD.

E12.6 General

E12.6.1 Construct curb ramps, sidewalk ramps and multi-use paths in accordance with the referenced Standard Construction Specifications, Standard Details, and SDE drawings.

E12.6.2 Detectable warning surface tile shall not be placed at private approaches or alleys.

E12.6.3 All curb ramps opposite each other shall have the same width.

E12.6.4 Construct the lip of the depressed curb in accordance with SDE – 229E.

E12.6.5 Construct ramp slopes in accordance with SD-229C and SD-229D. Use a ramp slope with preference for a slope as close to 5% maximum as possible.

E12.6.6 Construct flare and curb taper slopes according to the following:

a) If the curb taper is within a grassed area, construct the curb taper 900mm in length.

b) When the flare and curb taper are in a full width sidewalk and the sidewalk area at the top of the ramp is <1500mm in width, construct the flare and curb taper at 5% slope to allow safe passage for wheelchairs in this area.

c) When the flare and curb taper are in a full width sidewalk and the sidewalk area at the top of the ramp is ≥ 1500mm in width, construct the flare and curb taper at 10% slope.

E12.6.7 Install the detectable warning surface tile in accordance with E12.10.

E12.6.8 Trim the corner of the tile at curb radii in accordance with SDE-229AA and SDE-229AD.

E12.6.9 Install the detectable warning surface tiles as shown on the referenced drawings or as directed by the Contract Administrator.

E12.6.10 Orient the detectable warning surface tiles perpendicular to the crossing direction.

E12.6.11 Locate gratings, access covers and other appurtenances outside of the sidewalk ramps, depressed curbs, rest areas, and gutters in front of the depressed curbs, as directed by the Contact Administrator.

E12.7 Medians and Refuge Islands

E12.7.1 Where the distance from back of curb to back of curb is 1.32m or greater, install one detectable warning surface tile 50mm from the back of each curb.

E12.7.2 Where the distance from back of curb to back of curb is less than 1.32m, place the tiles 50mm from the back of curb and cut the tile(s) to fill the remaining area between the curbs.

E12.8 2.0m Wide Depressed Curb for Multi-use Paths

E12.8.1 Construct a curb ramp with a 2.0m depressed curb at high volume collector and regional street intersections in accordance with SDE-229E, in accordance with Public Works Department guidelines and as directed by the Contract Administrator.

E12.8.2 Construct the concrete ramp 2.0m wide and a minimum of 1.50m deep from back of curb.

E12.8.3 Construct the curb ramp in accordance with SD-229C and SD229D.

E12.8.4 Install one 610mm x 1220mm tile centered to the 2.0m wide depressed curb. The part of the tile nearest the curb must be 50mm form the back of curb similar to tile placement in SDE-229AA.

E12.9 3.5m Wide Depressed Curb for Multi-use Paths

E12.9.1 Construct a curb ramp with a 3.5m depressed curb at low volume collector and residential street intersections in accordance with SDE-229E, in accordance with Public Works Department guidelines and as directed by the Contact Administrator.

E12.9.2 Construct the concrete ramp 3.5m wide and a minimum of 1.50m deep from back of curb.

E12.9.3 Construct the curb ramp in accordance with SD-229C and SD229D.

E12.9.4 Install two (2) tiles in each concrete ramp, one (1) on each side for each direction. Place the short edge of each tile 150mm from the edge of the concrete ramp, with both tiles in line with each other transversely across the concrete ramp. The tile(s) nearest the curb must be 50mm from back of curb similar to tile placement in SDE-229AA.

E12.9.5 Saw cut the middle of the concrete slab, perpendicular to the curb and to a depth of D/4. Cut additional sawcuts as directed by the Contract Administrator.

INSTALLATION INSTRUCTIONS

E12.10 Installation Instructions for Cast In Place Inline Dome Detectable/Tactile Warning Surface Tile

(a) During Cast In Place Detectable/Tactile Warning Surface Tile installation procedures, ensure adequate safety guidelines are in place and that they are in accordance with the applicable industry and government standards.

(b) The specifications of the structural embedment flange system and related materials shall be in strict accordance with the contract documents and the guidelines set by their respective manufacturers. Do not set Cast In Place tiles in asphaltic concrete.

(c) The physical characteristics of the concrete shall be consistent with the contract specifications. An overly wet mix will cause the tile to float. Under these conditions, suitable weights such as 2 concrete blocks or sandbags (12 kg) shall be placed on each tile.

(d) Prior to placement of the Cast In Place Detectable/Tactile Warning Surface Tile system, the contract drawings shall be reviewed.

(e) Pour and finish the concrete using typical mason’s tools, however, 12 kg weights, and a large non-marring rubber mallet are specific to the installation of the Cast In Place Detectable/Tactile Warning Surface Tile system. A vibrating mechanism can be employed, if desired. The vibrating unit should be fixed to a soft base such as wood, at least 300mm square.

(f) The factory-installed plastic sheeting must remain in place during the entire installation process to prevent the splashing of concrete onto the finished surface of the tile. Remove the plastic sheeting after the concrete has set.

(g) When preparing to set the tile, it is important that NO concrete be removed in the area to accept the tile. It is imperative that the installation technique eliminates any air voids under the tile. Holes in the tile perimeter allow air to escape during the installation process. Concrete will flow through the large holes in each embedment flange on the underside of the tile. This will lock the tile solidly into the cured concrete.

(h) Drill additional 6mm vent holes in the ribs under the tile as required to help seat the tile in the concrete.

(i) The concrete shall be poured and finished true and smooth to the required dimensions and slope prior to the tile placement. The tile shall be placed in accordance with the contract drawings.

(j) The Cast In Place Detectable/Tactile Warning Surface Tiles shall be tamped (or vibrated) into the fresh concrete to ensure that the surface of the truncated domes are flush to the adjacent concrete surface. Embedment of the tile so the top of the truncated domes are flush with the adjacent concrete will reduce the possibility of damage due to snow clearing operations. The embedment process should not be accomplished by stepping on the tile as this may cause uneven setting which can result in air voids under the tile surface.

(k) While concrete is workable, a 3/8” radius edging tool shall be used to create a finished edge of concrete, a steel trowel shall then be used to finish the concrete around the tile’s perimeter.

(l) During and after the tile installation and the concrete curing stage, it is imperative that there is no walking, leaning or external force placed on the tile that may rock the tile causing a void between the underside of tile and concrete.

(m) Following tile placement, review installation tolerances to contract drawings and adjust tile before the concrete sets. Two suitable weights of 12kg each shall be placed on each tile as necessary to ensure solid contact of the underside of tile to concrete.

(n) If required, individual tiles can be bolted together using ¼ inch or equivalent hardware. This can help to ensure that adjacent tiles are flush to each other during the installation process. Tape or caulking can be placed on the underside of the bolted butt joint to ensure that concrete does not rise up between the tiles during installation. Any protective plastic wrap which was peeled back to facilitate bolting or cutting, should be replaced and taped to ensure that the tile surface remains free of concrete during the installation process.

(o) Following the concrete curing stage, protective plastic wrap is to be removed from the tile surface by cutting the plastic with a sharp knife, tight to the concrete/tile interface. If concrete bled under the plastic, a soft brass wire brush will clean the residue without damage to the tile surface.

(p) Tiles can be cut using a continuous rim diamond blade in a circular saw or mini-grinder. Use of a straightedge to guide the cut is advisable where appropriate.

(q) Bolt 300mm x 300mm tiles together prior to placing in plastic concrete. This ensures that the surface of the tiles are flush with each other.

MEASUREMENT AND PAYMENT

E12.11 Detectable Warning Surface Tiles shall be measured on a unit basis and paid for at the Contract Unit Price per unit for the "Items of Work" listed here below. The number of units to be paid for shall be the total number of detectable warning surface tiles supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

Detectable Warning Surface Tiles:

i) 300mm x 300mm tiles

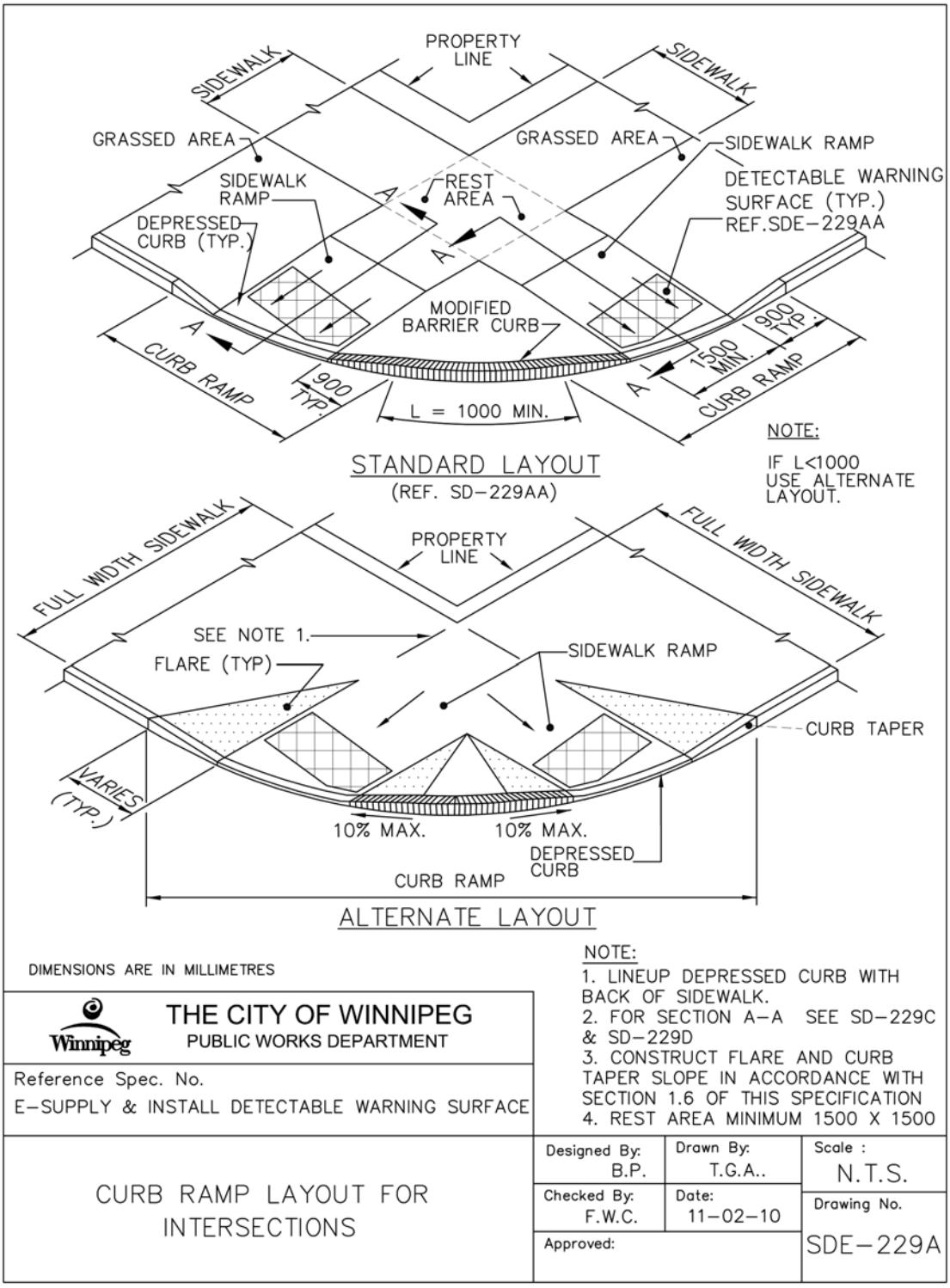
ii) 610mm x 1220mm tiles

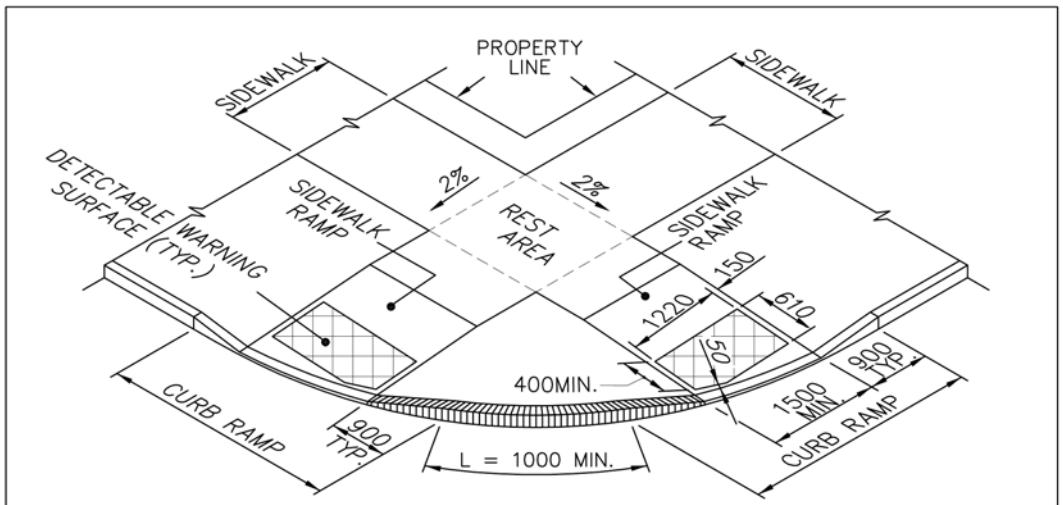
E12.12 The area under the detectable warning surface tile is part of the concrete sidewalk ramp and will be paid in accordance with CW 3235 or CW 3325.

E12.13 The concrete sidewalk ramp and the concrete ramp for multi-use paths will be paid as 100mm sidewalk in accordance with CW 3235 or CW 3325.

E12.14 Curb ramp will be paid in accordance with CW 3240 or CW 3310.

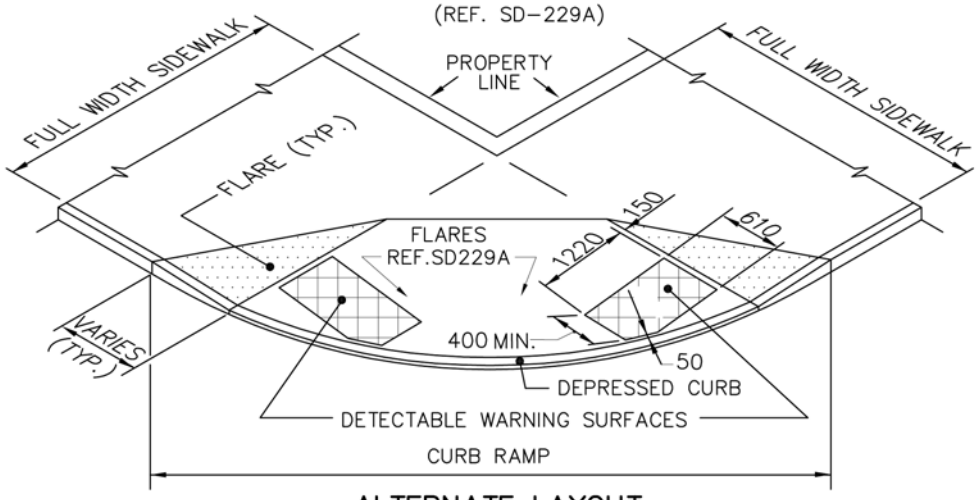
DRAWINGS


PROPERTY LINE
SIDEWALK
SIDEWALK
GRASSED AREA
GRASSED AREA
SIDEWALK RAMP
SIDEWALK RAMP
REST AREA
DETECTABLE WARNING SURFACE (TYP.) REF.SDE-229AA
DEPRESSED CURB (TYP.)
MODIFIED BARRIER CURB
A
A
A
A
CURB RAMP
900 TYP.
L = 1000 MIN.
1500 MIN.
900 TYP.
CURB RAMP
STANDARD LAYOUT
(REF. SD-229AA)
NOTE:
IF L<1000 USE ALTERNATE LAYOUT.
FULL WIDTH SIDEWALK
PROPERTY LINE
FULL WIDTH SIDEWALK
SEE NOTE 1.
FLARE (TYP)
SIDEWALK RAMP
CURB TAPER
VARIES (TYP.)
10% MAX.
10% MAX.
DEPRESSED CURB
CURB RAMP
ALTERNATE LAYOUT
DIMENSIONS ARE IN MILLIMETRES
NOTE:
1. LINEUP DEPRESSED CURB WITH BACK OF SIDEWALK.
2. FOR SECTION A-A SEE SD-229C & SD-229D
3. CONSTRUCT FLARE AND CURB TAPER SLOPE IN ACCORDANCE WITH SECTION 1.6 OF THIS SPECIFICATION
4. REST AREA MINIMUM 1500 X 1500
THE CITY OF WINNIPEG
PUBLIC WORKS DEPARTMENT
Reference Spec. No.
E-SUPPLY & INSTALL DETECTABLE WARNING SURFACE
CURB RAMP LAYOUT FOR INTERSECTIONS
Designed By: B.P.
Drawn By: T.G.A..
Scale : N.T.S.
Checked By: F.W.C.
Date: 11-02-10
Drawing No.
Approved:
SDE-229A



STANDARD LAYOUT

(REF. SD-229A)



ALTERNATE LAYOUT

(REF. SD-229A)

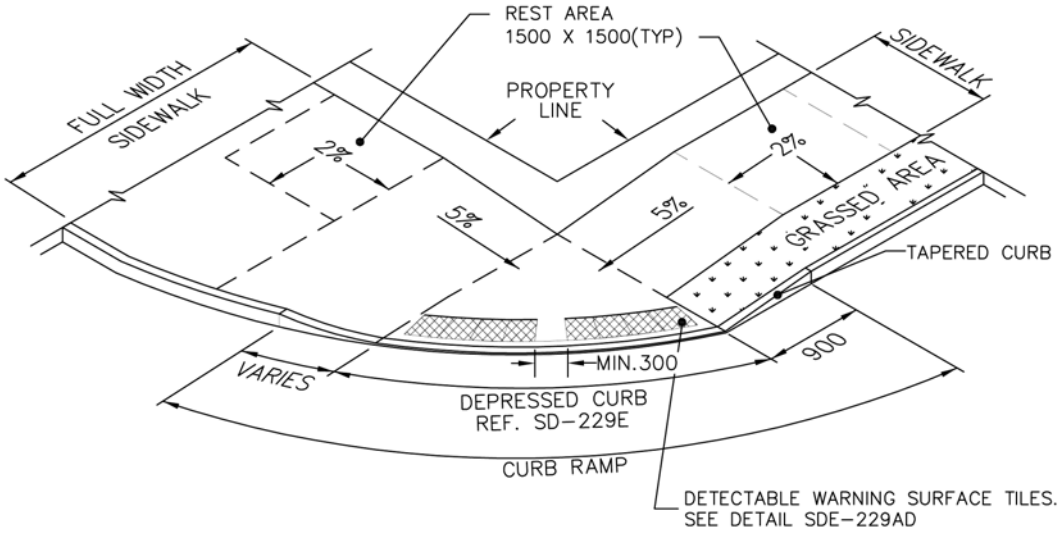
THE CITY OF WINNIPEG
PUBLIC WORKS DEPARTMENT

Reference Spec. No.
CW 3235, CW 3310, CW 3325
E-SUPPLY & INSTALL DETECTABLE WARNING SURFACE

DIMENSIONS ARE IN MILLIMETRES

DETECTABLE WARNING SURFACE TILE SURFACE IN CURB RAMPS FOR INTERSECTIONS. **LAYOUT OPTION 1**

Designed By:	Drawn By:	Scale :
B.P.	T.G.A.	N.T.S.
Checked By: F.W.C.	Date: 11-02-10	Drawing No.
Approved:		SDE-229AA



NOTES:
1. PLACE 300x300 DETECTABLE WARNING SURFACE TILES IN ACCORDANCE WITH "SELECTION OF LAYOUT OPTIONS" IN THIS SPECIFICATION.

THE CITY OF WINNIPEG
PUBLIC WORKS DEPARTMENT

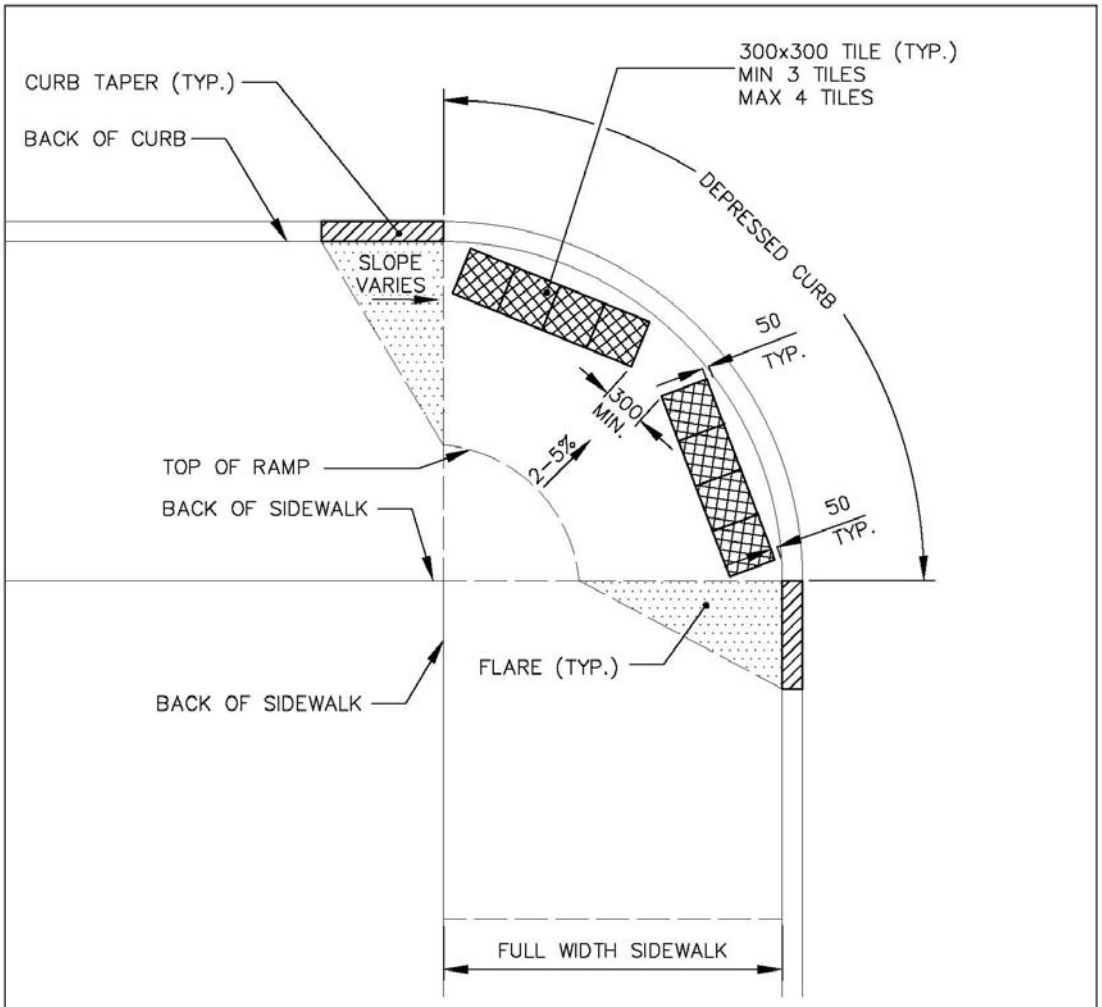
Reference Spec. No.
E-SUPPLY AND INSTALL DETECTABLE WARNING SURFACE TILES

DIMENSIONS ARE IN MILLIMETRES

300 X 300 mm DETECTABLE WARNING SURFACE TILE
LAYOUT OPTION 3

Designed By:	Drawn By:	Scale :
B.P.	R.R.	N.T.S.
Checked By:	Date:	Drawing No.
	11-02-10	
Approved:		SDE-229AC

Template Version: C420110321 - RW



NOTES:
1. WHEN THE SIDEWALK AREA AT THE TOP OF THE RAMP IS ≥ 1500mm OR < 1500mm IN WIDTH, CONSTRUCT THE SLOPE OF THE CURB RAMP AND THE CURB TAPER IN ACCORDANCE WITH SECTION 1.6 OF THIS SPECIFICATION.

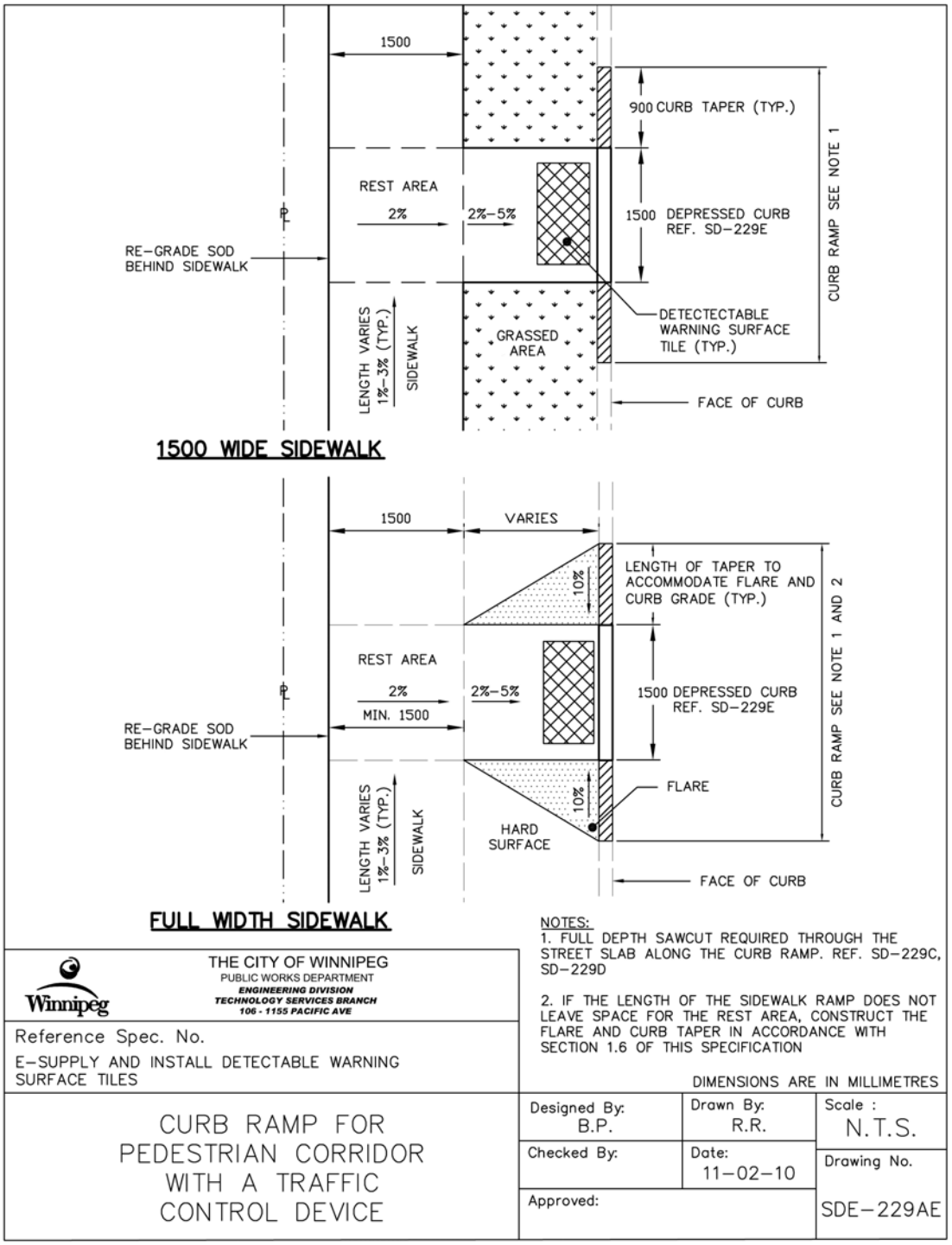
THE CITY OF WINNIPEG
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
TECHNOLOGY SERVICES BRANCH
185 - 1155 PACIFIC AVE

Reference Spec. No.
E-SUPPLY AND INSTALL DETECTABLE WARNING SURFACE TILES

DIMENSIONS ARE IN MILLIMETRES

300x300mm DETECTABLE WARNING SURFACE TILE
LAYOUT OPTION 3 DETAIL

Designed By:	Drawn By:	Scale :
B.P.	R.R.	N.T.S.
Checked By:	Date: 11-02-10	Drawing No.
Approved:		SDE-229AD



NOTES:
1. FULL DEPTH SAWCUT REQUIRED THROUGH THE STREET SLAB ALONG THE CURB RAMP. REF. SD–229C, SD–229D

2. IF THE LENGTH OF THE SIDEWALK RAMP DOES NOT LEAVE SPACE FOR THE REST AREA, CONSTRUCT THE FLARE AND CURB TAPER IN ACCORDANCE WITH SECTION 1.6 OF THIS SPECIFICATION

DIMENSIONS ARE IN MILLIMETRES

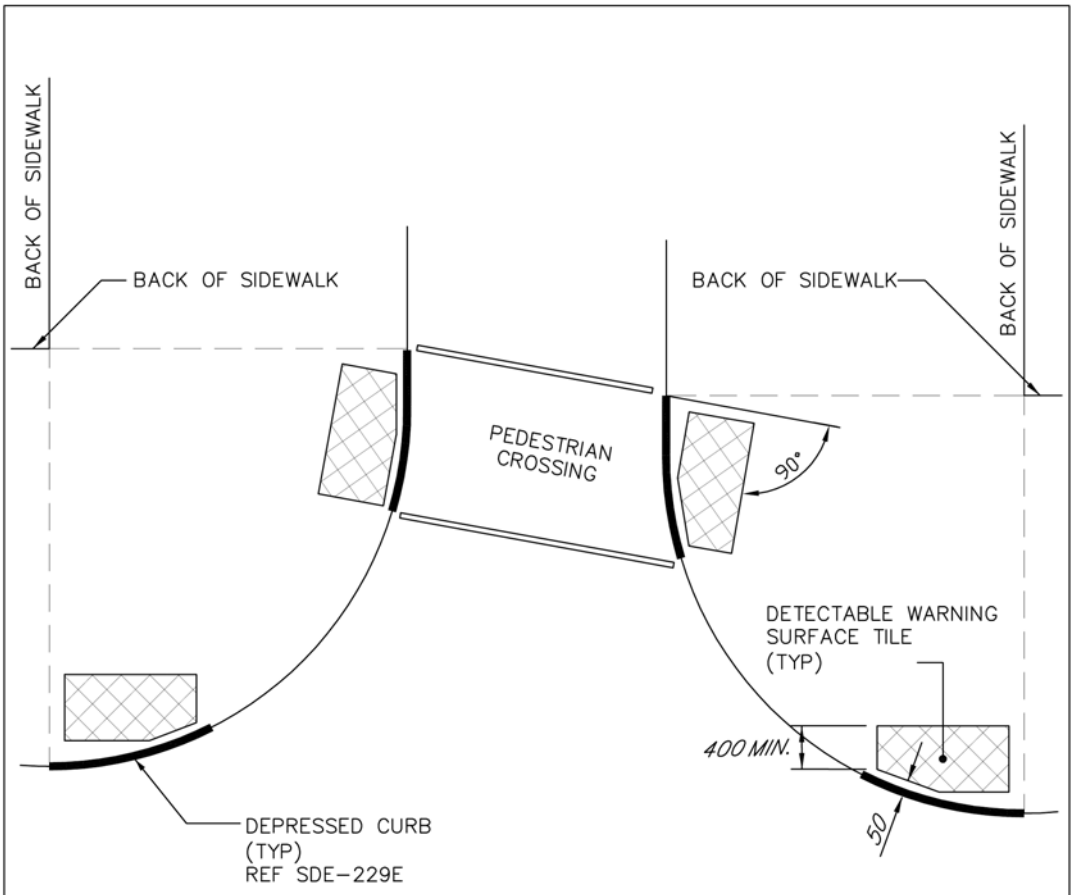
THE CITY OF WINNIPEG
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
TECHNOLOGY SERVICES BRANCH
106 - 1155 PACIFIC AVE

Reference Spec. No.
E–SUPPLY AND INSTALL DETECTABLE WARNING SURFACE TILES

CURB RAMP FOR PEDESTRIAN CORRIDOR WITH A TRAFFIC CONTROL DEVICE

Designed By:	Drawn By:	Scale :
B.P.	R.R.	N.T.S.
Checked By:	Date: 11–02–10	Drawing No.
Approved:		SDE–229AE

Template Version: C420110321 - RW



NOTES:
1.LOCATE END OF DEPRESSED CURB IN LINE WITH PROJECTED BACK OF SIDEWALK.
2.CONSTRUCT FLARES IN ACCORDANCE WITH SDE-229A

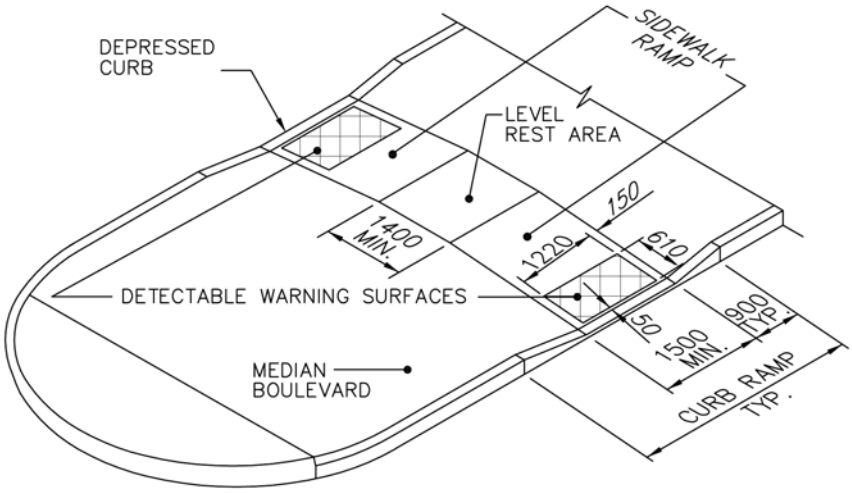
THE CITY OF WINNIPEG
PUBLIC WORKS DEPARTMENT

Reference Spec. No.
CW 3235, CW 3310, CW 3325
E-SUPPLY & INSTALL DETECTABLE WARNING SURFACE TILES

DIMENSIONS ARE IN MILLIMETRES

DETECTABLE WARNING SURFACE TILE ORIENTATION FOR OFFSET INTERSECTIONS

Designed By: B.P.	Drawn By: T.G.A.	Scale : N.T.S.
Checked By: F.W.C.	Date: 11-02-10	Drawing No. SDE-229AF
Approved:		



MEDIAN SIDEWALK CROSSING
(REF. SD-229B)

NOTE:
1. FOR NARROW MEDIANS AND REFUGE ISLANDS < 1.32m IN WIDTH, PLACE DETECTABLE WARNING SURFACE FULL WIDTH, MAINTAINING 50mm SPACING FROM BACK OF CURB.

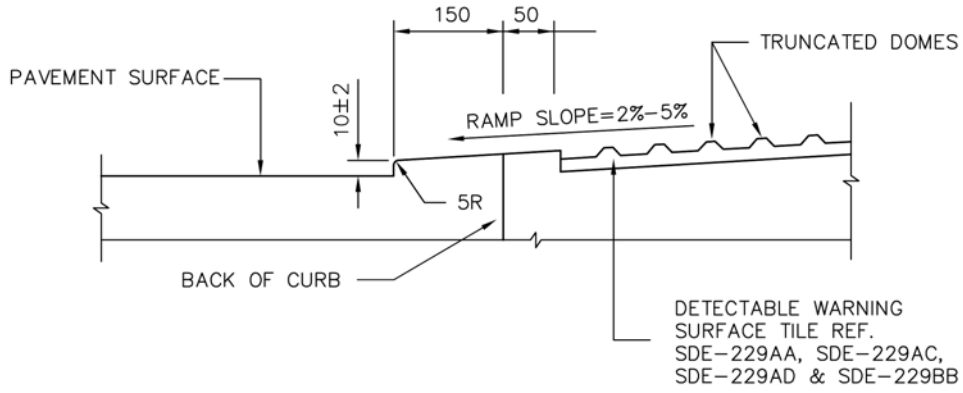
THE CITY OF WINNIPEG
PUBLIC WORKS DEPARTMENT

Reference Spec. No.
CW 3235, CW 3310, CW 3325
E-SUPPLY & INSTALL DETECTABLE WARNING SURFACE

DIMENSIONS ARE IN MILLIMETRES

DETECTABLE WARNING SURFACE TILE IN CURB RAMPS FOR MEDIANS

Designed By: B.P.	Drawn By: T.G.A.	Scale : N.T.S.
Checked By: F.W.C.	Date: 11-02-10	Drawing No. SDE-229BB
Approved:		



DEPRESSED CURB

NOTES:

1) SIDEWALK RAMP SURFACE SHALL BE GIVEN A PARALLEL TEXTURED BROOM FINISH.
2) INSTALL DETECTABLE WARNING SURFACE SO THAT THE TOP OF THE TRUNCATED DOMES ARE FLUSH WITH THE SURFACE FO THE ADJACENT SIDEWALK.

THE CITY OF WINNIPEG PUBLIC WORKS DEPARTMENT			
Reference Spec. No. CW 3235, CW 3310, CW 3325 E–SUPPLY & INSTALL DETECTABLE WARNING SURFACE	DIMENSIONS ARE IN MILLIMETRES		
CURB RAMP DEPRESSED CURB	Designed By: B.P.	Drawn By: T.G.A.	Scale : N.T.S.
	Checked By: F.W.C.	Date: 11–02–10	Drawing No. SDE–229E
	Approved:		

E13. NIGHT WORK AND NOISE LIMITATIONS

E13.1 Night work may have to be undertaken by the Contractor, as required by his Schedule of Work and by his actual Work progress, to ensure timely completion of all Works of this Contract, all at his own cost.

E13.2 Further to the General Conditions, the Contractor shall show that he has the approval of all applicable authorities in regard to said night work and to the anticipated/actual construction noise levels. In particular, such work shall conform with the Neighbourhood Liveability By-Law No. 1/2008. Also, the Contractor, at his own cost, incidental to these Works, shall supply sufficient lighting to enable all night work to be done in a safe and efficient manner, satisfactory to the Contract Administrator.

E13.3 The Contractor is advised that possible noise level problems may limit his Work activities on Sundays and at night. The Contractor must request and receive approval from the Contract Administrator at least 48 hours in advance of any Contract Work to be undertaken on Sundays or at night. It will be the Contractor's responsibility to schedule Work activities to minimize potential problems and/or to employ noise-reduction measures to lower the noise to an acceptable level. Time extension will not be granted on the basis of the Contractor being ordered to limit his activities at night.

E14. MOBILIZATION AND DEMOBILIZATION

E14.1 Description

E14.1.1 This Specification shall cover all operations relating to the mobilization and demobilization of the Contractor to the Site, as specified herein.

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

E14.2 Materials

E14.2.1 The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification.

E14.2.2 Construction fencing shall be constructed of orange wood lath or plastic and be 1200 mm high.

E14.3 Construction Methods

E14.3.1 Prior to mobilization, the Contractor shall submit a Site Mobilization Plan indicating the following:

(a) location of Site Trailer(s);

(b) location of Site access routes;

(c) location of any / all temporary construction roads within the Site; and,

(d) location and limits of a laydown area to be used during concrete box culvert construction.

E14.3.2 All construction traffic for Stages 1A, 1B, 3, 4, and 5 shall access the Site from Waverley Street, via Arbour Meadow Gate, Bridgeland Drive South, and North Town Road.

E14.3.3 Construction traffic shall not deviate from the approved construction access routes unless written approval is obtained from the Contract Administrator at least 48 hours prior to use of the alternate route(s). The Contractor shall arrange, attend, and assist a condition inspection of the route with the Contractor Administrator prior to the start of construction.

E14.3.4 The Contractor shall furnish the laydown area to be used during concrete box culvert construction with suitable granular base material to the satisfaction of the Contract Administrator.

E14.3.5 Site fencing shall be provided in the form of an orange plastic or wood snow fence to delineate the construction from the non-construction area as shown on the Drawings. The Contractor shall maintain the fence for the duration of the construction and remove it when construction is complete.

E14.3.6 The Contractor's Site supervisor is required to carry, at all times, a cellular telephone, with voice mail.

E14.3.7 This section also includes travel and accommodation, set-up and demobilization of Site offices, storage conveniences and other temporary facilities, construction plant, and other items not required to form part of the permanent works and not covered by other prices.

E14.4 The Limits of Work Area will be reviewed at the Pre-Construction Meeting. If the Contractor requests a Change in the Limits of the Work Area, they shall do so formally in writing at least ten (10) business days prior to mobilization. The Contract Administrator will respond within five (5) business days with a response; the Contractor Administrator has the right to dismiss the request.

E14.4.1 the intent of the Limits of the Work Area is to preserve existing trees and vegetation by minimizing removals.

E14.5 Measurement and Payment

E14.5.1 Mobilization and Demobilization will not be measured. This item of work will be paid for at the Contract Lump Sum Price for "Mobilization and Demobilization" performed in accordance with this Specification and accepted by the Contract Administrator.

E15. MAINTAINING FLOWS THROUGH THE EXISTING CONCRETE BOX CULVERT

E15.1 Description

E15.1.1 This Specification shall cover the maintaining of flows through the existing culvert for the duration of the construction Works.

E15.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all works as hereinafter specified.

E15.2 Materials

E15.2.1 The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

E15.3 Construction Methods

E15.3.1 In general, the Work shall include, but not necessarily be limited to:

(a) Design of the methods to maintain the flows of the ditch, through the culvert into Lot 16 Drain. The preparation and submission for review and approval by the Contract Administrator of a Water Management Plan comprised of detailed drawings and/or description of the methods.

(b) Removal of materials and/or equipment needed to maintain creek flows, at the end of their use.

(c) Confinement of suspended matter in the creek water generated at the Site through excavation, etc. to the area of the Site. This may require the construction of a downstream cofferdam and floating turbidity barrier through the creek to confine that suspended matter.

E15.3.2 The Contractor's Water Management Plan shall be designed to meet the following additional conditions and requirements:

(a) All cofferdams shall be designed by a Professional Engineer registered in the Province of Manitoba

(b) Cofferdams, if used, shall be constructed of non-erodible material such as sandbags, sheet piles or the like.

(c) Between the dates of March 30 and June 15, fish shall be afforded full access through the Site via a naturally flowing channel. In this time period, no construction activity impacting upon the culvert or drain affecting fish mobility or habitat will be permitted.

(d) Detailed design drawings and design calculations shall be submitted to the Contract Administrator for review at least five (5) business days prior to the start of construction of the cofferdams. The Bidders are advised that the drawings are for the Contract Administrator's review, information, and records only. The submission of the detailed drawings to the Contract Administrator shall in no way relieve the Contractor of the full responsibility for the design and proper functioning of the cofferdams.

(e) Maintenance of creek flows for the duration of construction of the culvert extension. The Water Management Plan is to be designed such that it can pass 0.3 cubic metre per second of water from the inlet of the culvert to the Lot 16 Drain.

(f) The Water Management Plan shall also ensure the aquatic life is not hurt through means such as the use of fish screens around pumps.

(g) Excavation and construction of the culvert and walls shall be completed under dry conditions. Cofferdams shall be as watertight as is necessary for the proper performance of the work that must be done inside them. The cofferdams shall be designed and constructed to meet the requirements of the Contractor's Water Management Plan, particularly with respect to maintaining stream flow through or around the site. The elevations of the cofferdams shall be determined by the Contractor. The water elevation of Lot 16 Drain on July 8, 2009 and January 18, 2011 is 229.1 based on site surveys. The water elevation of Lot 16 Drain during the 1997 flood event was recorded as 230.7. These elevations are not requirements for the cofferdams but rather are provided as information only.

(h) The Water Management Plan shall to outline the construction sequence to be utilized by the Contractor.

(i) The Water Management Plan must meet the requirements of this specification including the Substantial Performance, Total Performance and Regulatory requirements.

(j) Sheetpiling shall be driven to a depth below the bottom of the excavation to preclude the possibility of a blow-up from the bottom of the excavation.

(k) Cofferdams shall not be removed until construction of the culvert and backfilling operations have been completed to an extent where unimpeded stream flow can be re-established. Backfill required around the permanent Work shall be supplied and placed in accordance with the Specifications for The Contractor shall construct the cofferdams in accordance with the detailed design drawings. Variations from the cofferdam drawings will not be permitted, unless such variations are approved by the designer and the Contract Administrator is provided with the revised drawings.

(l) Unless otherwise provided for, cofferdams shall be removed after the completion of the structure. Care shall be taken not to disturb or to otherwise damage the finished structure.

E15.4 Measurement and Payment

E15.4.1 The maintenance of creek flows will not be measured. This item of work will be paid for at the Contract Lump Sum Price for "Maintaining Culvert Flows" performed in accordance with this Specification and accepted by the Contract Administrator.

E16. BOX CULVERT EXCAVATION AND REMOVALS

E16.1 Description

E16.1.1 This Specification shall cover all operations relating to the removal of a portion of the existing concrete box culvert and related materials including the culvert foundation and riprap. It shall also include excavation for the new culvert construction works, surface erosion control during construction, creek bed and embankment sloping, as noted on the Drawings and in the Specification.

E16.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all works as hereinafter specified.

E16.2 Materials

E16.2.1 The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

E16.2.2 Excavated material shall be unclassified excavation and shall include the excavation and satisfactory disposal of all surplus earth, gravel, sandstone, loose detached rock, cemented gravel or hard pan, disintegrated stone, rock in ledge or mass formation, and dry or all other material of whatever character that may be encountered.

E16.2.3 The erosion control blanket shall be as per E30.

E16.3 Construction Methods

E16.3.1 In general, the Work shall comprise of:

(a) The design of the excavation for the new box culvert extension is to conform to the requirements of the Manitoba Department of Labour and Immigration, Workplace Safety and Health Division.

(b) Design, installation and subsequent removal of sheeting, shoring, and other temporary protective work as may be required.

(c) The excavation of material of whatever nature, to the limits shown on the Drawings for the box culvert, riprap, creek bed, retaining wall and embankment trimming.

(d) The removal off-site of demolished portions of the existing concrete box culvert.

(e) Preparation of the interface between the existing culvert and the proposed extension.

(f) Prevention of frost incursion into the sidewalls or base of the excavation for the duration of the Works.

(g) Surface erosion protection and rough grading.

(h) The off-site disposal of surplus and unsuitable material.

(i) To the extent that the Items of Work, “Maintaining Culvert Flows” does not dewater the Site, provide dewatering of the excavation for the Works.

E16.3.2 All shoring shall be designed and sealed by a Professional Engineer registered in the Province of Manitoba in accordance with the following requirements:

(a) Detailed design drawings and design calculations shall be submitted to the Contract Administrator for review at least five (5) business days prior to the start of construction of the shoring. The drawings are for the Contract Administrator’s review, information, and records only. The submission of the detailed drawings to the Contract Administrator shall in no way relieve the Contractor of the full responsibility for the design and proper functioning of the shoring.

(b) The shoring shall be of a design and construction such that the Work can be properly constructed as required by the Specifications and Drawings. Sufficient clearance

shall be provided within the shoring to permit all required construction activities to proceed unhindered.

(c) The Contractor shall construct shoring in accordance with the shoring drawings. Variations from the shoring drawings will not be permitted, unless such variations are approved by the designer and the Contract Administrator is provided with the revised drawings.

(d) Unless otherwise provided for, shoring shall be removed after the completion of the structure. Care shall be taken not to disturb or to otherwise damage the finished structure.

(e) Shoring may be designed and installed “tight” and used as the outside form of the box culvert. If used that way, install bentonite geotextile waterproofing against the sheet piling at the joints prior to using it as a form.

E16.3.3 Specific requirements related to the excavation for the box culvert structure include:

(a) The excavation shall be such that the structure may be properly constructed to the required depths and without reduction of dimensions as shown on the Drawings.

(b) The dimensions of the excavation shall be such as to give sufficient clearances for the construction of forms and their subsequent removal and the construction of cut-off trenches and/or sumps, if required, to permit the pumping of water.

(c) The excavation shall be dewatered and maintained dewatered so that the material is excavated in its natural state. The bottom of the excavation shall be kept free from excessive moisture or free-flowing water.

(d) The level of any water inside the excavation shall be below the bottom of the culvert elevation so that the concrete may be placed in dry conditions. Pumping water from inside the enclosure shall be continued until the culvert and walls are completed and backfilled or as otherwise directed by the Contract Administrator.

(e) The shoring design shall meet all regulatory requirements including those of Manitoba Workplace Health and Safety.

E16.3.4 The Contractor shall be required to maintain the excavation sidewalls and base in a frost-free condition for the duration of the construction until the box culvert has been completely backfilled. This is required so that there will be no backfill placed on frozen earth and cause subsequent subsidence once thawed. This requirement does not apply to the area upstream and downstream of the culvert on which riprap will be placed.

E16.3.5 The Contractor shall provide rough grading to all disturbed surfaces within the construction area to the requirements of the “Preparation of Existing Grade” of Specification CW 3450. The Contractor shall be responsible to cover all unvegetated surfaces of the embankments with an erosion control blanket, erect silt fences or use other suitable methods to prevent soil erosion into the ditch or Lot 16 Drain, both during and after construction of the culvert up until the time of final landscaping restoration to be done by others. Erosion control blankets are to be installed on the bottom of the ditch in place of the removed CSP culverts during Phase II of the Work. The erosion control blanket it to be supplied, placed, measured and paid for in accordance with E30 and silt fences are to be supplied, placed, measured and paid for in accordance with E26.

E16.3.6 Excavated material that is unsuitable for, or surplus to, the backfill requirements shall become the property of the Contractor and shall be removed from the Site. Excavated material shall not be disposed of in a manner that will obstruct the flow of watercourses. During freezing weather, the excess material shall be disposed of before it freezes.

E16.3.7 Preparation of the Interface Between the Existing Culvert and the Proposed Extension

(a) The existing concrete surface remaining upon removal of the required concrete as shown on the Drawings shall have a minimum amplitude of 6 mm achieved through mechanical means.

(b) The existing concrete surface is to be sandblasted to remove any laitence or loose concrete.

(c) A bonding agent shall be applied to the existing concrete surface prior to the casting the proposed concrete.

(d) The existing reinforcing steel remaining shall be sand blasted in accordance with SSPC-SP 6/NACE NO.3.

(e) The bonding agent shall be in accordance with Section E18, “Structural Concrete”.

E16.4 Measurement and Payment

E16.4.1 Excavation and removals above Elevation 226.655 will not be measured. This item of work will be paid for at the Contract Lump Sum Price for “Culvert Excavation and Other Removals” performed in accordance with this Specification and accepted by the Contract Administrator. This payment item includes the required removal of all existing culvert components.

E16.4.2 Excavation below Elevation 226.655 will be measured per cubic metre. The volume to be measured shall be the total number of cubic metres of material excavated in accordance with this Specification, the Drawings and acceptable to the Contract Administrator, as computed from field measurements. This item of work will be paid for at the Contract Unit Price per metre for “Excavation Below Elevation 226.655” performed in accordance with this Specification and accepted by the Contract Administrator.

E17. SUPPLYING AND PLACING REINFORCING STEEL FOR BOX CULVERT

E17.1 Description

E17.1.1 This Specification shall cover the supply, fabrication and placement of plain reinforcing steel and stainless steel reinforcing bars.

E17.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all works as hereinafter specified.

E17.2 Materials

E17.2.1 General

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

(b) All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with the latest edition of CSA Standard CAN3-A23.1, Storage of Materials, except as otherwise specified herein.

E17.2.2 Plain Reinforcing Steel

(a) All plain reinforcing steel shall conform to the requirements of CSA Standard G30.18, Grade 400W, Billet-Steel Bars for concrete reinforcement. If, in the opinion of the Contract Administrator, any reinforcing steel provided for the concrete works exhibits flaws in manufacture or fabrication, such material shall be immediately removed from the Site and replaced with acceptable reinforcing steel.

(b) All reinforcing steel shall be straight and free from paint, oil, mill-scale, and injurious defects. Surface seams or surface irregularities will not be cause for rejection, provided that the minimum dimensions, cross section area, and tensile properties of a hand wire-brushed specimen are not less than the requirements of CSA Standard G30.18.

E17.2.3 Stainless Steel Reinforcing

(a) Stainless steel reinforcing shall be deemed to include all dowels and fabricated stainless steel sleeves.

(b) Stainless steel reinforcing bars to ASTM A955M, 300 Series, Grade 420, Type 2205 Duplex or Type 316 LN.

(c) Stainless steel plates for sleeves to ASTM A167,Type 308 or equivalent as per section B6.

(d) The stainless steel reinforcement shall be mechanically or chemically descaled prior to fabrication, leaving a totally passive stainless steel finish free of millscale, slag or oxidation.

E17.2.4 Bar Accessories

(a) Bar accessories shall be of a type approved by the Contract Administrator. They shall be made from a non-rusting material, and shall not stain, blemish, or spall the concreted surface for the life of the concrete.

(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 for stainless steel reinforcing bars shall be of the types suitable for stainless steel reinforcing and acceptable to the Contract Administrator. The supplying and installation of bar accessories shall be deemed to be incidental to the supplying and placing of reinforcing steel.

E17.2.5 Reinforcing Steel Shop Drawings

(a) Shop drawings are not required.

E17.3 Construction Methods

E17.3.1 Fabrication of Reinforcing Steel

(a) Reinforcing steel shall be fabricated in accordance with CSA Standard S6 to the lengths and shapes as shown on the Drawings.

E17.3.2 Placing of Reinforcing Steel

(a) Reinforcing steel shall be placed accurately in the positions shown on the Drawings and shall be retained in such positions by means of a sufficient number of bar accessories to that the bars shall not be moved out of alignment during or after the depositing of concrete. The Contract Administrator's decision in this matter shall be final.

(b) Reinforcing steel shall be free of all foreign material in order to ensure a positive bond between the concrete and steel. The Contractor shall also remove any dry concrete, which may have been deposited on the steel from previous concrete placement, before additional concrete may be placed. Intersecting bars shall be tied positively at each intersection.

(c) Splices in reinforcing steel shall be made only where indicated on the Drawings. Prior approval of the Contract Administrator shall be obtained where other splices are to be made. Welded splices shall conform to CSA Standard W186, and are subject to prior written approval of the Contract Administrator.

(d) Reinforcing steel shall not be straightened or re-bent in a manner that will injure the metal. Bars with bends not shown on the Drawings shall not be used. Heating of reinforcing steel will not be permitted without the prior approval of the Contract Administrator. A minimum of twenty-four (24) hours advance notice shall be given to the Contract Administrator prior to placing of any concrete to allow for inspection of the reinforcement.

E17.4 Quality Control

E17.4.1 Inspection

(a) All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations; from the selection and production of materials, through to final acceptance of the specified Work. The Contractor shall be wholly responsible for the

control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this Specification.

E17.4.2 Access

(a) The Contract Administrator shall be afforded full access for the inspection and quality control testing of reinforcing steel; both at the Site of Work and at any plant used for fabrication of the reinforcing steel, to determine whether the reinforcing steel is being supplied in accordance with this Specification.

E17.4.3 Quality Testing

(a) Quality control testing will be used to determine the acceptability of the reinforcing steel supplied by the Contractor.

(b) 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

E17.5.1 Supplying and placing plain reinforcing steel will be measured on a mass basis. The mass to be paid for shall be the total number of kilograms of reinforcing steel installed in accordance with this Specification, acceptable to the Contract Administrator, as computed from the reinforcing layout shown on the Drawings, excluding the mass of bar accessories. This item of work will be paid at the Contract Unit Price per kilogram for the "Supply and Place Reinforcing Steel" performed in accordance with this Specification and accepted by the Contract Administrator.

E17.5.2 Supplying and placing stainless steel reinforcing steel and stainless steel sleeves will be measured on a mass basis. The mass to be paid for shall be the total number of kilograms of stainless steel reinforcing installed in accordance with this Specification, acceptable to the Contract Administrator, as computed from the reinforcing layout shown on the Drawings, excluding the mass of bar accessories. This item of work will be paid at the Contract Unit Price per kilogram for the "Supply and Place Stainless Steel" performed in accordance with this Specification and accepted by the Contract Administrator.

E18. STRUCTURAL CONCRETE

E18.1 Description

E18.1.1 This Specification shall cover the preparation of Portland Cement Structural Concrete for, and all concreting operations related to, the construction of Portland Cement Structural Concrete Works as specified herein.

E18.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all works as hereinafter specified.

E18.2 Materials

E18.2.1 General

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

E18.2.2 Handling and Storage of Materials

(a) All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with CSA Standard CAN/CSA-A23.1.

E18.2.3 Testing and Approval

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

(b) All materials shall be approved by the Contract Administrator at least seven (7) days before any construction is undertaken. If, in the opinion of the Contract Administrator, such materials in whole or in part, do not conform to the Specifications detailed herein or are found to be defective in manufacture or have become damaged in transit, storage, or handling operations, then such materials shall be rejected by the Contract Administrator and replaced by the Contractor at his own expense.

E18.2.4 Bonding Agents

(a) The Contractor shall identify the product(s) and submit product information to the Contract Administrator for review and approval.

E18.2.5 Curing Compound

(a) If permitted for use, curing compound shall be liquid membrane-forming and conform to the requirements of ASTM Standard C309. Rate of application shall be 1.5 times the rate specified by the Manufacturer for the texture of concrete to which the curing compound is being applied.

(b) Curing compounds shall be resin-based and white-pigmented.

E18.2.6 Patching Mortar

(a) The patching mortar shall be made of the same cementitious material and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not more than 1 part cement to 2 parts sand by damp loose volume. White Portland Cement shall be substituted for a part of the grey Portland Cement on exposed concrete in order to produce a colour matching the colour of the surrounding concrete, as determined by a trial patch. The quantity of mixing water shall be no more than necessary for handling and placing.

E18.2.7 Non-Shrink Cementitious Grout

(a) Where non-shrink cementitious grout is used, it shall be Sternson M-bed Standard, Specialty Construction Products CPD Non-Shrink Grout, Sika 212 Non-Shrink Grout, Meadows CG-86, or equal as approved in accordance with B6. The minimum compressive strength of the grout at 28 days shall be 40 MPa.

E18.2.8 Formwork

(a) Formwork materials shall conform to CSA Standard CAN/CSA-A23.1, and CSA S269.3.

(b) No “stay-in-place” formwork or falsework is permitted.

(c) Form sheeting plywood to be covered with form liner or to be directly in contact with soil shall be exterior Douglas Fir, concrete form grade, conforming to CSA Standard O121, a minimum of 20 mm thick.

(d) Where form liner is not being used, form sheeting shall be Douglas Fir, overlay form liner type conforming to CSA Standard O121. Approved manufacturers are “Evans” and “C-Z”.

(e) Boards used for formwork shall be fully seasoned and free from defects such as knots, warps, cracks, etc., which may mark the concrete surface.

(f) No formwork accessories will be allowed to be left in place within 50 mm of the surface following form removal. Items to be left in place, must be made from a non-rusting material or galvanized steel; and they shall not stain, blemish, or spall the concrete surface for the life of the concrete.

(g) Forms for exposed concrete surfaces that do not require a form liner may be either new plywood or steel as authorized by the Contract Administrator.

(h) Studding shall be spruce or pine and shall have such dimensions and spacing that they shall withstand distortion from all the forces to which the forms will be subjected. Minimum dimensions shall be 50 mm x 150 mm.

(i) Walers shall be spruce or pine, with minimum dimensions of 100 mm x 150 mm.

(j) All forms are incidental to these Works and must be removed by the Contractor once adequate strength and curing of the concrete has been achieved.

E18.2.9 Permeable Formliner

(a) Formliner shall be Hyroform, Texel Drainaform or equal as approved in accordance with B6.

E18.2.10 Concrete

(a) General

(i) Concrete repair material shall be compatible with the concrete substrate.

(b) The Contractor shall be responsible for the design and performance of all concrete mixes supplied under this Specification. Either ready mix concrete or proprietary repair mortars, where applicable, may be used having the following minimum properties in accordance with CSA A23.1:

(i) Class of Exposure: C-1

(ii) Compressive Strength @ 28 days = 35 MPa

(iii) Water / Cementing Materials Ratio = 0.4

(iv) Air Content: Category 1 per Table 4 of CSA A23.1

(c) Mix design for ready mix concrete shall be submitted to Contract Administrator at least two weeks prior to concrete placing operations.

(d) The workability of each concrete mix shall be consistent with the Contractor's placement operations.

(e) Any proposed proprietary repair mortar shall be subject to the approval of the Contract Administrator and must meet or exceed the properties of the ready mix concrete.

(f) The temperature of all types of concrete shall be between 15˚C and 25˚C at discharge. Temperature requirements for concrete containing silica fume shall be between 10˚C and 18˚C at discharge unless otherwise approved by the Contract Administrator.

(g) Concrete materials susceptible to frost damage shall be protected from freezing.

E18.2.11 Aggregates

(a) The Contractor shall be responsible for testing the fine and coarse aggregates to establish conformance to these Specifications, and the results of these tests shall be provided to the Contract Administrator if requested. All aggregates shall comply with CSA A23.1.

(b) Coarse Aggregate

(i) The maximum nominal size of coarse aggregate shall be sized to suit the Contractor's mix design. Gradation shall be in accordance with CSA A23.1, Table 11, Group 1. The coarse aggregate shall satisfy the Standard Requirements specified in CSA A23.1, Table 12, "Concrete Exposed to Freezing and Thawing".

(ii) Coarse aggregate shall consist of crushed stone or gravel or a combination thereof, having hard, strong, durable particles free from elongation, dust, shale, earth, vegetable matter or other injurious substances. Coarse aggregate shall be clean and free from alkali, organic or other deleterious matter; and shall have an absorption not exceeding 2.25%.

(iii) The aggregate retained on the 5 mm sieve shall consist of clean, hard, tough, durable, angular particles with a rough surface texture, and shall be free from

organic material, adherent coatings of clay, clay balls, and excess of thin particles or any other extraneous material.

(iv) Coarse aggregate when tested for abrasion in accordance with ASTM C131 shall not have a loss greater than 30%.

(v) Tests of the coarse aggregate shall not exceed the limits for standard for requirements prescribed in CSA A23.1, Table 12, for concrete exposed to freezing and thawing.

(c) Fine Aggregate

(i) Fine aggregate shall meet the grading requirements of CSA A23.1, Table 10, Gradation FA1.

(ii) Fine aggregate shall consist of sand, stone, screenings, other inert materials with similar characteristics or a combination thereof, having clean, hard, strong, durable, uncoated grains free from injurious amounts of dust, lumps, shale, alkali, organic matter, loam, or other deleterious substances.

(iii) Tests of the fine aggregate shall not exceed the limits for standard requirements prescribed in CSA A23.1, Table 12.

E18.2.12 Cementing Materials

(a) Cementing materials shall conform to the requirements of CSA A3001.

(b) Silica Fume

(i) Should the Contractor choose to include silica fume in the concrete mix design, it shall not exceed 8% by mass of cement.

(c) Fly Ash

(i) Fly ash shall be Type CI or Type F and shall not exceed 25% by mass of cement.

(d) Cementitious materials shall be stored in a suitable weather-tight building that shall protect these materials from dampness and other destructive agents. Cementitious materials that have been stored for a length of time resulting in the hardening or formation of lumps shall not be used in the Work.

E18.2.13 Admixtures

(a) Air entraining admixtures shall conform to the requirements of ASTM C260.

(b) Chemical admixtures shall conform to the requirements of ASTM C494 or C1017 for flowing concrete.

(c) All admixtures shall be compatible with all other constituents. The addition of calcium chloride, accelerators, and air-reducing agents will not be permitted, unless otherwise approved by the Contract Administrator.

(d) Appropriate low range water reducing and/or superplasticizing admixtures shall be used in concrete containing silica fume. Approved retarders or set controlling admixtures may be used for concrete containing silica fume.

(e) An aminocarboxylate based migrating corrosion inhibitor admixture shall be used in concrete that will be used as a repair material that will either be in contact with or adjacent to reinforcing steel in existing concrete. Proposed admixtures shall be subject to the approval of the Contract Administrator.

E18.2.14 Water

(a) Water to be used for mixing and curing concrete or grout and saturating substrate shall conform to the requirements of CSA A23.1 and shall be free of oil, alkali, acidic, organic materials or deleterious substances.

E18.2.15 Concrete Supply

(a) Concrete shall be proportioned, mixed, and delivered in accordance with the requirements of CSA A23.1, except that the transporting of ready mixed concrete in

non-agitating equipment will not be permitted unless prior written approval is received from the Contract Administrator.

(b) Unless otherwise directed by the Contract Administrator, the discharge of ready mixed concrete shall be completed within 120 minutes after the introduction of the mixing water to the cementing materials and aggregates.

(c) The Contractor shall maintain all equipment used for handling and transporting the concrete in a clean condition and proper working order.

E18.2.16 Flexible Joint Sealant

(a) Flexible joint sealant for all horizontal, vertical, and sloping joints shall be guaranteed non-staining grey polyurethane, approved by the Contract Administrator and applied in strict accordance with the manufacturer's instructions, including appropriate primers. Approved products are Vulkem 116 by Mameco; Sonolastic NP1 by Sonneborne; RC-1 by Permapol; and Sikaflex by Sika; or equal in accordance with B6.

E18.2.17 Fibre Joint Filler

(a) Fibre joint filler shall be rot-proof and of the preformed, non-extruding, resilient-type, made with a bituminous fibre such as "Flexcell," and shall conform to the requirements of ASTM Standard D1751, or equal as approved in accordance with B6.

E18.2.18 Expanding Joint Filler

(a) Expanding joint filler shall be compressed to 20 percent of its expanded width and be a polyurethane foam, impregnated throughout with a latex modified asphalt. An approved product is "Emseal," by Emseal Corporation. Expanding joint filler to be installed as per Manufacturer's instructions.

E18.2.19 Waterproofing

(a) Waterproofing shall be Bituthene 3000 as distributed by Grace Construction Products, or equal as approved in accordance with B6.

E18.2.20 Miscellaneous Materials

(a) The Contractor shall supply all materials, as approved by the Contract Administrator, to ensure the satisfactory completion of the concrete repair works.

E18.3 Equipment

E18.3.1 General

(a) All equipment shall be of a type accepted by the Contract Administrator. The equipment shall be in good working order, kept free from hardened concrete or foreign materials, and shall be cleaned at frequent intervals.

(b) The Contractor shall have sufficient standby equipment available on short notice at all times.

E18.3.2 Vibrators

(a) The Contractor shall have sufficient numbers of internal concrete vibrators and experienced operators on-site to properly consolidate all concrete in accordance with ACI 309. The type and size of vibrators shall be appropriate for the particular application, the size of the pour, and the amount of reinforcing and shall conform to standard construction procedures.

(b) The Contractor shall use rubber coated vibrators for consolidating concrete containing epoxy-coated reinforcing steel.

(c) The Contractor shall have standby vibrators available at all times during the pour.

E18.3.3 Miscellaneous Equipment

(a) The Contractor shall provide all miscellaneous equipment as required to properly and thoroughly execute and complete all operations related to the supply and placement of structural concrete.

E18.4 Construction Methods

E18.4.1 General

(a) The Works involving Structural Concrete include the construction of:
  (i) Culverts
  (ii) Headwalls
  (iii) Cut-off Wall.
  (iv) Retaining Wall

E18.4.2 Concrete Working Base

(a) Upon completion of all excavation, the bottom of the excavation shall be inspected by the Contract Administrator. Concrete working base shall be installed where shown on the Drawings. Under no circumstances shall the Contractor place the concrete working base without the prior approval from the Contract Administrator. The supply and installation of working base will be considered incidental to the work of backfilling, and no separate payment will be made.

E18.4.3 Form Work and Shoring

(a) Formwork shall be designed, erected, braced, and maintained to safely support all vertical and lateral loads until such loads can be supported by the concrete.

(b) As a maximum, the following spacings shall apply, for studding and whaling:
  (i) 20 mm plywood: studding - 450 mm centre to centre
  (ii) walers - 760 mm centre to centre

(c) Forms shall be clean before use. Plywood and other wood surfaces shall be sealed against adsorption of moisture from the concrete by a field-applied form coating or a factory-applied liner.

(d) Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be a commercially manufactured type. The portion remaining within the concrete shall leave no metal within 50 mm of the surface when the concrete is exposed to view. Spreader cones on ties shall not exceed 25 mm in diameter.

(e) All exposed edges shall be chamfered 25 mm unless otherwise noted on the Drawings.

(f) Slots, recesses, chases, sleeves, inserts, bolts, hangers, and other items shall be formed or set in coordination and cooperation with the trade concerned. No openings shall be made in structural members that are not shown on the structural drawings without the prior approval of the Contract Administrator.

(g) Shores shall be provided with positive means of adjustment (jacks or wedges). All settlement shall be taken up before or during concreting as required.

(h) Mud sills of suitable size shall be provided beneath shores, bedded in sand or stone, where they would otherwise bear on soil. The soil below shores must be adequately prepared to avoid settlements during or after concreting. Shores must not be placed on frozen ground.

(i) Brace shores horizontally in two directions and diagonally in the same two vertical planes so that they can safely withstand all dead and moving loads to which they will be subjected.

(j) Formwork shall have sufficient strengths and rigidity so that the resultant finished concrete conforms to the shapes, lines, and dimensions of the members shown on the Drawings.

(k) Formwork shall be constructed to permit easy dismantling and stripping and such that removal will not damage the concrete. Provision shall be made in the formwork for shores to remain undisturbed during stripping where required.

(l) Forms shall be constructed and maintained so that the completed Work is within minus 3 mm or plus 6 mm of the dimensions shown on the Drawings.

(m) Formwork shall be cambered, where necessary to maintain the specified tolerances, to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete and due to construction loads.

(n) Forms shall be sufficiently tight to prevent leakage of grout or cement paste.

(o) Form panels shall be constructed so that the contact edges are kept flush and aligned.

(p) All form lumber, studding, etc. becomes the property of the Contractor when the Work is finished, and it shall be removed from the concrete and the Site by the Contractor after the concrete is set, free of extra charge, and the entire Site left in a neat and clean condition.

(q) It shall be permissible to use the forms over again where possible, provided they are thoroughly cleaned and in good condition after being removed from the former portions of the Work. The Contract Administrator shall be the sole judge of their condition and his decision shall be final regarding the use of them again.

E18.4.4 Formliner

(a) Formliners shall be used on all exposed formed surfaces, except soffit surfaces.

E18.4.5 General Curing

(a) The use of curing compound will not be allowed on concrete areas that are to receive additional concrete or waterproofing.

(b) Unformed concrete surfaces shall be covered and kept moist by means of wet polyester blankets for seven (7) consecutive days immediately following finishing operations or otherwise approved by the Contract Administrator and shall be maintained at above 10°C for at least seven (7) consecutive days thereafter. Construction joints shall only be covered and kept saturated by means of wet polyester curing blankets for the curing period.

(c) If permitted for use, curing compounds shall be applied uniformly by roller. Spraying of the compound will not be permitted.

(d) Concrete shall be protected from the harmful effects of sunshine, drying winds, surface dripping, or running water, vibration, and mechanical shock. Concrete shall be protected from freezing until at least twenty-four hours after the end of the curing period.

(e) Changes in temperature of the concrete shall be uniform and gradual and shall not exceed 3°C in anyone hour period or 20°C in any twenty-four hour period.

(f) Formed surfaces shall receive, immediately after stripping and patching, the same application of curing compound as finished surfaces.

(g) After completing the finishing of unformed surfaces, where curing compound is not permitted, the surfaces shall be promptly covered with a minimum of a single layer of clean, damp polyester curing blanket and 6 mil polyethylene.

(h) Care shall be exercised to ensure that the polyester curing blanket is well drained and that it is placed as soon as the surface will support it without deformation. The Contractor shall ensure that water from the polyester curing blankets does not run into areas where concrete placement and finishing operations are underway. If this occurs, concrete placement shall stop until the problem is corrected satisfactory to the Contract Administrator.

E18.4.6 Placing Concrete

(a) The Contract Administrator must be notified at least 24 hours prior to concrete placement so that an adequate inspection may be made of formwork, shoring, reinforcement, expansion joints, and related works. Placement without required prior notification will not be allowed.

(b) Equipment for mixing or conveying concrete shall be thoroughly flushed with clean water before and after each pour. Water used for this purpose shall be discharged outside the forms.

(c) Concrete shall be conveyed from the mixer to the place of final deposit by methods that will prevent segregation and a marked change in consistency.

(d) Before depositing any concrete, all debris shall be removed from the space to be occupied by the concrete and any mortar splashed upon the reinforcement or forms shall be removed.

(e) Placing of concrete, when started, shall be continuous. No concrete shall be placed against concrete that has sufficiently hardened to cause the formation of seams or "cold joints" within the section. If placing must be interrupted, construction joints shall be located where shown on the Drawings or as approved.

(f) Concrete shall be placed as nearly as possible to its finish position. Rakes or mechanical vibrators shall not be used to transport concrete.

(g) The maximum drop of free concrete into the forms shall not be greater that 1.5 m; otherwise, rubber tubes or pouring ports spaced not more than 1.5 m vertically and 2.5 m horizontally shall be used.

(h) All concrete, during and immediately after deposition, shall be consolidated by mechanical vibrators so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into the corners of the forms; eliminating all air or stone pockets that may cause honeycombing, pitting or planes of weakness. Mechanical vibrators, when immersed, shall have a minimum frequency of 7,000 revolutions per minute.

(i) Vibrators shall be inserted systematically into the concrete at intervals such that the zones of influence of the vibrator overlap (generally 300 to 900 mm). Apply the vibrator at any point until the concrete is sufficiently compacted (5 to 15 seconds) but not long enough for segregation to occur. Spare vibrators in working condition shall be kept on the job Site during all placing operations.

(j) Concrete shall not be placed in rain or snow, unless adequate protection is provided for formwork and concrete surfaces.

E18.4.7 Finishing of Unformed Surfaces

(a) Screeding of all unformed concrete surfaces shall be performed by the sawing movement of a straight edge along wood or metal strips or form edges that have been accurately set at required elevations.

(b) Screeding shall be done on all concrete surfaces as a first step in other finishing operations. Screeding shall be done immediately after the concrete has been vibrated.

(c) After screeding, the concrete shall not be worked further until ready for floating. Floating shall begin when the water sheen has disappeared. The surface shall then be consolidated with hand floats. Concrete surfaces after floating shall have a uniform, smooth, granular texture.

E18.4.8 Form Removal

(a) All forms shall remain in place for a minimum of seven (7) days, unless otherwise accepted by the Contract Administrator. The Contract Administrator must be notified at least 24 hours prior to any form removal. The Contractor must receive approval from the Contract Administrator prior to beginning Work.

(b) The minimum strength of concrete in place for safe removal of soffit forms for horizontal or inclined members, as well as vertical forms shall be 25 MPa, with the

added provisions that the member shall be of sufficient strength to carry safely its own weight, together with superimposed construction loads, and that the forms shall stay in place a minimum of three days unless otherwise approved by the Contract Administrator.

(c) Field-cured test specimens, representative of the in-place concrete being stripped, may be tested to verify the concrete strength.

E18.4.9 Patching of Formed Surfaces

(a) Immediately after forms have been removed, but before any repairing or surface finishing is started, the concrete surface shall be inspected by the Contract Administrator. Any repair or surface finishing started before this inspection may be rejected and required to be removed.

(b) All formed concrete surfaces shall have bolts, ties, struts, and all other timber or metal parts not specifically required for construction purposes cut back fifty (50) mm from the surface before patching.

(c) Minor surface defects caused by honeycomb, air pockets greater than 5 mm in diameter, and voids left by strutting, and tie holes shall be repaired by removing the defective concrete to sound concrete, dampening the area to be patched and then applying patching mortar. A slurry grout consisting of water and cement, shall be thoroughly brushed onto the area to be patched. When the slurry grout begins to lose the water sheen, the patching mortar shall be applied. It shall be struck-off slightly higher than the adjacent surface and left for one hour before final finishing to permit initial shrinkage of the patching mortar and it shall be touched up until it is satisfactory to the Contract Administrator. The patch shall be cured as specified in this Specification, and the final colour shall match the surrounding concrete.

(d) All objectionable fins, projections, offsets, streaks, or other surface imperfections shall be removed by approved means to the Contract Administrator's satisfaction. Cement washes of any kind shall not be used.

(e) Concrete shall be cast against forms that will produce plane surfaces with no bulges, indentations, or protuberances other than those shown on the Drawings. The arrangement of panel joints shall be kept to a minimum. Panels containing worn edges, patches, or other defects that will impair the texture of concrete surfaces shall not be used. All fins on the concrete surfaces shall be removed.

E18.4.10 Cold Weather Concreting

(a) The requirements of this section shall be applied to all concreting operations during cold weather; i.e., if the mean dally temperature falls below 5°C during placing or curing.

(b) Supplementary equipment, as required below, shall be at the job Site if concrete is likely to be placed in cold weather.

(c) Formwork and reinforcing steel shall be heated to at least 5°C before concrete is placed.

(d) The temperature of the concrete shall be maintained at not less than 10°C for seven days or 15°C for five days or 20°C for three days after placing. The concrete shall be kept above freezing temperature for at least a period of seven days. In no case shall the heating be removed until the concrete has reached a minimum compressive strength, which will be specified by the Contract Administrator for Work under construction, and as determined from compressive strength tests for specimens secured under the same conditions as the concrete works in question.

(e) Aggregates shall be heated to a temperature of not less than 20°C and not more than 55°C. Water shall be heated to a temperature between 20°C and 55°C. The temperature of the concrete at the time of placement shall be within the range specified in CSA Standard CAN/CSA-A23.1 for the thickness of the section being placed.

(f) When the mean dally temperature may fall below 5°C, a complete hoarding of the Work, together with supplementary heat, shall be provided.

(g) When the ambient temperature is below -15°C, the hoarding shall be constructed so as to allow the concrete to be placed without the hoarding having to be opened. If the mixing is done outside of the hoarding, the concrete shall be placed by means of hoppers installed through the hoarding. The hoppers are to be plugged when not in use.

(h) When the ambient temperature is equal to or above -15°C, the Contractor will be permitted to open small portions of the hoarding for a limited time to facilitate the placing of the concrete.

(i) Before depositing any of the concrete, the Contractor shall show that enough heating equipment is available to keep the air temperature surrounding the forms within the specified range. This shall be accomplished by bringing the temperature inside of the hoarding to the specified 20°C, at least 12 hours prior to the start of the concrete placing.

(j) The Contractor shall supply all required heating apparatus and the necessary fuel. When dry heat is used, a means of maintaining atmospheric moisture shall be provided. The relative humidity within the heated enclosure shall be maintained at a minimum of 40 percent during concrete placing and finishing operations. Following finishing operations, exposed concrete surfaces shall be protected from excessive drying by applying curing compound, covering the surfaces with polyethylene, or providing water curing.

(k) Sufficient standby heating equipment must be available to allow for any sudden drop in outside temperatures and any breakdowns that may occur in the equipment.

(l) Combustion-type heaters may be used if their exhaust gases are vented outside the enclosures and not allowed to come into contact with concrete surfaces. Fire extinguishers must be readily at hand wherever combustion-type heaters are used.

(m) The Contractor shall keep a curing record of each concrete pour. The curing record shall include: date and location of the pour, mean daily temperature, hoarding relative humidity, temperatures above and below the concrete surface at several points, and notes regarding the type of heating, enclosure, unusual weather conditions, etc. This record shall be available for inspection by the Contract Administrator at the end of the concrete operations.

E18.4.11 Hot Weather Concreting

(a) General

(i) The requirements of this section shall be applied during hot weather; i.e. air temperatures above 25°C during placing.

(ii) Concrete shall be placed at as low a temperature as possible, preferably below 15°C, but not above 22°C. Aggregate stockpiles may be cooled by water sprays and sunshades.

(iii) Ice may be substituted for a portion of the mixing water, providing it has melted by the time mixing is completed.

(iv) Form and conveying equipment shall be kept as cool as possible before concreting, by shading them from the sun, painting their surfaces white, and/or the use of water sprays.

(v) Sunshades and wind breaks shall be used as required during placing and finishing.

(vi) Work shall be planned so that concrete can be placed as quickly as possible to avoid “cold joints.”

(vii) The Contract Administrator's approval is necessary before the Contractor may use admixtures, such as retardants, to delay setting or water-reducing agents to maintain workability and strength, and these must then appear in the Mix Design Statement submitted to the Contract Administrator.

(viii) Curing shall follow immediately after the finishing operations.

(b) Hot-Weather Curing

(i) When the air temperature is at or above 25°C, curing shall be accomplished by water spray or by using saturated absorptive fabric, in order to achieve cooling by evaporation. Mass concrete shall be water cured for the basic curing period when the air temperature is at or above 20°C, in order to minimize the temperature rise of the concrete.

(c) Job Preparation

(i) When the air temperature is at or above 25°C, or when there is a probability of it's rising to 25°C during the placing period, facilities shall be provided for protection of the concrete in place from the effects of hot and/or drying weather conditions. Under severe drying conditions, the formwork, reinforcement, and concreting equipment shall be protected from the direct rays of the sun or cooled by fogging and evaporation.

(d) Concrete Temperature

(i) The temperature of the concrete as placed shall be as low as practicable and in no case greater than that shown below for the indicated size of the concrete section.

Thickness of Section (m)	**Temperatures, °C**	
	Minimum	Maximum
Less than 0.3	10	35
0.3 to 1.0	10	30
1.0 to 2.0	5	25

E18.4.12 Construction Joints

(a) Construction joints shall be located only where shown on the Drawings or as otherwise approved in writing by the Contract Administrator. Construction joints shall be at right angles to the direction of the main reinforcing steel. All reinforcing steel shall be continuous across the joints. Bevelled shear keys, as shown on the Drawings or approved by the Contract Administrator, shall be provided at all joints.

(b) In lieu of shear keys, the Contractor may roughen the surface as follows. The surface shall be rough, with a minimum amplitude of 6 mm. Acceptable procedures to obtain this rough surface are as follows:

(i) By removing the mortar from between the larger aggregate particles with a water jet and soft brush when the concrete is in a semi-hardened state (green-cut).

(ii) By first applying a chemical retarder to the surface and then removing the mortar from the larger aggregate particles with a water jet and brush.

(c) The face of joints shall be cleaned of all laitance and dirt, after which the cementitious grout or an approved bonding agent shall be applied. Forms shall be retightened, and all reinforcing steel shall be thoroughly cleaned at the joint prior to concreting.

E18.4.13 Structure Identification

(a) Structure Identification Date

(i) The Contractor shall indent into the exposed concrete a structure identification date at the location shown on the Drawings in accordance with the detail shown on the Drawings or as otherwise directed by the Contract Administrator, all incidentally to the Work of this Specification.

E18.4.14 Clean Up

(a) The Contractor shall maintain the Sites of Work in a tidy condition and free from the accumulation of waste and debris.

E18.5 Quality Control

E18.5.1 Inspection

(a) All workmanship and materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator, including all operations, from the selection and production of the Work, through to final acceptance of the specified Work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or Works which are not in accordance with the requirements of this Specification.

E18.5.2 Access

(a) The Contract Administrator shall be afforded full access for the inspection and control of testing of concrete and constituent materials, both at the Site of Work and at any plant used for the production of concrete, to determine whether the concrete is being supplied in accordance with this Specification.

E18.5.3 Materials

(a) All materials supplied under this Specification shall be subject to testing and approval by the Contract Administrator.

E18.5.4 Concrete Quality

(a) Quality control tests will be used to determine the acceptability of the concrete supplied by the Contractor.

(b) The Contractor shall provide, without charge, the samples of concrete and the constituent materials required for quality control tests and provide such assistance and use of tools and construction equipment as is required.

(c) The frequency and number of concrete quality control tests shall be in accordance with the requirements of CSA Standard CAN/CSA-A23.1 or as required by the Contract Administrator.

(d) Compressive strength tests on specimens cured under the same conditions as the concrete works will be made to check the strength of the in-place concrete and the adequacy of curing. Backfilling or subsequent concreting operations will not be allowed until the in-place concrete has achieved a compressive strength of 25 MPa.

E18.5.5 Corrective Action

(a) If the results of the tests indicate that the concrete is not of the specified quality, the Contract Administrator shall have the right to implement additional testing, as required, to further evaluate the concrete at the Contractor's expense.

(b) The Contractor shall, at his own expense, correct such work or replace such materials found to be defective under this Specification in an approved manner to the satisfaction of the Contract Administrator.

E18.6 Measurement and Payment

E18.6.1 Structural Concrete

(a) Supplying and placing structural concrete will be measured on a volume basis. The volume to be measured shall be the total number of cubic metres of structural concrete supplied and placed in accordance with this Specification, acceptable to the Contract Administrator, as computed from the Drawing dimensions. No deductions will be made for chamfers, reinforcing steel, structural steel, bolts or voids of seventy-five (75) mm in diameter or less. All accessories like inserts are incidental to the supply and placement of structural concrete and no payment will be made for this work. This item of work will be paid for at the Contract Unit Price per cubic metre for "Structural Concrete" performed in accordance with this Specification and accepted by the Contract Administrator.

E18.6.2 Cold Weather Concreting

(a) Cold Weather Concreting will not be measured. This item of work will be paid for at the Contract Lump Sum Price for "Cold Weather Concreting", performed in accordance with this Specification and accepted by the Contract Administrator.

E19. BOX CULVERT BACKFILL

E19.1 Description

E19.1.1 This Specification shall cover all operations related to supply, placement and compaction of backfill materials as herein specified.

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

E19.2 Materials

E19.2.1 General

(a) The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

(b) All materials supplied under this Specification shall be subject to testing and approval by the Contract Administrator.

E19.2.2 Suitable Site Backfill

(a) Suitable Site backfill material shall be of a type approved by the Contract Administrator.

E19.2.3 Granular Backfill

(a) Granular backfill material shall be sound, free from organic material, and meet the following gradation requirements:

Canadian Metric Sieve Size	Percent Total Dry Weight Passing
50,000	100%
20,000	75%-100%
5,000	45%-85%
2,500	35%-55%
315	15%-35%
160	5%-20%
80	0%-7%

(b) In lieu of the above granular backfill, in the winter, crushed limestone of 50 mm maximum aggregate size conforming to CW 3110-R12, may be used.

E19.2.4 Crushed Limestone Base Course Material

(a) Crushed limestone base course material shall be supplied in accordance with City of Winnipeg Specification CW 3110-R12 with maximum 20 mm size.

E19.2.5 Free Draining Granular Backfill Material

(a) Free draining granular backfill shall consist of hard crushed stone, free from organic material meeting the following gradation requirements (concrete coarse aggregate) or approved equal.

Canadian Metric Sieve Size	Percent Total Dry Weight Passing
40,000	95%-100%

20,000	35%-70%
10,000	10%-30%
5,000	0%-5%

(b) In addition to the above granular material, the drainage material specified in Section 5.2 of CW 3120-R3 is also approved for this project.

E19.2.6 Clay Borrow Material

(a) Clay borrow material shall be of a type approved by the Contract Administrator.

E19.2.7 Polystyrene Insulation

(a) Polystyrene insulation shall be Styrofoam HI60 or approved equal, in accordance with B6.

E19.2.8 Working Base

(a) Working base shall be concrete meeting the requirements of CSA A 23.1 latest edition, for S-2 class of exposure, except as follows:

(i) 20 MPa at 28 days

E19.2.9 Low Density Foam Board

(a) Low density foam board shall be constructed of expanded foam.

E19.3 Construction Methods

E19.3.1 General

(a) The Work shall comprise of supply and placement of:

(i) A 300 thick free draining granular base for the culvert.

(ii) A 75 mm thick concrete working base.

(iii) Granular backfill of the culvert.

(iv) Backfill as required to produce embankment slopes as shown on the Drawings.

(b) The Work shall also include:

(i) Erosion control.

E19.3.2 Free Draining Granular Culvert Base

(a) Supply and place a 300 mm thick layer of free draining granular material below the working base of the culvert. Place to a minimum of one hundred percent (100%) Maximum Standard Proctor Density.

E19.3.3 Working Base Concrete

(a) Following approval of the granular culvert base, place a 75 mm thick concrete working base.

E19.3.4 Culvert Backfill

(a) All backfill of the culvert is to be unfrozen granular backfill and placed on unfrozen base. Place the backfill in accordance with the preparation of sub-base in Specification CW 3110-R12. That is in layers not exceeding 150 mm in compacted thickness and to a minimum of 100% Maximum Standard Proctor Density.

(b) Place the backfill up to the elevation of the underside of the base course for the concrete pavement or concrete sidewalk, or to the underside of topsoil, as applicable.

E19.3.5 150 mm Thick Base Course

(a) Place a 150 mm thick or greater layer of base course as per E12.2.4 beneath the roadway and sidewalk on the granular backfill of the culvert to the grades indicated on the Drawings or as indicated in the field by the Contract Administrator. The base course shall be compacted to 100% Maximum Standard Proctor Density.

(b) This base course layer will provide the substructure for the 200 mm concrete roadway that will constitute the roadway surface.

E19.3.6 Embankment Slope Backfill

(a) Backfill the embankment slopes where required producing the embankment grades shown on the Drawings. Use suitable Site backfill or clay backfill compacted to a minimum of 98% Maximum Standard Proctor Density.

E19.3.7 Clay Plugs

(a) Place clay plugs of one (1) metre width (north-south direction) for the full width of the excavation to act as a barrier to prevent possible future washout of the backfill material from around the culvert. Place the clay in an unfrozen condition and compact to 98% Maximum Standard Proctor Density.

E19.3.8 Erosion Control

(a) The Contractor shall perform the following erosion control works:

(i) Exposure of soils along creek slopes shall be kept to a minimum practical amount, acceptable to the Contract Administrator.

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

(iii) Sediment control fencing, or other such erosion control structures, shall be employed whenever construction activity increases the potential for runoff to carry sediment into a drainage channel or other watercourse. Sediment control fencing shall be supplied, placed, measured and paid for as per E26 Silt Fence Barrier. The Contractor shall inspect all such structures daily during heavy construction activity in the areas of the structures and after heavy rainfall to ensure their continued integrity.

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

(v) Within the limits of construction and where slopes are bare and erodible, the surface water runoff into the creek is to be intercepted by cut-off trenches constructed near the creek's edge to reduce the deposition of sediments in the creek.

(vi) All erosion control necessary due to runoff from the roadway/sidewalk and embankment areas.

E19.4 Measurement and Payment

E19.4.1 Culvert Backfill above Elevation 226.655 will not be measured. This item of work includes all free draining material as well all other backfill material above Elevation 226.655. This item of work will be paid for at the Contract Lump Sum Price for "Culvert Backfill Above Elevation 226.655" performed in accordance with this Specification and accepted by the Contract Administrator.

E19.4.2 Culvert Backfill below Elevation 226.655 will be measured per cubic metre. The volume to be measured shall be the total number of cubic metres of backfill supplied and placed in accordance with this Specification, acceptable to the Contract Administrator, as computed from field measurements after the backfill is placed and compacted. This item of work will be paid for at the Contract Unit Price per metre for "Culvert Backfill Below Elevation 226.655" performed in accordance with this Specification and accepted by the Contract Administrator.

E20. SILT FENCE BARRIER

E20.1 Descripition

E20.1.1 This Specification shall cover all operations relating to the work necessary for the supply, installation and maintenance of silt fence barriers, as herein specified.

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

E20.2 Materials

E20.2.1 The Contractor shall be responsible for the supply, safe storage, and handling of all materials set forth in this Specification.

E20.2.2 The silt fence fabric shall be proposed by the Contractor and approved by the Contract Administrator.

E20.2.3 The stakes shall be of sufficient strength to satisfy silt fence barrier performance and maintenance requirements. The stakes shall be a minimum of 1.2 metres in length with a maximum spacing of 2.5 metres between stakes.

E20.3 Construction Methods

E20.3.1 The locations of the reinforced silt fence barriers are shown on the Plans, but the final locations of the silt fence barriers will be dependent on site conditions, the Contractor's activities and methods of construction and on direction of the Contract Administrator.

E20.3.2 The different types of reinforced silt fence barriers are required under the following conditions:

(a) The sandbag reinforced silt barrier (frozen ground conditions) is required to isolate all works at or near the waterway during freezing/ice conditions.

(b) The chained reinforced silt barrier.

E20.3.3 Sandbag Reinforced Silt Barrier

(a) Sandbags shall be filled with a type of sand as recommended by the sandbag supplier. When lying flat the filled sandbags shall measure not less than 250mm (width) by 450mm (length) by 180mm (height).

E20.3.4 Chained reinforced silt barrier

(a) Posts shall be spaced a maximum of 2.5 m apart, and shall be driven vertically into the ground to a minimum depth of 600 mm.

(b) A trench measuring approximately 200 mm wide by 200 mm deep shall be excavated along the entire line of stakes. The trench shall be on the side of the stakes where grading work is to be conducted.

(c) The geotextile from the silt fence shall extend into the trench a minimum of 300 mm. The prefabricated silt fence shall be installed without sags and have an overlap of 450 mm wherever its length is extended.

(d) The trench shall be backfilled and tamped to existing grade so as to hold the base of the geotextile firmly in place. The completed silt fence barrier shall have a minimum height of 600 mm above the ground surface.

E20.4 Maintenance

E20.4.1 All silt fences shall be inspected immediately after runoff event and at least daily during prolonged rainfall or runoff. Any required repairs shall be made immediately. The silt fence barriers shall be maintained in place, without gaps, and without undermining, so as to prevent sediment passage through or under the barrier. Silt fence barriers shall be maintained vertical without tears and without sagging and maintain a 450 mm overlap on seams.

E20.4.2 Accumulated sediment shall be removed at the direction of the Contract Administrator in a manner that avoids escape to the downstream side of the barriers. Sediment shall be removed to the level of the grade existing at the time of barrier installation and shall conform to the following:

(a) accumulated sediment shall be removed when it reaches a depth of one-half the height of the silt fence barrier;

(b) accumulated sediment shall be removed as necessary to perform maintenance repairs;

(c) accumulated sediment shall be removed immediately prior to the removal of the silt fence.

E20.5 Removal

E20.5.1 Removal of the silt fence barrier shall be completed by others.

E20.6 Measurement and Payment

E20.6.1 Supplying and placing silt fence barrier will be measured per lineal metre. The length to be measured shall be the total number of metres of silt fence barrier supplied and placed in accordance with this Specification, acceptable to the Contract Administrator, as computed from field measurements. This item of work will be paid for at the Contract Unit Price per metre for "Silt Fence Barrier" performed in accordance with this Specification and accepted by the Contract Administrator.

E21. RIPRAP

E21.1 General

E21.1.1 Riprap shall be random stone riprap and supplied and installed in accordance with Specification CW 3615-R2, except as specified herein.

E21.2 Materials

E21.2.1 Rock

(a) The rock shall be fieldstone, resistant to the action of air and water and suitable in all other respects for the purpose intended. The rock is to be in accordance with CW 3615-R2. The Contract Administrator shall approve the rock for riprap prior to placing.

E21.2.2 Geotextile Fabric

(a) Geotextile fabric shall be non-woven and conform to the requirements of CW 3120-R3 Section 2.5.

E21.3 Construction Methods

E21.3.1 Place a layer of the geotextile fabric under the riprap and anchor the upstream and downstream end of rock filled trenches as shown on the Drawings. The inlet and outlet proposed riprap are to blend into the existing riprap.

E21.3.2 Place the rock riprap carefully on the geotextile fabric so that it does not tear.

E21.4 Measurement and Payment

E21.4.1 Riprap and Geotextile Fabric will not be measured. This item of work will be paid for at the Contract Lump Sum Price for "Random Stone Riprap and Geotextile" performed in accordance with this Specification and accepted by the Contract Administrator.

E22. CHAINLINK FENCING

E22.1 Description

E22.1.1 The Work covered under this item shall include all operations relating to supply and installation of new chainlink fencing as specified herein.

E22.1.2 The Work to be done by the Contractor under this Section shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies and all things necessary for and incidental to the satisfactory performance and completion of the Work as hereinafter specified.

E22.2 Materials

E22.2.1 Fence Post Inserts

(a) The fence post inserts shall be fabricated and installed in accordance with the details provided on the Drawings. The post inserts shall be hot-dip galvanized.

(b) Non-shrink cementitious grout for grouting the fence post inserts shall be Sternson M-bed Standard, Specialty Construction Products CPD Non-Shrink Grout, Sika 212 Non-Shrink Grout, Meadows CG-86, or equal in accordance with B6. The minimum compressive strength of the grout at 28 days shall be 40 MPa.

E22.2.2 Chain Link Fence

(a) Chain link fencing to be supplied in accordance with CW 3550.

(b) Further to CW 3550, 43 O.D. bottom rails shall be used.

E22.3 Construction Methods

E22.3.1 Fence Post Inserts

(a) Core holes for the posts in the box culvert headwalls and wingwalls to the sizes and locations shown on the Drawings. Grout posts using non-shrink grout in accordance with this Specification.

E22.3.2 Chain Link Fence

(a) New chain link fence to be installed to the limits shown on the Drawings in accordance with CW 3550.

E22.4 Measurement and Payment

E22.4.1 Chain Link Fencing will not be measured. This item of work will be paid for at the Contract Lump Sum Price for “Chain Link Fencing” performed in accordance with this Specification and accepted by the Contract Administrator.

E23. PRE-CAST CONCRETE TRAFFIC BARRIERS

E23.1 Description

E23.1.1 This Specification covers the pick-up, installation, maintenance, and return of pre-cast concrete traffic barriers as indicated on the Drawings.

E23.2 Materials

E23.2.1 Precast Concrete Traffic Barriers will be available for use by the Contractor at the City of Winnipeg Bridge Yard.

E23.2.2 Work zone crash cushions to be Energy Absorption Systems Inc. “Energite III Crash Cushion” system to be supplied, placed, and removed by the Contractor.

E23.3 Construction Methods

E23.3.1 The Contractor shall arrange to pick up, load, deliver and unload the precast concrete barriers to the Site from the City of Winnipeg Bridge Yard at 849 Ravelstone Avenue West and pick-up, load, deliver and unload the precast concrete barriers to the City of Winnipeg Bridge Yard at 849 Ravelstone Avenue West from the Site by contacting Mike Terleski at 794-8510.

E23.3.2 The Contract is to supply all necessary equipment for loading, unloading, placing, maintenance and all items related thereto that are not identified under a separate item of work at both the City Yard and the Site.

E23.3.3 The Contractor shall be responsible for maintenance of the barriers during construction.

E23.3.4 The Contractor shall be responsible for loading the precast units from the City Yard, hauling, unloading, placing, as well as storing of the precast concrete barriers once they have been received. The Contractor shall supply all necessary equipment and materials for loading, hauling, unloading and storing of the barriers.

E23.3.5 Precast concrete barrier shall be installed at location shown on the Drawings. The barriers shall be properly aligned, seated firmly to the sub-surface and pinned together to the satisfaction of the Contract Administrator.

E23.3.6 The Energite III Crash Cushion array, configuration, and sizing shall be in accordance with the manufacturer's requirements for a TL-2. The supply, placement, and removal of the crash cushions shall be considered incidental to the supply and placement of the temporary traffic barriers and no separate measurement or payment shall be made for these items.

E23.4 Measurement and Payment

E23.4.1 Placing Pre-Cast Concrete Traffic Barriers will be measured by each unit placed onsite and subsequently returned to the City Yard. The total number to be measured shall be the total number of Pre-Cast Concrete Traffic Barriers placed and returned in accordance with this Specification, acceptable to the Contract Administrator, as computed from the Drawings. This item of work will be paid for at the Contract Unit Price each for "Place Pre-Cast Concrete Traffic Barriers" performed in accordance with this Specification and accepted by the Contract Administrator.

E23.4.2 Payment for the pre-cast concrete traffic barriers will be 50% of the unit price for each unit being installed and maintained to the satisfaction for the duration of construction as accepted by the Contract Administrator and 50% of the unit price for each unit returned to the yard as accepted by the Contract Administrator.

E24. EROSION CONTROL BLANKET (ECB)

E24.1 Description

E24.1.1 This Specification covers the supply, installation, and maintenance of erosion control blanket to be installed on areas disturbed during construction and as directed by the Contract Administrator.

E24.2 Materials

E24.2.1 Erosion Control Blanket(ECB)

(a) Erosion Control Blanket shall be a machine-produced mat of 70% agricultural straw and 30% coconut blanket with a functional longevity of up to 24 months. Suitable products include SC 150 Extended Term manufactured by North American Green, or approved equivalent.

(b) The blanket shall be of consistent thickness with the straw and coconut evenly distributed over the entire area of the mat. The blanket shall be covered on the topside with heavyweight photodegradable polypropylene netting having ultraviolet additives to delay breakdown and a maximum 159mm x 159mm mesh and on the bottom side with a lightweight photodegradable polypropylene netting with a maximum 127mm x 127mm mesh. The blanket shall be sewn together on 381mm centres (maximum) with degradable thread

(c) ECB shall have the following properties:

(i) Matrix 70% Straw Fibre (0.19kg/m2) and 30% Coconut Fibre (0.08kg/ m²).

(ii) Netting top side heavyweight photodegradable with UV additives (1.47kg/100 m²).

(iii) Bottom side lightweight photodegradable minimum netting weight (0.73 kg/100 m²).

(iv) Degradable thread.

E24.2.2 Submittals

E24.2.3 The Contractor shall submit all manufacturers' product specifications and recommended installation methods for the proposed erosion control blankets and associated materials to the contract administrator a minimum of 14 days before construction.

E24.2.4 Construction Methods

E24.2.5 The Contractor shall supply all ECB materials required and store them on site. The installation and maintenance of all ECM will be as directed by the Contract Administrator. The installation will be required only if the outer coffer dam upstream of the culvert is going to be over topped.

E24.2.6 Actual alignment and location of the ECB may be adjusted in the field by the Contract Administrator.

E24.2.7 Erosion Control Blanket – Drainage Channel Installation

(a) In general excavate a trench 150mm deep by 150mm wide at the upstream end of the drainage channel and leave 300mm of ECB beyond the upslope portion of the trench. Anchor blanket with 200mm long staples in trench as shown on the Drawings. Staples shall be a minimum of 300mm apart. Backfill trench with soil and compact. Apply seed to compacted soil. Fold remaining portion of blanket over sodded soil and secure with staples spaced 300mm (minimum) apart across width of blanket. Starting with the blanket on bottom of drainage channel, roll blanket out in direction of water flow. Securely fasten blanket against soil surface with staples. There shall be a minimum of 0.8 staples per square metre. Place blankets end over end in the downstream direction and secure overlaps with a double row of staples, staggered 10cm (minimum) apart. There shall be a minimum 10cm to 15cm overlap between blankets in the downstream direction. The City of Winnipeg Specifications

(b) Repeat with blankets along the side slopes of the drainage channel. The overlap between adjacent blankets in the channel side slope direction shall be 50mm to 125mm (depending of blanket type). At the top of the side slope the full length edge of the blanket shall be anchored into a 150mm deep by 150mm wide anchor trench with staples spaced 300mm apart (minimum). The anchor trench shall be backfilled and compacted upon completion of stapling.

(c) Secure downstream edges of ECB as per manufacturer's specifications and detail drawings.

E24.3 Maintenance

E24.3.1 The areas covered with ECB shall be regularly inspected especially after severe rainfall or storm events, to check for blanket separation or breakage.

E24.3.2 Any damaged or poorly performing areas as the result of storm events shall be replaced/repaired immediately. Re-grading of the slope by hand methods may be required in the event of rill or gully erosion.

E24.3.3 Should the Contract Administrator determine that the Contractor has not maintained the erosion control blankets properly or has damaged the blankets from construction activities resulting in sediment releases beyond the work area, the Contractor shall retrieve all sediment that has left the construction area, to the fullest extent possible, at his own cost. As a minimum, the Contractor shall remove all deltas and sediment deposited in drainage ways and re-grade and/or reseed the areas where sediment removal results in exposed soil. The removal and restoration shall take place within 5 working days of discovery unless precluded by legal, regulatory, or physical access restraints. If precluded, removal and

restoration must take place within 5 working days of obtaining access. The Contractor is responsible for contacting all local, regional, provincial, and federal authorities before working in surface waters and for obtaining applicable permits. The Contractor's restoration work to restore property outside of the designated work area shall be at his own cost.

E24.4 Measurement and Payment

E24.4.1 Supplying and placing Erosion Control Blanket will be measured on a square metre basis. The area to be measured shall be the total number of square metres of Erosion Control Blanket supplied and placed in accordance with this Specification, acceptable to the Contract Administrator, as computed from the Drawing dimensions. This item of work will be paid for at the Contract Unit Price per square metre for “Supply and Install Erosion Control Blanket” performed in accordance with this Specification and accepted by the Contract Administrator.

E25. REMOVAL AND SALVAGE OF ALUMINUM BALANCED BARRIER

E25.1 Description

(a) Further to CW 3650 this specification covers the removal and salvage of the existing aluminum balanced barrier on Kenaston Blvd./Bishop Grandin Blvd northbound at the existing culvert location.

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

E25.2 Material

E25.2.1 General

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

E25.2.2 Handling and Storage of Materials

(c) All material shall be handled and stored in a careful and workmanlike manner, in accordance with Section 5.2 of CW 3650, to the satisfaction of the Contract Administrator.

(d) Any damaged or missing material or components resulting from handling and storage operations shall be replaced at the Contractor’s expense, to the satisfaction of the Contractor Administrator.

(e) All aluminum balanced barrier rail and posts are to be stored on wood blocking and shall not be stored directly on the ground. The barrier components to be salvaged and returned to the City shall be transported on wood blocking and shall be secured to prevent movement which may cause damage during transportation.

(f) The contractor shall provide equipment at the City Bridge Yard for unloading and placement of the material at the location directed by City personnel.

E25.2.3 Granular Backfill Material

(g) Granular backfill material shall conform to the requirements of Section 5.5 of CW 3650. Crushed limestone base course in not allowed for use.

E25.2.4 Miscellaneous Materials

(h) The Contractor shall supply all miscellaneous materials, as approved by the Contract Administrator, to ensure the salvaging of the aluminum balanced barrier.

E25.3 Construction Methods

E25.3.1 Removal of Aluminum Balance Barrier

(b) Further to Section 9.6 of CW 3650, removal of the barrier railing components shall be undertaken in careful and workmanlike manner. Material damaged through negligent operations shall be replaced by the Contractor at his expense.

(c) A minimum of 48 hours prior to commencement of dismantling operations, the Contractor shall spray all the existing cap screws with an anti-seize compound to the satisfaction of the Contract Administrator.

(d) All cap screws shall be initially loosed with a hand wrench to limit the number of broken cap screws in clamp bars and splice bars. Once loosened, the bolts may be removed with an impact wrench unless otherwise directed by the Contract Administrator.

E25.3.2 Inspection and Preparation of Barrier Posts

(e) After the barrier posts are removed, all posts shall be thoroughly cleaned to the satisfaction of the Contract Administrator.

E25.3.3 Salvaging of Existing Guardrail

(f) Further to Section 9.6 of CW 3650, all salvaged material shall be delivered to the City Bridge Yard located at 849 Ravelston Avenue. Contact Mike Terleski, C.E.T. at 794-8510 to arrange a suitable time and date for delivery.

(g) Further to Section 5.2 of CW 3650, the salvage material shall be properly placed in the bridge yard at location determined by City personnel in a manner accepted by the City.

(h) Prior to delivery, splice bars and clamp bars are to be removed from the aluminum barrier rail.

(i) Broken cap screws shall be removed from splice bars and clamp bars and the holes re-tapped prior to delivery. Alternately, the Contractor may supply new material or have the material value, as determined by the Contract Administrator, deducted from a Contract progress payment.

E25.4 Measurement and Payment

E25.4.1 Removal Salvage and Reinstallation of aluminum balanced barrier will be measured and paid for in accordance with City of Winnipeg Standard Construction Specification CW3650.

E26. ENVIRONMENTAL PROTECTION PLAN

E26.1 The Contractor will plan and implement the Work of this Contract strictly in accordance with the requirements of the Federal Environmental Assessment (CEAR # 10-01-59643) and this Environmental Protection Plan as herein specified.

E26.2 The Contractor is advised that at a minimum the following Acts, Regulations and By-laws apply to the Work and are available for viewing on line at the applicable websites (www.canlii.ca and/or http://www.winnipeg.ca/CLKDMIS/) or at the office of the Contract Administrator.

E26.3 Federal

(a) Canadian Environmental Assessment Act (CEAA), c.37;

(b) Canadian Environmental Protection Act;

(c) Fisheries Act, c. F-14;

(d) Transportation of Dangerous Goods Act and Regulations, c. 34;

(e) Migratory Birds Convention Act and Regulations, c. 22;

(f) Species at Risk Act, c. 29;

(g) And any other applicable Acts, Regulations and By-laws;

(h) Applicable Fisheries and Oceans Canada Operational Statements for Manitoba for temporary stream crossings;

(i) The *Department of Fisheries and Oceans Freshwater Intake End-of-Pipe Fish Screen Guidelines*, DFO 1995;

(j) *Fisheries and Oceans Policy for the Management of Fish Habitat 1986*;

(k) *Federal Policy on Wetland Conservation 1991*;

(l) *Transportation Association of Canada's Transportation Association of Canada National Guide to Erosion and Sediment Control on Roadway Projects, 2005*.

E26.4 Provincial

(a) The Dangerous Goods Handling and Transportation Act, D12;

(b) The Endangered Species Act, c. E111;

(c) The Heritage Resources Act, c. H39.1;

(d) The Noxious Weeds Act, c. N110;

(e) The Nuisance Act, c. N120;

(f) The Public Health Act, c. P210;

(g) The Water Protection Act, c. W65;

(h) Workplace Safety and Health Act, c. W210;

(i) And current applicable associated regulations;

(j) And any other applicable Acts, Regulations, and By-laws;

(k) The *Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat*, Manitoba Natural Resources and DFO, 1996.

E26.5 Municipal

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

(b) The City of Winnipeg Traffic By-law No. 1573/77 and all amendments up to and including 55/2011;

(c) And any other applicable Acts, Regulations and By-laws.

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

(e) *City of Winnipeg Motor Vehicle Noise Policies and Guidelines*

E26.6 The Contractor is advised that the Fisheries and Oceans Canada (DFO) Letters of Advice are applicable to all Works. The materials submitted for review and Letters of Advice received are in Appendix C. A copy of the material submitted to DFO and the DFO Letter of Advice must be on Site at all times. All dates stated within the DFO submission and responses are valid.

E26.7 The Contractor is advised that the project has been determined to not likely to cause significant environmental effects) under the *Canadian Environmental Assessment Act*

E26.8 The Contractor is advised that the Waverley West Arterial Roads Project Environmental Assessment Screening Report, dated June 2011, applies to the Work and is available for viewing at the office of the Contract Administrator. An Environmental Effects Analysis Summary is available in Appendix B.

E26.9 The Contractor is advised that both the mitigation measures contained in the Waverley West Arterial Roads Project Environmental Assessment Screening Report, dated June 2011 as well as the following environmental protection measures apply to the Work.

(a) Materials Handling and Storage

(i) Storage of construction materials and equipment will be confined within a fenced area or at a location approved by the Engineer or Contract Administrator with environmental protection (e.g. silt fence) as appropriate.

(ii) Construction materials will not be deposited or stored on or near watercourses unless written acceptance from the Contract Administrator is received in advance.

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

(iv) Construction materials and debris will be prevented from entering watercourses. In the event that materials and/or debris inadvertently enter the land drainage system, the Contractor will be required to remove the material to an appropriate landfill or storage facility and restore the watercourse to its original condition.

(b) Fuel Handling and Storage

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

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

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

(iv) The Contractor will ensure that any temporary fuel storage areas established for construction of the project are contained by an impermeable dyke and are located a minimum distance of 100 m away from the Lot 16 Drain, Beaujolais Coulee and any other watercourse. Dykes will be designed, constructed, and maintained to retain not less than 100% of the capacity of the total number of containers or 110% of the largest container, whichever is greatest. The dykes will be constructed of clay or similar impervious material. If this type of material is not available, the dyke will be constructed of locally available material and lined with high-density polyethylene (HDPE). Furthermore, the fuel storage area(s) will be secured by a barrier such as a high fence and gate to prevent vandalism.

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

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

(vii) When servicing requires the drainage or pumping of fuels, lubricating oils or other fluids from equipment, a groundsheet of suitable material (such as HDPE) and size will be spread on the ground to catch the fluid in the event of a leak or spill.

(viii) Wash, refuel and service machinery and store fuel and other materials for the machinery 100 m away from watercourses to prevent deleterious substances from entering the water.

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

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

(xi) Machinery is to arrive on Site in a clean condition and is to be maintained free of fluid leaks.

(xii) A sufficient supply of materials, such as absorbent material and plastic oil booms, to clean up minor spills will be stored nearby on Site. The Contractor will ensure that additional material can be made available on short notice. Additionally, appropriate staff on site will be trained in proper handling of deleterious liquids (i.e. fueling) and trained on how to prevent and clean-up minor spills.

(c) Waste Handling and Disposal

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

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

(iii) The Contractor will, during and at the completion of construction, clean up the construction area and all resulting debris shall be deposited at a Waste Disposal Ground operating under the authority of Waste Disposal Grounds Regulation, Manitoba Regulation 150/91. Exceptions are liquid industrial and hazardous wastes which require special disposal methods.

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

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

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

(vii) No burning of waste or other materials is permitted.

(viii) Clearing debris will be disposed of by chipping and/or mulching with the material being used by the City of Winnipeg for future uses.

(ix) The Contractor will use structurally suitable Site excavation material as fill within the project. Should excavated material exceed fill needs, the remainder would be stockpiled for use on other local projects.

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

(xi) Waste storage areas will not be located so as to block natural drainage.

(xii) Runoff from a waste storage area will not be allowed to cause siltation of a watercourse.

(xiii) Waste storage areas will be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.

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

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

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

(d) Dangerous Goods/Hazardous Waste Handling and Disposal

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

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

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

(iv) Different waste streams will not be mixed.

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

(vi) Liquid hydrocarbons will not be stored or disposed of in earthen pits on Site.

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

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

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

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

(xi) Runoff from a dangerous goods/hazardous waste storage area will not be allowed to cause siltation of a watercourse.

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

(e) Emergency Response

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

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

(iii) The Contractor will designate a qualified supervisor as the on Site emergency response coordinator for the project. The emergency response coordinator will have the authority to redirect manpower in order to respond in the event of a spill.

(iv) The following actions will be taken by the person in charge of the spilled material or the first person(s) arriving at the scene of a hazardous material accident or the on Site emergency response coordinator.

(i) Notify emergency-response coordinator of the accident:

- Identify exact location and time of the accident.
- Indicate injuries, if any.
- Request assistance as required by magnitude of accident [Manitoba Conservation 24-hour Spill Response Line (204) 945-4888, Police, Fire Department, Ambulance, company backup].

(ii) Attend to public safety:

- Stop traffic, roadblock/cordon off the immediate danger area.
- Eliminate ignition sources.
- Initiate evacuation procedures if necessary.

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

- Personnel on Site.
- Cause and effect of spill.
- Estimated extent of damage.
- Amount and type of material involved.
- Proximity to waterways, sewers and manholes.

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

- Approach from upwind.
- Stop or reduce leak if safe to do so.
- Dyke spill material with dry, inert absorbent material or dry clay soil or sand.
- Prevent spill material from entering waterways and utilities by dyking.
- Prevent spill material from entering manholes and other openings by covering with rubber spill mats or dyking.

(v) Resume any effective action to contain, clean up, or stop the flow of the spilled product.

(vi) The emergency response coordinator will ensure that all environmental accidents involving contaminants shall be documented and reported to

Manitoba Conservation according to The Dangerous Goods Handling and Transportation Act Environmental Accident Reports Regulation 439/87.

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

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

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

Table 1 - Environmental Accident Reporting
Reportable Quantities of Spills that must be Reported to Manitoba Conservation [(204) 944-4888]

Classification	Hazard	Reportable Quantity or Level
1	Explosives	All
2.1	Compressed Gas (Flammable)	100 L*
2.2	Compressed Gas	100 L*
2.3	Compressed Gas (Toxic)	All
2.4	Compressed Gas (Corrosive)	All
3	Flammable Liquids	100 L
4	Flammable Solids	1 Kg
5.1 Packing Groups I and II	Oxidizer	1 Kg or 50 L
Packing Group III	Oxidizer	5 Kg or 50 L
5.2	Organic Peroxide	1 Kg or 1 L
6.1 Packing Group I	Acute Toxic	1 Kg or 1 L
Packing Groups II and III	Acute Toxic	5 Kg or 5 L
6.2	Infectious	All
7	Radioactive	Any discharge or level exceeding 10 m Sv/h at the package surface and 200 uSv/h at 1 m from the package surface
8	Corrosive	5 Kg or 5 L
9.1	Miscellaneous (except PCB Mixtures)	50 Kg
9.1	PCB Mixtures	500 grams
9.2	Aquatic Toxic	1 Kg or 1 L
9.3	Wastes (Chronic Toxic)	5 Kg or 5 L

* Container Capacity (refers to container water capacity)
Source: *Environmental Accident Reporting Regulation M.R. 439/87*

(f) Noise and Vibration

(i) The Contractor will adhere to all Noise and Vibration mitigation outlined in the Waverley West Arterial Roads Project Environmental Assessment Screening Report, dated June 2011

(ii) Noise generating activities will be limited to the hours indicated in the City of Winnipeg Neighbourhood Liveability By-law No. 1/2008. The activities will generally be restricted to 7:00 a.m. to 7:00 p.m. weekdays with written permission of the Contract Administrator and the City of Winnipeg for any after-hours or weekend work required for special cases. No extended or alternative working hours/dates will be permitted for pile driving activities.

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

(g) Dust and Emissions

(i) Construction vehicles and machinery will be kept in good working order by the Contractor through the use of inspection and maintenance.

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

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

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

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

(vi) Stockpiled soils will be wetted down or covered with tarpaulin covers to prevent the creation of dust, when appropriate.

(h) Erosion Control

(i) The Contractor will develop a sediment control plan prior to beginning construction in adherence with the Transportation Association of Canada National Guide to Erosion and Sediment Control on Roadway Projects, 2005 and to the satisfaction of the Contract Administrator.

(ii) Sediment control will be applied to all inwater works to prevent the release or re-suspension of sediments to the watercourse. A turbidity curtain will be used to contain sediments from coffer dam construction/removal and riprap placement, if warranted. This turbidity curtain should isolate as small an area as possible to complete the works, and should be completely removed once turbidity within the isolated area has returned to background levels.

(iii) The Contractor will inspect all sediment control structures daily during heavy construction activity in the areas of the structures and after a heavy rainfall to ensure their continued integrity.

(iv) Exposure of soils along drain slopes will be kept to the minimum practical amount, acceptable to the Contract Administrator.

(v) Effective sediment and erosion control measures (e.g., straw mulch, erosion control blankets, interceptor ditches) will be used both during construction and until vegetation is re-established to prevent sediment-laden runoff from entering the Lot 16 Drain, wetlands and other watercourses.

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

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

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

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

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

(i) Runoff Control

(i) Measures will be undertaken to ensure that runoff containing suspended soil particles is minimized from entering the land drainage system to the extent possible to the satisfaction of the Contract Administrator.

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

(iii) Construction activities on erodible slopes will be avoided during spring runoff and heavy rain falls.

(iv) Soil and fill will not be stockpiled on immediate watercourse bank areas.

(j) Fish

(i) The Contractor will adhere to all of the protection measures below and the measures included in Appendix C to adhere to the DFO No Net Loss Policy for fish habitat.

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

(iii) If possible, culvert replacement works will be constructed during periods of no flow or very low flow. Flowing water should be diverted around the construction area using a dam and bypass pump or temporary flume (culvert). Water will be diverted in a manner that avoids sediment generation to downstream areas and does not alter the volume of flow in the watercourse. Use coffer dams made of non-earthen material such as aquadams, sand bags, sheet pile or clean granular material wrapped in poly-plastic or other suitable isolation materials. Ensure any pump inlets are appropriately screened following the DFO Freshwater Intake End-of-Pipe Fish Screen Guidelines. Ensure all isolation materials are completely removed from the watercourse once construction is complete.

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

(v) All culvert replacement works will be limited to within road's right-of-way.

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

(vii) Culverts will be installed according to the Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat (Manitoba Natural Resources and DFO, 1996). The culverts will be embedded a minimum of 0.3 m or 10% of culvert vertical diameter, whichever is greater to maintain connectivity during lower flows in this forage fish stream.

(viii) The duration of work and amount of disturbance to the bed and banks of the water body will be minimized.

(ix) Use only clean rock for armouring the inlets and outlets of the culvert, and haul it in from an appropriate land-based source. Avoid using poor quality limestone that breaks down quickly when exposed to the elements or acid generating rocks typical from metal mines. All rock will be clean and free of fine materials and of appropriate size to resist displacement during high flow events.

(x) The rock is placed such that it does not constrict the channel or change the hydraulics in a way that might damage the bed and/or banks of the watercourse or interfere with fish passage.

(xi) Where grading of stream banks is required they are sloped by pulling material back from the water's edge. Stabilize any waste materials removed from the work site, above the ordinary high water mark, to prevent them from entering any water body. Spoil piles could be contained with silt fence, flattened, covered with biodegradable mats or tarps, and/or planted with preferably native grass or shrubs.

(xii) Excavation of the water body bed will be limited to within the road right of way and is the minimum required for the proper placement of the culvert crossing.

(xiii) Shoreline vegetation will be retained to the greatest extent possible to maximize the stability of the banks.

(xiv) Operate machinery from outside of the water and in a manner that minimizes disturbance to the banks of the water body.

(xv) The intake of any pumps used in surface waters will be screened to meet the Department of Fisheries and Oceans' Freshwater Intake End-of-Pipe Fish Screening

Guidelines (1995) and water withdrawal rates will not exceed 10% of the instantaneous stream flow at the time.

(k) Wildlife

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

(ii) No one will disturb, move or destroy migratory birds' nests.

(iii) If a nest is encountered, work will cease in the immediate area and the Contract Administrator will be contacted for further direction.

(iv) In the event that species at risk are encountered during the project construction, all work will cease in the immediate area, the site will be made safe and the Contract Administrator will be contacted.

(l) Wetlands

(i) The Contractor will implement the following environmental protection measures to prevent the new loss of wetland functions, in accordance with the Federal Policy on Wetland Conservation:

(i) The Contractor will clearly mark wetland limits near the construction footprint prior to commencement of the Work and will remain marked throughout the construction period.

(ii) Wetlands will not be disturbed without written permission from the Contract Administrator.

(iii) Should additional wetlands be encountered during construction, construction in that area will halt until the area is properly marked.

(iv) Construction equipment will avoid the marked wetland areas as much as possible, where feasible.

(v) The Contractor will not discharge water into adjacent wetlands without written permission from the Contract Administrator, having confirmed the quality of the water to be discharged and the capacity of the receiving wetland.

(vi) Any fish located within the wetlands to be disturbed by the project will be captured and returned to a nearby watercourse unharmed.

(m) Vegetation

(i) The Contractor will clearly mark the disturbance limit prior to commencement of the Work and will remain marked throughout the construction period.

(ii) Vegetation will not be disturbed without written permission from the Contract Administrator.

(iii) The Contractor will protect plants or trees which may be at risk of accidental damage. Such measures may include protective fencing or signage and will be approved in advance by the Contract Administrator.

(iv) The Contractor will limit the removal of trees and snags (standing dead trees); surface disturbance and vegetation clearing.

(v) Herbicides and pesticide will not be used adjacent to any surface watercourse.

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

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

(viii) Trees damaged during construction activities will be examined by bonded tree care professionals. Viable trees damaged during construction activities will be pruned according to good practices by bonded tree care professionals.

(ix) Damaged trees which are not viable will be replaced at the expense of the Contractor.

(n) Landscaping

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

(ii) Topsoil will be stripped prior to construction and salvaged for use during landscaping. Surplus topsoil will be properly stockpiled for use in other projects.

(iii) The Contractor will adhere to the landscaping plan for the maintenance of initial stages and development stages of the plant community.

(o) Heritage Resources

(i) If heritage material is located during the construction and soil removal process, all Work will cease and the Contractor will immediately contact the Contract Administrator. The Historic Resource Branch, Manitoba Culture, Heritage, Tourism and Sport or the Project Archaeologist, will be contacted by the Contract Administrator to determine the nature and extent of the archaeological material and to arrange for its recovery. The archaeological remains will be recovered by salvage excavation upon authorization by the Contract Administrator, having consulted with the Historic Resources Branch, Manitoba Culture, Heritage, Tourism and Sport.

(ii) The Contractor will be prepared to continue his Work elsewhere on the project while the Archaeologist investigates the find and determines its heritage value.

(iii) The Contractor is advised that he may be denied access to such areas of the project until such time as a thorough archaeological investigation is conducted or the find is deemed to have no heritage value.

(iv) Construction and excavation work will not resume until the Contract Administrator, having consulted with the Historic Resources Branch, Manitoba Culture, Heritage, Tourism and Sport, or the Project Archaeologist, authorizes a resumption of Work.

(v) If human remains are uncovered during the construction and soil removal process, all Work will cease and the Heritage Resources Branch, Manitoba Culture, Heritage, Tourism and Sport will be contacted by the Contract Administrator. The Historic Resources Branch will contact the City of Winnipeg Police.

(vi) If the human remains are not considered forensic, (i.e., no foul play suspected), they will be removed by the Historic Resources Branch, Manitoba, Culture, Heritage, Tourism and Sport or the Project Archaeologist and turned over to the Province.

(vii) If the human remains are considered forensic, the City of Winnipeg Police will be responsible for their removal.

(viii) Additional information may be obtained by contacting: Archaeological Assessment Services, Historic Resources Branch.

(p) Construction Traffic

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

(ii) Large equipment will be equipped with flashing beacons and/or an audible “back up” warning device that is audible when the transmission is in reverse.

(iii) The Contractor will adhere to the Standard Provisions of the Standard Construction Specifications, and of the Manual of Temporary Traffic Control in Work Areas on City Streets of the City of Winnipeg Public Works Department.

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

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

(q) Access

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

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

E26.10 MEASUREMENT AND PAYMENT

E26.10.1 The Environmental Protection Plan will be considered incidental to the Work and as such no measurement or payment will be made for this item.

E27. CLEARING AND GRUBBING

E27.1 REFERENCES

E27.1.1 Section E26, “Environmental Protection Plan”.

E27.1.2 U.S. Environmental Protection Agency (EPA)/Office of Water

(a) EPA 832, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

E27.2 DEFINITIONS

E27.2.1 Clearing consists of cutting off trees and brush vegetative growth to not more than specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.

E27.2.2 Close-cut clearing consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.

E27.2.3 Clearing isolated trees consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris.

E27.2.4 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm trunk diameter and disposing of fallen timber and surface debris.

E27.2.5 Grubbing consists of excavation and disposal of stumps and roots, boulders and rock fragments of specified size to not less than specified depth below existing ground surface.

E27.3 QUALITY ASSURANCE

E27.3.1 Safety Requirements: worker protection.

(a) Workers must wear gloves, eye protection and protective clothing when applying herbicide materials.

(b) Workers must not eat, drink, or smoke while applying herbicide material.

(c) Clean up spills of preservative materials immediately with absorbent material and safely discard to landfill.

E27.4 SUBMITTALS

E27.4.1 Samples:

(a) Submit a sample of each material listed below for approval prior to delivery of materials to project site.

(b) Tree wound paint: one litre can with manufacturer's label.

(c) Herbicide: one litre can with manufacturer's label.

E27.4.2 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

E27.4.3 Submit manufacturer's installation instructions.

E27.5 STORAGE AND PROTECTION

E27.5.1 Prevent damage to fencing, trees, natural features, bench marks, existing buildings existing pavement, utility lines, site appurtenances, water courses, root systems of trees which are to remain.

E27.5.2 Repair damaged items to approval of Contract Administrator. Replace trees designated to remain, if damaged, as directed by Contract Administrator.

E27.5.3 The Contractor shall not remove any trees or perform any clearing and grubbing that has not been clearly marked by the Contract Administrator. If the Contractor removes any tree, regardless of size or species, that was not approved by the Contract Administrator, the Contractor shall supply and install five (5) trees of a species and calliper equal to or greater than that which was removed. The replaced trees shall be installed at a location determined by the Contract Administrator, which may be in or near the Site.

E27.5.4 Protect existing trees to remain on-site with snow fencing as indicated by the Contract Administrator.

E27.5.5 Limit site disturbance including earthwork and clearing of vegetation to

(a) 12 m beyond the building perimeter.

(b) 1.5m beyond road way, walkways, ditches and main utility trenches.

(c) 5m beyond sports fields and parking.

E27.5.6 Maintain access roads to prevent accumulation of construction related debris on roads.

E27.6 WASTE MANAGEMENT AND DISPOSAL

E27.6.1 Consider felled timber from which saw logs, pulpwood, posts, poles, ties, or fuel wood can be produced as saleable timber.

(a) Trim limbs and tops, and saw into saleable lengths for pulpwood, for poles, for ties, and for fuel wood.

(b) Stockpile adjacent to site.

(c) Owner to have first right of refusal for saleable timber.

E27.7 MATERIALS

E27.7.1 Herbicide: effective for killing annual and perennial weeds, by being absorbed through roots and foliage.

E27.7.2 Soil Material for Fill:

(a) Excavated soil material: free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, deleterious, or objectionable materials.

(b) Remove and store soil material for reuse.

E27.8 TEMPORARY EROSION AND SEDIMENTATION CONTROL

E27.8.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to engineering controls such as silt fence, silt traps and filter cloth placement during construction.

E27.8.2 Excavation and reuse of soil must not create fugitive dust. Contractor to cover or dampen soil to prevent blowing dust or debris under dry conditions. All stockpiled materials must be covered with 6mm poly at the end of each day.

E27.8.3 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

E27.8.4 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

E27.9 PREPARATION

E27.9.1 Inspect site and verify with Contract Administrator items designated to remain.

E27.9.2 Locate and protect utility lines: preserve in operating condition active utilities traversing site.

E27.9.3 Notify Contract Administrator immediately of damage to or when unknown existing utility lines are encountered.

E27.9.4 Keep roads and walks free of dirt and debris.

E27.9.5 Supply and install protective strapping as per E4.1(b) and / or snow fencing around existing trees to remain as directed by the Contract Administrator.

E27.10 APPLICATION

E27.10.1 Manufacturer's instructions: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

E27.11 CLEARING

E27.11.1 Clearing includes cutting of trees into sections and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, snags, brush and rubbish occurring within cleared areas.

E27.11.2 Clear as directed by Consultant, by cutting at height of not more than 300 mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations to be not more than 1000 mm above ground surface.

E27.11.3 Cut off unsound branches on trees designated to remain as directed by Consultant.

E27.11.4 Apply herbicide in accordance with manufacturer's label to top surface of stumps designated to be removed.

E27.12 CLOSE CUT CLEARING

E27.12.1 Close cut clearing to ground level for gravel pathway areas as indicated

E27.13 UNDERBRUSH CLEARING

E27.13.1 Clear underbrush from areas as indicated at ground level.

E27.14 GRUBBING

E27.14.1 Remove and dispose of roots larger than 7.5 cm in diameter, matted roots, and designated stumps from indicated grubbing areas except gravel pathway areas.

E27.14.2 Grub out stumps and roots to not less than 100 mm below ground surface.

E27.14.3 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m^3.

E27.14.4 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.

E27.15 REMOVAL AND DISPOSAL

E27.15.1 Remove cleared and grubbed materials off site.

E27.15.2 Dispose of cleared and grubbed materials by burning, burying or mulching.

E27.15.3 Burn only in area designated by Consultant. Burn under constant care of competent watchmen, at such times and so that surrounding vegetation, adjacent property or anything to remain will not be jeopardized.

E27.15.4 Bury to approval of Consultant by:

(a) Consolidating.

(b) Covering with minimum 500 mm of mineral soil.

(c) Finishing surface.

E27.15.5 Chip or mulch and spread cleared and grubbed vegetative material on site as directed by Consultant.

E27.16 FINISHED SURFACE

E27.16.1 Leave ground surface in condition suitable for immediate grading operations to approval of Consultant.

E27.17 CLEANING

E27.17.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

E28. ROUGH GRADING

E28.1 REFERENCES

E28.1.1 American Society for Testing and Materials (ASTM)

(a) ASTM D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m).

E28.2 EXISTING CONDITIONS

E28.2.1 Examine geotechnical report.

E28.2.2 Known underground and surface utility lines and buried objects are as indicated on survey.

E28.3 PROTECTION

E28.3.1 Protect existing trees, natural features and drainage courses which are to remain as directed by Consultant. If damaged, restore to original or better condition unless directed otherwise.

E28.3.2 Protect existing trees to remain on-site

E28.3.3 Maintain access roads to prevent accumulation of construction related debris on roads.

E28.4 MATERIALS

E28.4.1 Fill material shall be suitable site material, as approved by the Contract Administrator.

E28.4.2 Excavated or graded material existing on site may be suitable to use as fill for grading work if approved by Consultant.

E28.5 STRIPPING OF TOPSOIL

E28.5.1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected as determined by Consultant.

E28.5.2 Commence topsoil stripping of areas as indicated and relocate off site.

E28.5.3 Strip topsoil to depths as directed by Consultant. Avoid mixing topsoil with subsoil.

E28.5.4 Stockpile in locations as directed by Consultant. Stockpile height not to exceed 2 m. All stockpiled materials must be covered with 6 mm poly at the end of each day.

E28.5.5 Dispose of unused topsoil as directed by Consultant.

E28.6 GRADING

E28.6.1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.

E28.6.2 Rough grade to depths appropriate to accommodate finish grades of seeded areas.

E28.6.3 Slope rough grades as indicated.

E28.6.4 Grade ditches to depth as indicated.

E28.6.5 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

E28.6.6 Compact filled and disturbed areas to Standard Proxy Density to ASTM D698, as follows:

(a) 86% under landscaped areas.

(b) 95% under paved and walk areas.

E28.6.7 Do not disturb soil within branch spread of trees or shrubs to remain.

E28.7 TESTING

E28.7.1 Inspection and testing of soil compaction will be carried out by designated testing laboratory designated by ULC.

E28.7.2 Submit testing procedure and frequency of tests to Consultant for approval.

E28.7.3 Remove surplus material and material unsuitable for fill, grading or as directed by Consultant.

E28.8 METHOD OF MEASUREMENT

E28.8.1 There shall be no separate measurement for the work associated with this Specification.

E28.9 BASIS OF PAYMENT

E28.9.1 Payment for work specified under this Specification is to be included with the price for either sodding or seeding.

E29. SALT TOLERANT GRASS SEEDING

DESCRIPTION

E29.1 Further to CW 3520 and CW3540, this specification shall cover sub-grade preparation and the supply and placement of Salt Tolerant Grass Seed.

MATERIALS

E29.2 Salt Tolerant Grass Seed

E29.2.1 Salt Tolerant Grass Seed for regional and collector boulevards, medians and interchange areas shall be a mixture composed of:

(a) Seventy percent (70%) Fults or Nuttals Alkaligrass (Puccinellia spp.), twenty percent (20%) Audubon or Aberdeen Creeping Red Fescue and ten percent (10%) Perennial Ryegrass.

EQUIPMENT

E29.3 Scarification equipment shall be suitable for the area being scarified, shall be capable of scarifying the sub-grade to the specified depth and shall be accepted by the Contract Administrator. For confined areas a toothed bucket may be acceptable. For larger areas tilling equipment may be required.

CONSTRUCTION METHODS

E29.4 Preparation of Existing Grade

E29.4.1 Prior to placing topsoil, in areas to be seeded greater in width than 600mm, prepare the existing sub-grade by scarifying to a minimum depth of 75mm and to a maximum depth of 100mm to the satisfaction of the Contract Administrator.

E29.4.2 Scarification shall consist of breaking up and loosening the sub-grade. No scarification shall occur within the edge of a tree canopy (or drip line).

E29.5 Salt Tolerant Grass Seeding

E29.5.1 Salt Tolerant Grass Seed shall be sown at a rate of 2.2 kilograms per 100 square meters.

MEASUREMENT AND PAYMENT

E29.6 Supply, placement and maintenance of Salt Tolerant Grass Seed will be paid for at the Contract Unit Price per square metre for "Salt Tolerant Grass Seeding", measured as specified herein, which price shall be payment in full for supplying all materials and for completing all operations herein described and all other items incidental to the work included in this Specification. Payment for Salt Tolerant Grass Seeding shall be in accordance with the following:

(a) Sixty five (65%) percent of quantity following supply and placement.

(b) Remaining thirty five (35%) percent of quantity following termination of the Maintenance Period

E30. TOP SOIL PLACEMENT AND GRADING

E30.1 DESCRIPTION

E30.1.1 This Specification shall cover the supply and placing of topsoil for areas to be seeded and planted.

E30.1.2 The work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and other things necessary for and incidental to the satisfactory performance and completion of all work as shown on the Drawings and hereinafter specified.

E30.2 TERMINOLOGY

E30.2.1 Growing medium replaces the term “Topsoil” and “Planting Soil” on all drawings.

E30.3 REFERENCES

E30.3.1 Agriculture and Agri-Food Canada

(a) The Canadian System of Soil Classification, Third Edition, 1998.

E30.3.2 Canadian Council of Ministers of the Environment

(a) PN1340-2005, Guidelines for Compost Quality.

E30.3.3 City of Winnipeg Standards specification CW 3540

E30.4 DEFINITIONS

E30.4.1 Compost:

(a) Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.

(b) Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.

(c) Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below (25) (50)), and contain no toxic or growth inhibiting contaminates.

(d) Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A) (B).

E30.5 SUBMITTALS

E30.5.1 Quality control submittals :

(a) Soil testing: submit certified test reports from a laboratory. This soil test must be conducted and test results submitted to the Consultant prior to tree, shrub and ground cover planting and seeding.

(b) Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

E30.6 WASTE MANAGEMENT AND DISPOSAL

E30.6.1 Separate waste materials for reuse and recycling.

E30.6.2 Divert unused soil amendments from landfill to official hazardous material collections site approved by the Consultant.

E30.6.3 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

E30.7 MATERIALS - GENERAL

E30.7.1 The Contractor shall be responsible for the supply, safe storage and handling of all materials set forth in this Specification. All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator and/or the City's designated turf inspector. There shall be no charge to the City for any materials taken by the Contract Administrator or the City's designated turf inspector for inspection and testing purposes

E30.7.2 Topsoil will be subject to tests for nitrate, phosphate, potassium, sulphate, pH, E.C. (salinity) and volume of organic matter by a testing laboratory approved by the Contract Administrator

E30.7.3 The Contract Administrator and/or the City's designated turf inspector will collect as many samples as are deemed necessary to ensure that a good representation of the entire topsoil shipment is provided for the soil analysis report.

E30.8 TOPSOIL

E30.8.1 Topsoil for seeded areas and planting beds:

(a) Shall consist of a screened clay-textured or loam textured dark topsoil, a fertile, friable material (neither of heavy clay nor of a very light sandy nature composition) containing by volume, a minimum of four (4%) percent for clay loams and two (2%) percent for sandy loams to a maximum twenty-five (25%) percent organic matter (peat, rotted manure or composted material) and capable of sustaining vigorous plant growth.

(b) Shall be free of subsoil contamination, roots, stones over 25mm diameter, baler twine or subsoil clay lumps over 25mm diameter and other extraneous matter;

(c) Shall not contain couch or crab grass rhizomes, Canada thistle roots or other noxious weeds;

(d) Upon delivery or thirty (30) days following delivery, salinity rates shall be less than 4.0mm hos/cm on a saturated paste basis. The pH range shall be between 6.0 to 8.0;

(e) May be either on-site soil or imported soil;

(i) On-site soil which has been stockpiled can be reused providing that it is shredded or screened prior to being re-spread and that it meets the requirements specified above for soil;

(f) Shall be manually spread around trees, shrubs and other obstacles;

(g) Shall not come into contact with new asphaltic concrete pavement that is less than 2 weeks old;

(h) The Consultant reserves the right to reject planting soil not conforming to the requirements of these Specifications.

E30.9 SOIL AMENDMENTS

E30.9.1 The soil test results will govern over the soil amendments provided below.

E30.9.2 Fertilizer:

(a) Fertility: major soil nutrients present in following amounts:

(b) Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.

(c) Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.

(d) Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.

(e) Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.

(f) Ph value: 6.5 to 8.0.

E30.9.3 Peatmoss:

(a) Derived from partially decomposed species of Sphagnum Mosses.

(b) Elastic and homogeneous, brown in colour.

(c) Free of wood and deleterious material which could prohibit growth.

(d) Shredded particle minimum size: 5mm.

E30.9.4 Sand: washed coarse silica sand, medium to course textured.

E30.9.5 Organic matter: compost Category A, B in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.

E30.9.6 Use composts meeting Category B requirements for land fill reclamation and large scale industrial applications.

E30.9.7 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

E30.10 SOURCE QUALITY CONTROL

E30.10.1 Advise Consultant of sources of topsoil to be utilized with sufficient lead time for testing.

E30.10.2 Contractor is responsible for amendments to supply topsoil as specified.

E30.10.3 Perform soil testing by recognized testing facility for PH, P and K, and organic matter.

E30.10.4 Soil sampling, testing and analysis to be in accordance with Provincial standards.

E30.11 STRIPPING OF TOPSOIL

E30.11.1 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill as directed by the Consultant.

E30.12 PREPARATION OF EXISTING GRADE

E30.12.1 Verify that grades are correct.

(a) If discrepancies occur, notify the Consultant and do not commence work until instructed by the Consultant.

E30.12.2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.

E30.12.3 Remove debris, roots, branches, stones in excess of 50mm diameter and other deleterious materials.

(a) Remove soil contaminated with calcium chloride, toxic materials and petroleum products.

(b) Remove debris which protrudes more than 75mm above surface.

(c) Dispose of removed material off site.

E30.12.4 Cultivate entire area which is to receive topsoil to minimum depth of 100mm.

(a) Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

E30.13 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

E30.13.1 Place topsoil after the Consultant has accepted subgrade.

E30.13.2 Spread topsoil in uniform layers not exceeding 150mm.

E30.13.3 Spread topsoil as indicated on the Softscape Details sheet to minimum depths after settlement.

E30.13.4 Manually spread topsoil around trees, shrubs and obstacles.

E30.14 SOIL AMENDMENTS

E30.14.1 Used on an as required basis and use as directed by the product label.

E30.14.2 The Contractor shall provide the Contract Administrator with a report for each work site indicating the fertilizer formulation used, the rate of application and the date of application.

E30.14.3 Fertilizer shall be spread uniformly over the entire area of topsoil at a rate to provide 48kg actual Nitrogen, 96 kg actual Phosphate and 48 kg actual Potassium per hectare.

E30.15 FINISH GRADING AND ROLLING

E30.15.1 Area shall be fine graded and the topsoil loosened. Eliminate rough spots and low areas to ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.

E30.15.2 Topsoil shall be rolled with mechanical roller of a minimum weight of 220kg, minimum width of 760mm roller, to consolidate it in areas to be seeded, leaving surface smooth, uniform, and firm against deep foot printing and to the satisfaction of the Contract Administrator.

E30.16 ACCEPTANCE

E30.16.1 The Consultant will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

E30.17 SURPLUS MATERIAL

E30.17.1 Dispose of materials not required off site.

E30.18 CLEANING

E30.18.1 All sidewalks, streets, approaches, driveways and properties near the Work Site shall be kept clean at all times by the Contractor.

E30.18.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

E31. TREES, SHRUBS AND GROUND COVER PLANTING

E31.1 DESCRIPTON

E31.1.1 Materials and installation for plant material, mulch, planting and maintenance.

E31.2 REFERENCES

E31.2.1 Agriculture and Agri-Food Canada (AAFC).

(a) Plant Hardiness Zones in Canada-2000.

E31.2.2 Canadian Nursery Landscape Association (CNLA).

(a) Canadian Standards for Nursery Stock-2001.

E31.3 SUBMITTALS

E31.3.1 Submit product data for mulch.

E31.4 QUALITY ASSURANCE

E31.4.1 The Consultant shall approve in writing the plant material either at the nursery or on-site prior to installation. Ensure all plant identification tags remain on the plant material through to final inspection.

E31.5 STORAGE AND PROTECTION

E31.5.1 The Contractor shall coordinate the shipping of trees and excavation of tree pits to ensure no more than a maximum of a 24 hour time lapse has occurred between the plant material arriving on Site and the installation of that plant material.

(a) Trees shall be transported with care taken to prevent damage.

(i) Protect trees against abrasion, exposure and extreme temperature change during transit.

(ii) When delivery distance is less than 30 km and vehicle travels at speeds under 80 km/h, tie tarpaulins around plants or over vehicle box.

(iii) When delivery distance exceeds 30 km or vehicle travels at speeds over 80 km/h, use enclosed vehicle where practical.

(iv) Protect foliage and root balls using anti-desiccants and tarpaulins, where use of enclosed vehicle is impractical due to size and weight of plant material.

(v) Avoid binding of trees with rope or wire that would damage bark, break branches or destroy natural shape of tree.

(vi) Point of contact with equipment shall be padded

(vii) Give full support to root ball of trees during lifting.

- Each balled specimen shall be handled by the root ball with sufficient care
- Broken root balls or root ball consisting of loose soil will not be accepted and shall be replaced.
- Broken roots of deciduous stock shall be pruned back prior to planting.

(b) Trees with broken or damaged trunks or branches are not acceptable. Trees with damaged trunks, however caused, will be rejected. No exceptions shall be made in this respect.

(c) Protect stored plant material from frost, wind and sun and as follows:

(i) Trees that cannot be planted immediately shall be well protected against damage and drying out; if necessary, trees shall be heeled-in in a shaded area and watered well.

(ii) Store and protect plant material which will not be installed within 1 hour after arrival at site in storage location approved by the Consultant.

(iii) For pots and containers, maintain moisture level in containers.

(d) Trees that are not given the correct pre-planting care specified will be rejected. Protect plant material from damage during transportation:

E31.5.2 Waste Management and Disposal:

(a) Separate waste materials for reuse and recycling.

(b) Remove from site and dispose of packaging materials at appropriate recycling facilities.

(c) Collect and separate for disposal paper, plastic, polystyrene, corrugated and cardboard packaging material in appropriate on-site bins or recycling in accordance with Waste Management Plan (WMP).

(d) Place materials defined as hazardous or toxic in designated containers.

(e) Divert unused metal materials from landfill to metal recycling facility as approved by the Consultant.

(f) Fold up metal and plastic banding, flatten and place in designated area for recycling.

(g) Divert discarded plastic plant containers materials from landfill to plastic recycling facility approved by the Consultant.

(h) Dispose of unused fertilizer at official hazardous material collection site approved by the Consultant.

(i) Dispose of unused anti-desiccant at official hazardous material collections site approved by the Consultant.

(j) Divert unused wood and mulch materials from landfill to recycling and/or composting facility approved by the Consultant.

E31.6 TREE LAYOUT

E31.6.1 The Contractor shall obtain all necessary utility clearances prior to the commencement of planting and in a timely manner so as not to jeopardize the schedule of the complete tree planting operation;

E31.6.2 Trees are not to be planted directly above underground utilities or below above ground utilities;

E31.6.3 Where a specified planting Site conflicts with utilities; the Contractor may modify the precise location in compliance with the utility clearances and the Minimum distance Guidelines:

(a) Intersections: 6m

(b) Light standards, hydro poles: 4.5m

(c) Fire hydrants, manholes, and sewer grates: 3m

(d) Private approaches: 1.5m

E31.6.4 Where a planting Site must be modified by more than 1 meter, the Contractor must receive prior approval from the Consultant or designate;

E31.6.5 The Contractor shall ensure the Multi-Use Pathway Trees must be kept in line with the pathway alignment at a minimum distance of 2m, except where otherwise indicated by the Consultant,

E31.7 SCHEDULING

E31.7.1 Obtain approval from the Consultant of schedule 7 days in advance of shipment of plant material.

E31.7.2 Schedule to include:

(a) Quantity and type of plant material.

(b) Shipping dates.

(c) Arrival dates on site.

(d) Planting Dates.

E31.8 WARRANTY

E31.8.1 For plant material as itemized on plant list, the warranty period is extended to 24 months.

E31.8.2 The Contractor hereby warrants that plant material as itemized on plant list will remain free of defects for 1 full growing season, providing adequate maintenance has been provided (twice per growing season).

E31.8.3 End-of-warranty inspection will be conducted by the Consultant.

E31.8.4 The Consultant reserves the right to extend Contractor's warranty responsibilities for an additional 12 months if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.

E31.9 PLANT MATERIAL

E31.9.1 Type of root preparation, sizing, grading and quality: comply to Canadian Standards for Nursery Stock.

(a) Source of plant material: grown in local climate of project site.

E31.9.2 Plant material: free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.

E31.9.3 Trees: with straight trunks, well and characteristically branched for species except where specified otherwise.

E31.10 WATER

E31.10.1 Water shall be free of oils, acids, alkalis, salts and other substances that may be detrimental to plant growth. Water suitable for human consumption shall be acceptable without testing.

E31.10.2 Water from rivers or streams shall not be used without prior approval of the Contract Administrator.

E31.10.3 Should the Contract Administrator determine that water quality testing is necessary, an approved testing laboratory shall perform the test at the sole expense of the Contractor.

E31.11 TREE STAKING AND ASSOCIATED MATERIALS

E31.11.1 Tree staking shall be provided for all multi-use pathway planting and parkland tree planting. Refer to details.

(a) T-rail iron stakes 40 x 40 x 5 x 1540 mm long, primed with 1 brush coat of zinc rich plant paint to CGSB 1-GP-191B, uniform in style and colour, or approved equal.

E31.11.2 Guying Materials: Non-abrasive hose-covered wire, flexible belting or other approved

E31.11.3 Trunk Protection Collars: Plastic weeping tile, 100 mm diameter x 600 mm long.

E31.12 MULCH

E31.12.1 Bark mulch. Product data to be submitted to the Consultant.

(a) Be a clean mulch free of leaves, branches and other extraneous matter; and

(b) Consist of chips not less that 15mm nor larger than 75mm in size.

E31.13 FERTILIZER

E31.13.1 Synthetic commercial type as recommended by soil test report.

E31.14 SOURCE QUALITY CONTROL

E31.14.1 Obtain approval from the Consultant of plant material prior to planting.

E31.15 LANDSCAPE EDGING

E31.15.1 140mm height, grade A premium blend medium density polyethylene landscape edging to be installed and secured with stakes set at 45 degree angles.

E31.15.2 Landscape edging joints to overlap 75mm min.

E31.15.3 Maximum distance between stakes should be 2m and all joints should be staked through both pieces.

E31.15.4 Minimum length of any single edging segment not to be less than 1.5m

E31.16 PRE-PLANTING PREPARATION

E31.16.1 Ensure plant material acceptable to the Consultant.

E31.16.2 Remove damaged roots and branches from plant material.

E31.17 EXCAVATION AND PREPARATION OF PLANTING BEDS

E31.17.1 Preparation of planting beds is specified in Topsoil Placement and Grading.

E31.17.2 For individual planting holes:

(a) Stake out location and obtain approval from the Consultant prior to excavating.

(b) Excavate to depth and width as indicated.

(c) Remove subsoil, rocks, roots, debris and toxic material from excavated material that will be used as planting soil for trees and individual shrubs. Dispose of excess material.

(d) Scarify sides of planting hole.

(e) Remove water which enters excavations prior to planting. Notify the Consultant if water source is ground water.

E31.18 PLANTING

E31.18.1 All Trees shall be set plump and shall be placed in the centre of the tree pit.

E31.18.2 For jute burlapped root balls, cut away top one third of wrapping and wire basket without damaging root ball. Do not pull burlap or rope from under root ball. All twine shall be removed from root ball.

E31.18.3 For container stock or root balls or seedlings or plugs in non-degradable wrapping, remove entire container or wrapping without damaging root ball.

E31.18.4 Plant vertically in locations as indicated. Orient plant material to give best appearance in relation to structure, roads and walks.

E31.18.5 For trees and shrubs:

(a) Backfill soil in 150 mm lifts. Tamp each lift to eliminate air pockets. When two thirds of depth of planting pit has been backfilled, fill remaining space with water. After water has penetrated into soil, backfill to finish grade.

(b) Form watering saucer as indicated.

E31.18.6 For ground covers, backfill soil evenly to finish grade and tamp to eliminate air pockets.

E31.18.7 Water plant material thoroughly.

E31.18.8 After soil settlement has occurred, fill with soil to finish grade.

E31.18.9 Dispose of burlap, wire and container material off site.

E31.19 MULCHING

E31.19.1 Ensure soil settlement has been corrected prior to mulching.

E31.19.2 Spread mulch as indicated.

E31.20 MAINTENANCE DURING ESTABLISHMENT PERIOD

E31.20.1 Perform following maintenance operations from time of planting to acceptance by the Consultant.

(a) Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion as follows:
   (i) Immediately upon being planted and every week for the first three (3) weeks after planting;
   (ii) Thereafter, watering shall be done every 7-14 days between May and October or as frequently as necessary (compensating appropriately for weather) to sustain vigorous plant growth;
   (iii) Water slowly to ensure that water does not run away from the root zone and the top 300mm of soil around the root system of the tree is well saturated;
   (iv) Use a deep root feeder (hard surface boulevards) or low pressure open flow nozzle and hose (turf boulevards and parks). The water stream must not gouge out a hole in the soil or mulch;
   (v) Use the recognized standard for tree watering as approximately 8-10 times during the growing season with the following amounts of water depending on the caliper of tree. (40 litres of water per 25mm caliper of tree);
   (vi) Recognize watering requirements of trees dependent upon variables such as tree species, soil type, when planted, and weather including precipitation. These watering requirements are a minimum standard and shall be followed unless otherwise directed by the Contract Administrator or designate.
   (vii) Apply a final watering for all trees, regardless of when planted, that shall be completed after temperatures falls below freezing to ensure adequate moisture in root zone at freeze up;

(b) Maintain surface of tree pit by hand weeding during the watering process;
   (i) Do not allow weeds to establish for a period longer than two (2) weeks; and
   (ii) Do not use any herbicides for weed control near trees unless authorized by the Consultant
   (iii) Replace or respread damaged, missing or disturbed mulch.
   (iv) For non-mulched areas, cultivate as required to keep top layer of soil friable.
   (v) If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from the Consultant prior to application.
   (vi) Remove dead or broken branches from plant material.
   (vii) Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

E31.21 MAINTENANCE DURING WARRANTY PERIOD

E31.21.1 From time of acceptance by the Consultant to end of warranty period, perform following maintenance operations.

(a) Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.

(b) Reform damaged watering saucers.

(c) Remove weeds 2- 4 times per growing season.

(d) Replace or respread damaged, missing or disturbed mulch.

(e) For non-mulched areas, cultivate monthly to keep top layer of soil friable.

(f) If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from the Consultant prior to application.

(g) Apply fertilizer in early spring as indicated by soil test.

(h) Remove dead, broken or hazardous branches from plant material.

(i) Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

(j) Submit monthly written reports to the Consultant identifying:
  (i) Maintenance work carried out.
  (ii) Development and condition of plant material.
  (iii) Preventative or corrective measures required which are outside Contractor's responsibility.

E32. PRECAST CONCRETE UNIT PAVING

E32.1 DESCRIPTION

E32.1.1 Requirements and procedures for installing precast concrete unit pavers by hand or with mechanical equipment.

E32.2 REFERENCES

E32.2.1 Canadian Standards Association (CSA International)

(a) CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Method of Test for Concrete

(b) CSA-A231.2, Precast Concrete Pavers

(c) CSA A283, Qualification Code for Concrete Testing Laboratories

E32.3 SUBMITTALS

E32.3.1 Submit following sampling and testing data:

(a) Sieve analysis for gradation of bedding and joint material.

(b) Unit paver sampling and testing.

(c) Evaluation of cleaning and sealing compound.

E32.3.2 Submit full size two samples of each type and color standard-size pavers.

E32.3.3 Submit manufacturer's installation instructions.

E32.4 QUALITY ASSURANCE

E32.4.1 Installer qualifications: company or person specializing in precast concrete paver installations with 5 years documented experience.

E32.4.2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

E32.4.3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

E32.4.4 Layout of the pavers to be approved by the Consultant.

E32.5 MATERIALS

E32.5.1 Unit pavers: uniform in material, colour, size 105x 210x 60 mm.

(a) Acceptable materials: Barkman Holland Pavers, or approved products. Colours – Charcoal, Natural and Desert Buff. Detectable Paver colour to be Rustic Red.

E32.5.2 Pavers shall conform to the requirements of CAN3-A231.2, Precast Concrete Pavers. Average compressive strength of pavers at time of delivery to Work site shall be not less than 40 MPa.

E32.5.3 Manufactured sand for bedding: hard, durable, crushed stone particles, conforming to gradation of concrete sand as specified in CAN/CSA A23.1. Sand: free from clay lumps, cementation, organic material, frozen material and other deleterious materials. Do not use limestone screenings or stone dust.

(a) Gradations: within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2. 0% to pass 0.075 mm sieve.

Sieve Designation	% Passing
10 mm	100
5 mm	95-100
2.5 mm	80-100
1.25 mm	50- 85
0.630 mm	25- 60
0.315 mm	10- 35
0.160 mm	5- 15
0.080 mm	0-10

E32.5.4 Joint sand: to CSA A179, hard, durable, angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.

E32.5.5 Edge Restraints:

(a) Edge restraints shall be concrete structural curb or plastic as indicated:

(b) PVC or medium density polyethylene, industrial and flexible type edging, manufactured for use in paver installation, complete with connectors and pre-manufactured anchoring locations for spikes.

(c) Anchoring: to manufacturer's instructions. Galvanized, spiral, steel anchor spikes 9.5 mm diameter x 254 mm length, 1 per 300 mm of edging and at 100 mm each side of joints.

E32.5.6 Cleaning Compound:

(a) Clear, organic solvent, designed and recommended by manufacturer for cleaning concrete pavers of contamination encountered.

(b) Acid based chemical detergent, designed and recommended by manufacturer for removal of contamination encountered on pavers.

E32.5.7 Sealing Compound:

(a) Clear and exterior type specially formulated for application on precast concrete pavers.

(b) Clear and exterior type, containing co-polymer specially formulated for application on precast concrete pavers.

E32.5.8 Geotextile: 12oz Non-woven Geotextile from Nilex.

E32.5.9 Biaxial Geogrid – Tensar BX1200 from Nilex.

E32.6 MANUFACTURER'S INSTRUCTIONS

E32.6.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

E32.6.2 Place geo-textile and geo-grid as per manufacturer’s instructions.

E32.7 STRUCTURAL SURFACE

E32.7.1 Verify that structural surfaces conform to levels required for installation of unit pavers. If discrepancies occur, notify Consultant and do not commence Work until instructed by Consultant.

E32.7.2 Verify that top of structural surface (top of base) does not exceed plus or minus 10mm of grade over 3m straightedge.

E32.7.3 Ensure that structural surface is not frozen nor standing water is present during installation.

E32.8 STRUCTURAL CURBS

E32.8.1 Verify that structural curbs conform to elevations and alignments required for installation of unit pavers. If discrepancies occur, notify Consultant and do not commence work until instructed by Consultant.

E32.9 INSTALLATION OF EDGE RESTRAINTS

E32.9.1 Install restraints true to grade, in accordance with manufacturer's recommendations.

E32.10 PLACING OF BEDDING MATERIAL

E32.10.1 Ensure bedding material is not saturated or frozen until installation is complete.

E32.10.2 Spread and screed material on structural surface to achieve 20mm compacted thickness after vibrating pavers in place. Do not use joint sand for bedding sand.

E32.10.3 Do not disturb screeded material. Do not use bedding material to fill depressions in structural surface.

E32.11 INSTALLATION OF CONCRETE PAVERS

E32.11.1 Lay pavers to pattern indicated. Joints between pavers: 2 to 5mm wide.

E32.11.2 Use appropriate end, edge and corner stones. Saw cut pavers to fit around obstructions and at abutting structures.

E32.11.3 Installation by mechanical equipment:

(a) Prepare installation sequence and obtain approval of sequence by Engineer.

(b) Place paver pallets and other materials without exceeding load bearing capacity, or otherwise detrimentally affecting installations.

(c) Run equipment approved for installation only on paving surfaces vibrated in place.

(d) Inspect pavers and remove chipped, broken or otherwise damaged pavers as directed by Engineer.

(e) Replace pavers removed without altering layout and structural quality.

E32.11.4 Use a low amplitude, high frequency plate compactor capable of at least 22 kN centrifugal compaction force to vibrate pavers into bedding sand.

E32.11.5 Inspect, remove, and replace chipped, broken and damaged pavers.

E32.11.6 Sweep dry joint sand material into joints.

E32.11.7 Settle sand by vibrating pavers with plate compactor.

E32.11.8 Continue application of joint material and vibrating of pavers until joints are full. Do not vibrate within 1m of unrestrained edges of pavers.

E32.11.9 Sweep off excess joint material when installation is complete.

E32.11.10 Final surface elevations not to exceed plus or minus 10mm under 3m long straightedge.

E32.11.11 Surface elevation of pavers: 3 to 4mm above adjacent drainage inlets, concrete collars, or channels.

E32.11.12 Ensure conformance of final elevations.

E32.12 SEALING

E32.12.1 Ensure paver surfaces to be sealed are clean, free of extraneous materials and efflorescence, dry and appropriately cured.

E32.12.2 Apply coats of sealer in accordance with manufacturer's recommendations.

E32.12.3 Protect sealed surfaces from trespass until sealer has dried and hardened.

E32.13 FIELD QUALITY CONTROL

E32.13.1 Submit compaction test results for base and sub-base before installing pavers for consultant's approval.

E32.13.2 Sample and test in accordance with CSA-A231.2.

E32.13.3 Submit test results to Engineer for approval of precast concrete pavers.

E32.14 CLEANING

E32.14.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

E32.14.2 Carry out cleaning at times and conditions recommended by manufacturer of cleaning compound immediately as directed by Consultant.

E32.14.3 Remove and dispose of loose, extraneous materials from surfaces to be cleaned.

E32.14.4 Apply cleaning compounds appropriate for removal of various contaminants encountered in accordance with manufacturer's recommendations.

E32.14.5 Final surface to be free of contamination.

E33. TREE REMOVAL

E33.1 DESCRIPTION

E33.1.1 Further to CW3010-R4 and the City of Winnipeg "Tree Removal Guidelines", this specification shall cover the removal of trees as specified on the Contract Drawings.

E33.2 CONSTRUCTION METHODS

E33.2.1 Remove trees in accordance with CW 3010-R4.

E33.3 METHOD OF MEASURMENT

E33.3.1 Tree removal will be measured on a unit basis. The contractor will be paid according to the total number of trees removed within the limits of the work and approved by the Contract Administrator

E33.4 BASIS OF PAYMENT

E33.4.1 The removal of trees shall be paid for at the Contract Unit Price per tree for "Tree Removal", measured as specified herein, which price shall be payment in full for performing all operation herein described and other items incidental to the work included in this Specification.

E34. INSTALLATION OF STRAW WATTLES

DESCRIPTION

E34.1 Straw wattles are required to be installed as erosion control measures to mitigate any deleterious materials from entering the Land Drainage System.

MATERIALS

E34.2 The straw wattles shall be Stenlog or other biodegradable straw wattles.

CONSTRUCTION METHODS

E34.3 Install 300mm Stenlog or other straw wattle sediment control material in accordance with the manufacturer's specifications around all riprap areas related to drainage inlets and outlets, and catch basins within seeded areas.

E34.4 Install straw wattles so that no gaps exist between the soil and the bottom of the wattle, and the ends of adjacent wattles are overlapped 150mm minimum to prevent water and sediment passing. Achieve a tight seal between the wattle segments.

E34.5 Dogleg terminal ends of straw wattle up the slope to prevent channelling of sedimentation.

E34.6 Use 300mm wooden stakes to fasten straw wattle to the soil. Place stakes on each side of the straw wattle, lying across the natural fibre twine, spaced 1200mm on centre. Leave 30 to 50mm of wood stake exposed above the wattle.

E34.7 Avoid damage to wattles. Damaged areas of wattles should be cut and tied off, then treated as terminal ends.

E35. REMOVAL OF EXISTING INTERLOCK PAVING STONE

E35.1 DESCRIPTION

E35.1.1 This Specification shall supplement Standard Construction Specification CW 3330 – R3 and shall cover all operations related to the removal of existing Interlock Paving Stones.

E35.2 CONSTRUCTION METHOD

E35.2.1 Removal of existing interlock paving stones shall be understood to include removal and disposal of interlock concrete sidewalk pavement and lean mix, regardless of depth. The removal of existing lean mix or concrete sidewalk shall be paid for as a separate item.

E35.2.2 Removal of interlock concrete paving stone for reinstallation shall include removal of paving stones and lean mix as required, disposal of unusable paving stone and base course material and stockpiling of paving stones in approved area for future reinstallation.

E35.2.3 Any existing lean mix concrete base at the limits of the designated removal area shall be sawcut for the full depth of the pavement prior to the demolition and removal operations. All costs in connection with sawcutting are incidental and shall be included in the unit price bid for “Removal of Interlock Paving Stone” and Removal of Interlock Paving Stone for Reinstallation”.

E35.2.4 The Contractor shall exercise due caution during the Interlock paving stone removal Works so as to limit vibration. The Contractor shall take all necessary precautions when Working in the vicinity of any existing areaways, coal chutes, duct lines, trees, hedges, etc.

E35.2.5 The Contractor shall take care when removing the paving stones not to damage them, and shall stockpile them.

E35.3 METHOD OF MEASUREMENT

E35.3.1 Removal of existing interlock paving stone will be measured on a surface area basis as follows:

(i) Salvage Existing Paving Stones.

E35.3.2 Removal of existing lean mix or concrete sidewalk underneath existing paving stones will be measured on a surface area basis as follow:

(i) Miscellaneous Concrete Slab Removal – Monolithic Median Slab.

E35.4 BASIS OF PAYMENT

E35.4.1 Removal of Existing Interlocking Paving Stone will be measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the Work included in this Specification and shall include removal, salvage and stockpiling.

E35.4.2 Removal of existing lean mix or concrete sidewalk underneath existing paving stones will be paid for at the Contract Unit Price for “Miscellaneous Concrete Slab Removal – Sidewalk”.

E36. SOFT EXCAVATION TO EXPOSE UNDERGROUND UTILITIES

E36.1 DESCRIPTION

E36.1.1 This specification covers the soft excavation to expose underground utilities to determine the depth of the underground utility and whether it will interfere with the installation of proposed Works on site.

E36.2 METHOD

E36.2.1 Prior to commencement of any construction works adjacent to underground utilities, the Contractor shall use soft digging or hand excavation to expose the underground utilities.

E36.3 MEASUREMENT AND PAYMENT

E36.3.1 No separate measurement or payment will be made for any soft excavation operations or any items incidental to those operations.

E37. SUBDRAIN INSTALLATION AND MAINTENANCE

E37.1 DESCRIPTION

E37.1.1 This specification shall amend and supplement City of Winnipeg Standard Construction Specifications CW 2140-R3 “Sewer and Manhole Cleaning” and CW 3120-R4 “Installation of Subdrains”; it shall cover the installation of subdrains and the maintenance of existing subdrains.

E37.1.2 Referenced Standard Construction Specifications:

(a) CW 2140-R3 – Sewer and Manhole Cleaning

(b) CW 3120-R4 – Installation of Subdrains

E37.1.3 Referenced Standard Detail

(a) SD-245 – Subdrain Installation Detail

E37.2 MATERIALS

E37.2.1 As specified in CW 3120-R4.

E37.3 CONSTRUCTION METHODS

E37.3.1 Subdrain Installation

(a) As per CW 3120-R4.

E37.3.2 Connection of Existing Subdrains to New Catchbasins

(a) The Contractor shall connect all existing Kenaston Boulevard and Bishop Grandin Boulevard subdrains within the construction limits to the new catch basins installed under D17.1(f), as directed by the Contract Administrator.

(b) As per CW 3120-R4, section 3.5.

E37.3.3 Maintenance of Existing Subdrains

(a) The Contractor shall clean all existing Kenaston Boulevard and Bishop Grandin Boulevard subdrains within the construction limits, as directed by the Contract Administrator.

(b) As per CW 2140-R3, section 3.5.

E37.4 MEASUREMENT AND PAYMENT

E37.4.1 Subdrain Installation

(a) As per CW 3120-R4.

E37.4.2 Connection of Existing Subdrains to New Catchbasins

(a) As per CW 3120-R4.

E37.4.3 Maintenance of Existing Subdrains

(a) As per CW 2140-R3, section 4.1.

(b) Video inspection will not be conducted following subdrain cleaning. Payment will be made following satisfactory completion of the work, as determined by the Contract Administrator.

E38. SAWCUTTING PAVEMENT

E38.1 At the limits of excavation as directed by the Contract Administrator, the Contractor shall saw cut the existing pavement to produce a clean straight edge when excavated. The edge must be clean and straight prior to pouring new concrete pavement.

E38.2 For concrete pavements, the cost of saw cutting and disposal of surplus material shall be included in the unit price bid for "Pavement Removal – Concrete Pavement".

E39. BACKFILL OF EXISTING POND

E39.1 DESCRIPTION

E39.1.1 Further to E26, "Environmental Protection Plan", this Specification shall cover all operations related to supply, placement and compaction of backfill materials as herein specified.

E39.1.2 The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all works as hereinafter specified.

E39.2 MATERIALS

E39.2.1 General

(a) The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

(b) All materials supplied under this Specification shall be subject to testing and approval by the Contract Administrator.

E39.2.2 Suitable Site Backfill

(a) Suitable Site backfill material shall be of a type approved by the Contract Administrator.

E39.2.3 Granular Backfill

(a) Granular backfill material shall be sound, free from organic material, and conform to gradation requirements for City of Winnipeg, Type 1 material, in accordance with SD-002.

E39.3 CONSTRUCTION METHODS

E39.3.1 General

(a) The Work shall comprise of supply and placement of:

(i) Granular backfill of the existing pond with City of Winnipeg, Class 3 backfill, in accordance CW 2030-R7, sections 3.8.3 and 3.9.

E39.4 MEASUREMENT AND PAYMENT

E39.4.1 Supply and placement of granular material for backfill of the existing pond will be measured on a unit basis (per tonne) and paid for at the Contract Unit Price for "Type 1 Granular Backfill for Pond".

E40. DEWATERING

E40.1 Provision of adequate site drainage during the entire construction phase shall be the Contractor's responsibility. The Contractor shall maintain site grading as necessary to provide for proper drainage away from the excavated area. This water is to be re-directed into ditches or sewers outside of the site. Silt fences shall be properly erected and keyed into the primary ditches to protect fish habitat and prevent clogging of LDS. No extra payment or time extension will be granted as a result of difficulties associate with site access resulting from poor site drainage during any part of the construction phase.

E40.2 The Contractor shall prepare and submit a plan to dewater the existing pond at the Pre-Construction Meeting. The plan shall adhere to guidelines specified in E26, "Environmental Protection Plan". The plan will be reviewed and approved by the Contract Administrator prior to commencement of construction. If at any time the Contract Administrator deems the dewater efforts to be insufficient, the Contract Administrator may order the Contractor to modify and / or increase efforts at the sole discretion of the Contract Administrator with no additional time or compensation. The Contractor shall maintain dewatering until final completion of the contract.

E40.3 The Contractor shall coordinate dewatering procedures with the other contractors on site to prevent conflicts with potential runoff from other work areas. No claim for extra payment shall be made because of conflicts with other work area's drainage issues.

E40.4 Payment for dewatering of the existing pond will be measured on a lump-sum basis and paid for at the Contract Unit Price for "Dewatering of existing pond" and considered compensation in full for supplying all of the labour, materials, equipment, and tools, and completing all operations herein described and all other work included in the work of this specification.

E40.4.1 Dewatering via the sanitary sewer system or disposal truck may be required as a result of water quality testing prior to the commencement of dewatering, as determined by the Contract Administrator. Should the Contract Administrator request the Contractor to undertake dewatering via the sanitary sewer system or disposal truck based on this testing, the Contractor shall submit pricing for these works to the Contract Administrator for approval. The Contractor will not proceed with dewatering via the sanitary sewer system or disposal truck without prior written approval of the Contract Administrator.

E41. CULVERT DRAINAGE PIPE

E41.1 DESCRIPTION

E41.1.1 This Specification covers the supply, installation, and maintenance of the culvert drainage pipe to be installed as shown on the Drawings.

E41.2 MATERIALS

E41.2.1 All drainage materials shall be in accordance with CW 3120-R4.

E41.3 CONSTRUCTION METHODS

E41.3.1 Installation of Drainage Fabric

(a) Install drainage fabric in the longest continuous practical length, free from tension, stress, folds, wrinkles and creases.

(b) Install drainage fabric in accordance with the Specification and the Drawings.

(c) Overlap joints a minimum of 600 millimetres.

(d) Install pins and place piles of drainage material as required to hold the drainage fabric in place.

(e) Remove and replace drainage fabric that has been improperly installed or damaged as directed by the Contract Administrator.

E41.3.2 Installation of Drainage Pipe

(a) Install drainage pipe to line and grade shown on the Drawings or as directed by the Contract Administrator.

(b) Cast drainage pipe into the wall at the location shown on the Drawings such that 100mm of the pipe extends past the wall into the backfill material to allow for the connection of the drainage pipe behind the wall with the a capped T fitting or other appropriate fittings. Contractor to confirm the extension length beyond the wall to make the connection to the drainage pipe behind the wall in accordance with the drainage pipe being utilized.

(c) Assemble pipe in accordance with manufacturer's instructions so when complete the drainage pipe will have a smooth and uniform invert.

(d) Install drainage pipe on 100 millimetres of drainage material ensuring uniform support under bell and pipe body throughout full length.

(e) Use longest pipe length manufactured where practicable to reduce number of joints on the sub-drain.

(f) Commence installation of drainage pipe at lowest point and proceed upgrade.

(g) Lay drainage pipe with bell upgrade.

(h) Install drainage pipe with perforations positioned towards.

(i) Install caps on ends of all sub-drains and secure to drainage pipe in accordance with manufacturer's recommendations.

(j) Allowable variance from specified line to be +/- 100 millimetres.

(k) Allowable variance from specified grade to be +/- 25 millimetres.

(l) Correct alignment and grade exceeding the allowable variance as directed by the Contract Administrator.

E41.3.3 Placement of Drainage Material

(a) Complete placement of drainage material in 150 millimetre lifts and compact to the satisfaction of the Contract Administrator.

(b) Place drainage material to ensure no damage occurs to the drainage fabric and drainage pipe.

E41.4 MEASUREMENT AND PAYMENT

E41.4.1 Supplying and placing culvert drainage pipe will be measured on a linear metre basis. The length to be measured shall be the total number of metres of culvert drainage pipe supplied and placed in accordance with this Specification, acceptable to the Contract Administrator, as computed from the Drawing dimensions. This item of work will be paid for at the Contract Unit Price per metre for "Culvert Drainage Pipe" performed in accordance with this Specification and accepted by the Contract Administrator.

E42. DITCH INLET GRATES

E42.1 DESCRIPTION

E42.1.1 This Specification covers the supply and installation of ditch inlet grates on catch basins.

E42.2 MATERIALS

E42.2.1 All steel shall be supplied in accordance with details on the Drawings. All steel shall be hot dip galvanized and all hardware shall be stainless steel. Ditch Inlet Grates shall be Shopost Iron Works MK-A1 or approved equal.

E42.3 CONSTRUCTION METHODS

E42.3.1 The Contractor shall be required to supply and install ditch inlet grates on drainage inlets shown on the Drawings.

E42.3.2 The Contractor shall salvage existing ditch inlet grates as indicated on the Drawings. Salvaged ditch inlet grates shall be re-used whenever possible, as directed by the Contract Administrator.

E42.3.3 The ditch inlet grate shall be understood to include the supply and installation of all anchor steel, grate steel, and hardware. All concrete material shall be included in the unit price bid for the catch basins.

E42.3.4 The ditch inlet grate shall be securely fastened to the drainage inlets as shown on the Drawings and as approved by the Contract Administrator.

E42.3.5 Any galvanized surfaces that are damaged shall be coated with a galvanizing compound approved by the Contract Administrator.

E42.4 MEASUREMENT AND PAYMENT

E42.4.1 This item of work will be paid for at the Contract Unit Price per unit for “Salvage Ditch Inlet Grate” performed in accordance with this Specification and accepted by the Contract Administrator.

E43. REMOVAL OF EXISTING CULVERTS

E43.1 DESCRIPTION

E43.1.1 This specification covers the removal of existing culverts.

E43.1.2 Referenced Standard Construction Specifications

(a) CW 2030-R7 – Excavation Bedding and Backfill

E43.2 REMOVAL OF EXISTING CULVERTS

E43.2.1 The Contractor shall remove and salvage existing culverts designated for removal within the limits of the Contract and as shown on the Drawings.

E43.2.2 The excavation for removal of existing culverts outside of proposed pavements shall be backfilled to Class 4 standards in accordance with CW 2030. The excavation for removal of existing culverts under proposed pavements shall be backfilled to Class 2 standards in accordance with CW 2030.

E43.2.3 The culverts shall be removed so as not to damage the pipe sections. Where culverts are coupled, the sections shall be separated prior to removal.

E43.2.4 Culverts that are deemed unsalvageable by the Contract Administrator shall be removed and disposed of off Site.

E43.2.5 Salvaged culverts shall be delivered to the City of Winnipeg, Public Works Department, South West District Yard, 1539 Waverley St.

E43.3 MEASUREMENT AND PAYMENT

E43.3.1 The removal of existing culverts will be measured on a length basis for each size of culvert and paid for at the Contract Unit Price for “Removal of Existing Culverts”. Length to be paid for will be the total number of lineal metres removed, measured horizontally at grade, in accordance with this specification, accepted and measured by the Contract Administrator.

E43.3.2 Salvaging and delivery or disposal of the culverts shall be included in payment for “Removal of Existing Culverts” and no further payment shall be made.

E44. SODDING

E44.1 Further to CW 3510-R9 – Sodding

E44.1.1 The maintenance and warranty period will be one year.

E44.1.2 Payment Method: The unit price for sodding to include the maintenance and warranty period of one year. The 10% of the cost of sodding will be held as a maintenance contract value.

E45. SEEDING

E45.1 Further to CW 3520-R7 – Seeding

E45.1.1 The maintenance and warranty period will be one year.

E45.1.2 Payment Method: The unit price for seeding to include the maintenance and warranty period of one year. The 10% of the cost of seeding will be held as a maintenance contract value.

APPENDIX 'A'

GEOTECHNICAL REPORT

APPENDIX 'A' - GEOTECHNICAL REPORT

THE NATIONAL TESTING LABORATORIES LIMITED

GEOTECHNICAL INVESTIGATION
FOR
KENASTON BOULEVARD
SOUTH EXTENSION

Prepared for
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August 26, 2009

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The geotechnical report is provided to aid in the Contractor's evaluation of the existing pavement structure and/or soil conditions. The information presented is considered accurate at the locations shown on the Drawings and at the time of drilling. However, variations in pavement structure and/or soil conditions may exist between test holes and fluctuations in groundwater levels can be expected seasonally and may occur as a result of construction activities. The nature and extent of variations may not become evident until construction commences.

Geotechnical Report for Kenaston Boulevard South Extension

Report

THE NATIONAL TESTING LABORATORIES LIMITED

1.0 SUMMARY

The National Testing Laboratories Limited was retained to undertake a geotechnical investigation to establish the soil conditions for the proposed Kenaston Blvd and Bishop Grandin Blvd Intersection and Kenaston Blvd Extension. The project site is located at the western limit of Bishop Grandin Blvd and the southern limit of Kenaston Blvd. Twenty-six testholes were drilled on the project site on July 13, 14, and 15, 2009. This report provides recommendations for the new roadworks to be completed for this project. It is our understanding that the roadworks component of the project will include a realignment of Kenaston Blvd and Bishop Grandin Blvd near the intersection, as well as the southern extension of Kenaston Blvd. The geotechnical investigation revealed a general soil profile of a thin layer of topsoil overlying clay and silt, overlying till to the depths explored. Clay fill was encountered at the surface of several testholes.

2.0 TERMS OF REFERENCE

The National Testing Laboratories Limited was retained to undertake a geotechnical investigation to establish the soil conditions for the proposed Kenaston Blvd and Bishop Grandin Blvd Intersection and Kenaston Blvd extension. Authorization to proceed with the geotechnical investigation was provided by Scott Suderman on May 15, 2009.

3.0 GEOTECHNICAL INVESTIGATION

3.1 Testhole Drilling and Soil Sampling

The subsurface drilling and sampling program was conducted on July 13, 14, and 15, 2009 with drilling services provided by Maple Leaf Drilling Ltd. under the supervision of our geotechnical field personnel. Twenty-six testholes were drilled throughout the project area to depths ranging from 3 to 16 m. The testholes were drilled using a track-mounted drill rig equipped with 125 mm diameter solid stem augers. The testhole locations are shown on the attached Testhole Location Plans. It should be noted that Testholes TH7 to TH11 were drilled in the clay fill stockpile to establish the thickness and quality of the clay fill. These testholes were not drilled to establish the subgrade conditions for the proposed roadworks.

Representative soil samples were obtained directly off the augers. Upon completion of drilling, the testholes were examined for evidence of sloughing and groundwater seepage. The testholes were backfilled with auger cuttings. The samples were visually classified in the field and returned to our soils laboratory for additional examination and testing.

3.2 Laboratory Testing

Laboratory testing included moisture content determinations, Atterberg limits, and particle size analyses. The results of the Atterberg limits and particle size analysis are summarized in the table below.

Testhole No.	Depth (m)	Particle Size			Atterberg Limits		
		Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH2	0.6	2.4	42.0	55.6	71	16	55
TH5	0.9	1.6	21.9	76.5	87	18	69
TH13	1.5	0.1	19.7	80.2	87	24	63
TH21	0.8	0.1	4.3	95.6	95	25	70
TH25	0.9	0.1	67.2	32.7	37	15	22

4.0 SUBSURFACE CONDITIONS

4.1 Soil Profile

The general soil stratigraphy at the site, as interpreted from the testhole logs, typically consists of a thin layer of topsoil overlying clay and silt, overlying till to the depths explored. Clay fill was encountered at the surface of several testholes.

Topsoil

A thin layer of topsoil was found at the surface the testholes. The topsoil was approximately 0.1 m thick in the testholes.

Clay Fill

Clay fill was encountered beneath the topsoil in Testholes TH13, TH14, TH17, TH19, TH20, TH21, TH22, TH25 and TH26. The clay fill was brown, stiff to very stiff, moist, and of high plasticity. Much of the clay fill contained trace silt and trace fine gravel. Water contents of the clay fill ranged from 21 to 44%.

Clay

Clay was encountered in all testholes. The clay was brown to grey, soft to stiff, moist, and of medium to high plasticity. The clay extended to a depth of 14.2 m in Testhole TH12, 13.2 m in Testhole TH14, 13.4 m in Testhole TH19, and 12.2 m in Testhole TH26. The clay extended to the depths explored in the remaining testholes. Water contents of the clay ranged from 18 to 62%.

Silt

Silt layers were encountered at shallow depths in all testholes except for Testhole TH26. The silt was tan, soft, moist, and of low plasticity. Water contents of the silt ranged from 14 to 29%.

Silt Till

Silt till was encountered below the clay layer in Testholes TH12, TH14, TH19, and TH26. The silt till was tan, loose to dense, dry to moist, and of low plasticity. Water contents of the clay till ranged from 8 to 19%.

THE NATIONAL TESTING LABORATORIES LIMITED

4.2 Groundwater

Groundwater conditions were observed during and upon the completion of drilling each testhole. Minor groundwater seepage was observed in Testhole TH12, heavy groundwater seepage was observed in Testhole TH19, and minor to moderate seepage was observed in Testhole TH26, all from the silt till layer. The groundwater level upon completion of drilling was 15.4 m in Testhole TH12, 4.1 m in Testhole TH19, and 11.4 m in Testhole TH26. No groundwater seepage was observed in the remaining testholes.

Soil sloughing was observed in Testholes TH19 and TH26 to depths of 11.5 and 10.7 m respectively. No soil sloughing was observed in the remaining testholes. It should be noted that only short-term seepage and sloughing conditions were observed and groundwater levels will normally fluctuate during the year and will be dependent upon precipitation and surface drainage.

5.0 DESIGN RECOMMENDATIONS AND COMMENTS

5.1 Subgrade Preparation

The clay, as described in the soil profile section of this report, is suitable as a subgrade for the proposed roads. Preparation of the subgrade should comply with the City of Winnipeg Standard Construction Specification CW3110. The topsoil should be removed, as well as any other organic material to expose the native clay subgrade. The clay subgrade should be proof rolled to identify soft or weak areas. A 30 tonne rubber tired roller, tandem truck, or grader should be used to proof roll the subgrade. Equipment speeds between 4 and 8 km have been shown to provide the best results for proof rolling. Passes should be made in a systematic fashion to ensure complete coverage of the subgrade. Inspection should be provided to record the results of the proof rolling. Where subcutting is required to remove unsuitable subgrade materials, the underlying material should be scarified and compacted to at least 95% Standard Proctor dry density. Subcutting should typically not extend more than 1 m below the final elevation of the road surface. Sub-base materials, complying with the requirements of CW3110, should be used to backfill areas with unsuitable subgrade materials.

Silt layers were encountered at a shallow depth in all testholes except for Testhole TH26. Silt is considered to be a frost-susceptible soil. If silt is found within the annual depth of frost penetration, the service life of the pavement may be reduced due to frost heave and thaw weakening of the subgrade. The annual depth of frost penetration is dependent upon several factors but is typically in the order of 2 m in the Winnipeg area. To eliminate frost-related distress in the pavement would require removal of frost-susceptible soils within the depth of annual frost penetration. To minimize frost-related distress, it is recommended that silt, if encountered at the subgrade level, be subcut to a maximum depth of 1 m below the final elevation of the road surface.

Where stable subgrade is exposed at the base of the pavement structure, a geotextile fabric should be placed between the stable subgrade and the granular sub-base material to provide separation. If an unstable subgrade is exposed beneath the proposed pavement structure, a geotextile fabric together with geogrid should be placed over the unstable subgrade. Supply and installation of geotextile fabric and geogrid should comply with the requirements of City of Winnipeg Standard Construction Specification CW3130.

5.2 Drainage

Drainage of water from the subgrade is an important consideration because excess water will lead to reduced subgrade strength and consequently, increase the potential for subgrade failure and frost heave. During construction, the surface of the subgrade should be graded to prevent water from ponding on the exposed subgrade. Where ditches are provided adjacent to the roadway, they should be deep enough to ensure that the surface of the free water will be maintained below the pavement structure. Where ditches are not provided, underdrains should be installed along the full length of the roadway to provide drainage of the sub-base and base course layers. Risers should be installed for the inspection and cleaning of the underdrains.

6.0 CLOSURE

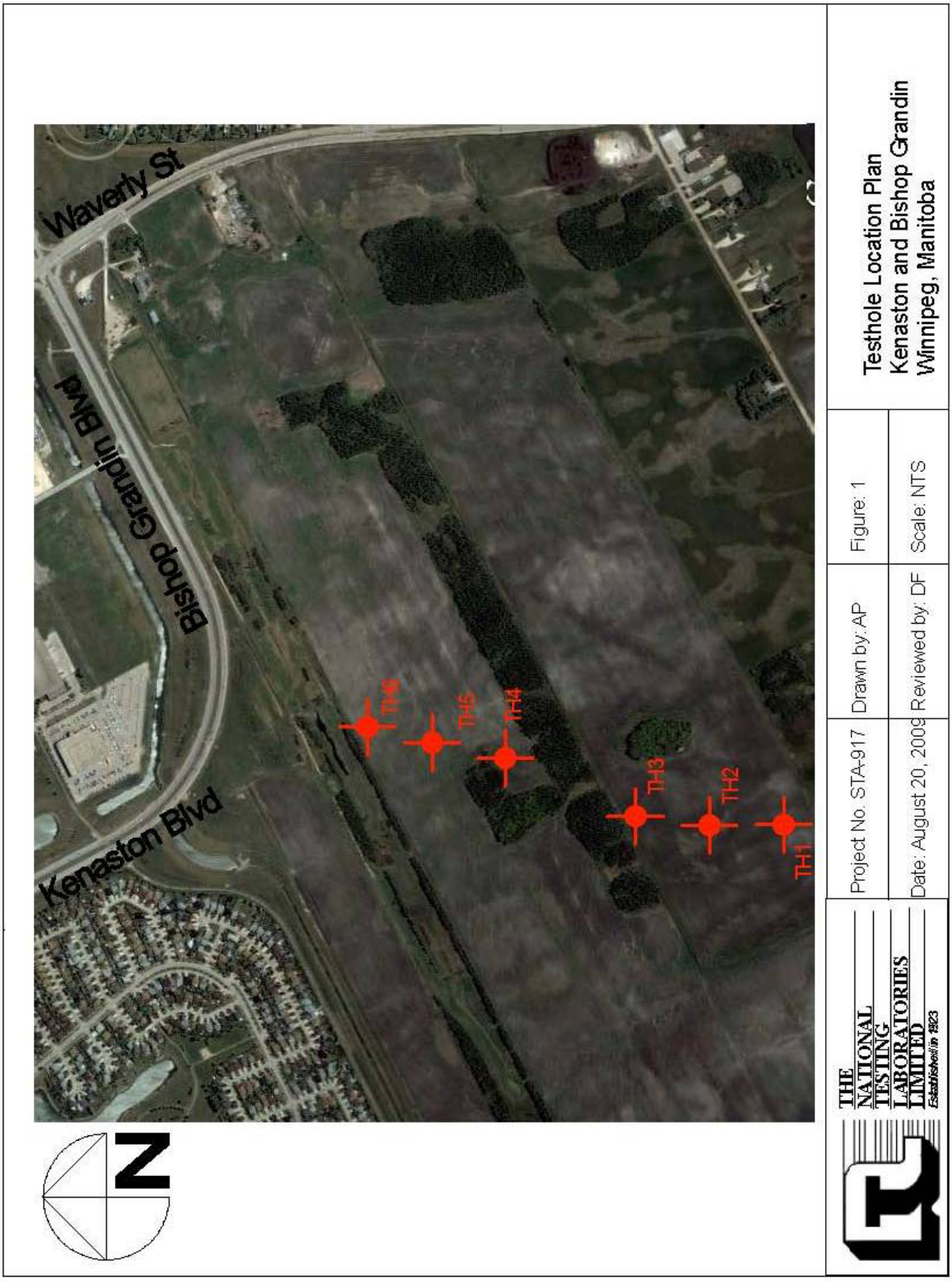
Professional judgments and recommendations are presented in this report. They are based on an evaluation of the technical information gathered during our site investigation. We do not guarantee the performance of the project in any respect other than that our engineering work and judgment rendered meet the standards and care of our profession. It should be noted that the testholes may not represent potentially unfavourable subsurface conditions between testholes. If during construction soil conditions are encountered that vary from those discussed in this report, we should be notified immediately in order that we may evaluate effects, if any, on the recommendations provided in this report. The recommendations presented in this report are applicable only to this specific site. These data should not be used for other purposes.

We appreciate the opportunity to assist you in this project. Please call me if you have any questions regarding this report.

Don Flatt

Don Flatt, M. Eng., P.Eng.
Senior Geotechnical Engineer

Test Hole Locations



Test Hole Locations

Test Hole Log for Test Hole #1

TESTHOLE TH1

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5517869.0 N, 629984.8 E

Date Drilled: July 14, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%)
0.0		Ground Surface	
		Topsoil	
		Clay - brown, stiff, moist, high plasticity, trace silt	35
		Silt - tan, soft, moist, low plasticity	27
1.0		**Clay** - brown, firm, moist, high plasticity	31
		Silt - tan, soft, moist, low plasticity	24
			26
		Clay - brown, firm, moist, high plasticity	36
2.0		**Silt** - tan, soft, moist, low plasticity	29
		Clay - brown, firm, moist, high plasticity	44
			42
3.0			50
		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 3.0 m	

Water Content (%): 0 20 40 60 80 100

Test Hole Log for Test Hole #2

TESTHOLE TH2

THE NATIONAL TESTING LABORATORIES LIMITED

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5518048.6 N, 629969.9 E

Date Drilled: July 14, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
0.0		Ground Surface	
		Topsoil	
		Clay - tan to brown, soft, moist, high plasticity, silty - brown, firm below 0.8 m	26, 23, 27, 30, 36
1.0			
		Silt - tan, soft, moist, low plasticity, with clay below 1.8 m	24
2.0			
		Clay - brown, firm, moist, high plasticity	34, 41, 48, 44
3.0			
		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 3.0 m	

Test Hole Log for Test Hole #3

TESTHOLE TH3

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5518189.6 N, 630018.5 E

Date Drilled: July 14, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
0.0		Ground Surface	
		Topsoil	
		Silt - tan, soft, moist, low plasticity, trace clay	28
		Clay - brown, firm, moist, high plasticity	32, 36, 39
1.0			
		Silt - tan, soft, moist, low plasticity	
		Clay - brown, firm, moist, high plasticity	39, 47, 50, 51, 47
2.0			
3.0		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 3.0 m	

Test Hole Log for Test Hole #4

TESTHOLE TH4

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5518482.4 N, 630166.8 E

Date Drilled: July 14, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
0.0		Ground Surface	
		Topsoil	
		Silt - tan, soft, moist, low plasticity	25, 28, 28, 28, 29
1.0			
		Clay - brown, firm, moist, high plasticity	43, 43, 45, 49, 48
2.0			
3.0		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 3.0 m	

Test Hole Log for Test Hole #5

TESTHOLE TH5

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5518609.1 N, 630197.6 E

Date Drilled: July 14, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
0.0		Ground Surface	
		Topsoil	
		Silt - tan, soft, moist, low plasticity	25
		Clay - brown, firm, moist, high plasticity - 0.10 m of tan, soft silt at 1.8 m	29 30 32 39 42
1.0			
2.0			46 51 55
3.0		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 3.0 m	52

Test Hole Log for Test Hole #6

TESTHOLE TH6

THE NATIONAL TESTING LABORATORIES LIMITED

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5518758.0 N, 630215.3 E

Date Drilled: July 14, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
0.0		Ground Surface	
		Topsoil	
		Silt - tan, soft, moist, low plasticity	26, 24
1.0		**Clay** - brown, firm, moist, high plasticity	37, 41, 37
		Silt -tan, soft, moist, low plasticity	29
2.0		**Clay** - brown, firm, moist, high plasticity	33, 43, 45, 51
3.0		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 3.0 m	

Test Hole Log for Test Hole #7

TESTHOLE TH7

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

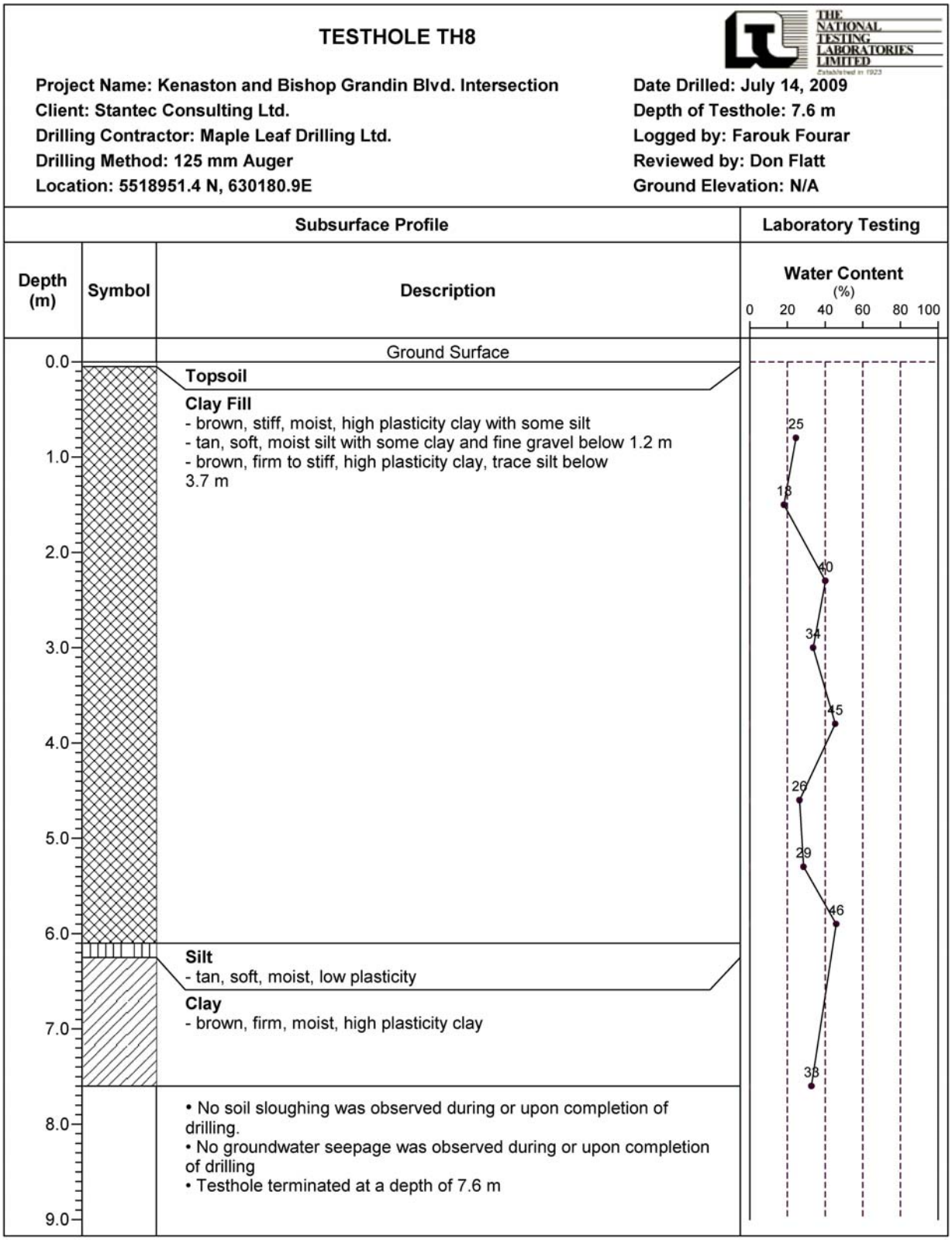
Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5518927.2 N, 630164.3 E

Date Drilled: July 14, 2009
Depth of Testhole: 6.1 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Depth (m)	Symbol	Description	Laboratory Testing: Water Content (%)
0.0		Ground Surface	
		Topsoil	
		Clay Fill - tan to brown, soft, low plasticity silty clay - fine sand and fine gravel below 1.4 m - silty clay with fine gravel below 2.3 m	16, 17, 19, 20, 37, 23, 26, 24
5.0		**Silt** - tan, soft, moist, low plasticity	
6.0		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 6.1m	
7.0			

Water Content (%): 0 20 40 60 80 100

Test Hole Log for Test Hole #8



Test Hole Log for Test Hole #9

TESTHOLE TH9

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5518957.5 N, 630223.5 E

Date Drilled: July 14, 2009
Depth of Testhole: 7.0 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
0.0		Ground Surface	
		Topsoil	
		Clay Fill - brown, firm, moist, high plasticity silty clay - clayey silt below 0.8 m - silt inclusions below 0.9 m	25, 18, 36, 34, 26, 44
6.0		**Clay** - brown, firm, moist, high plasticity clay	34, 48
7.0		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 7.0 m	
8.0			

Test Hole Log for Test Hole #10

TESTHOLE TH10

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

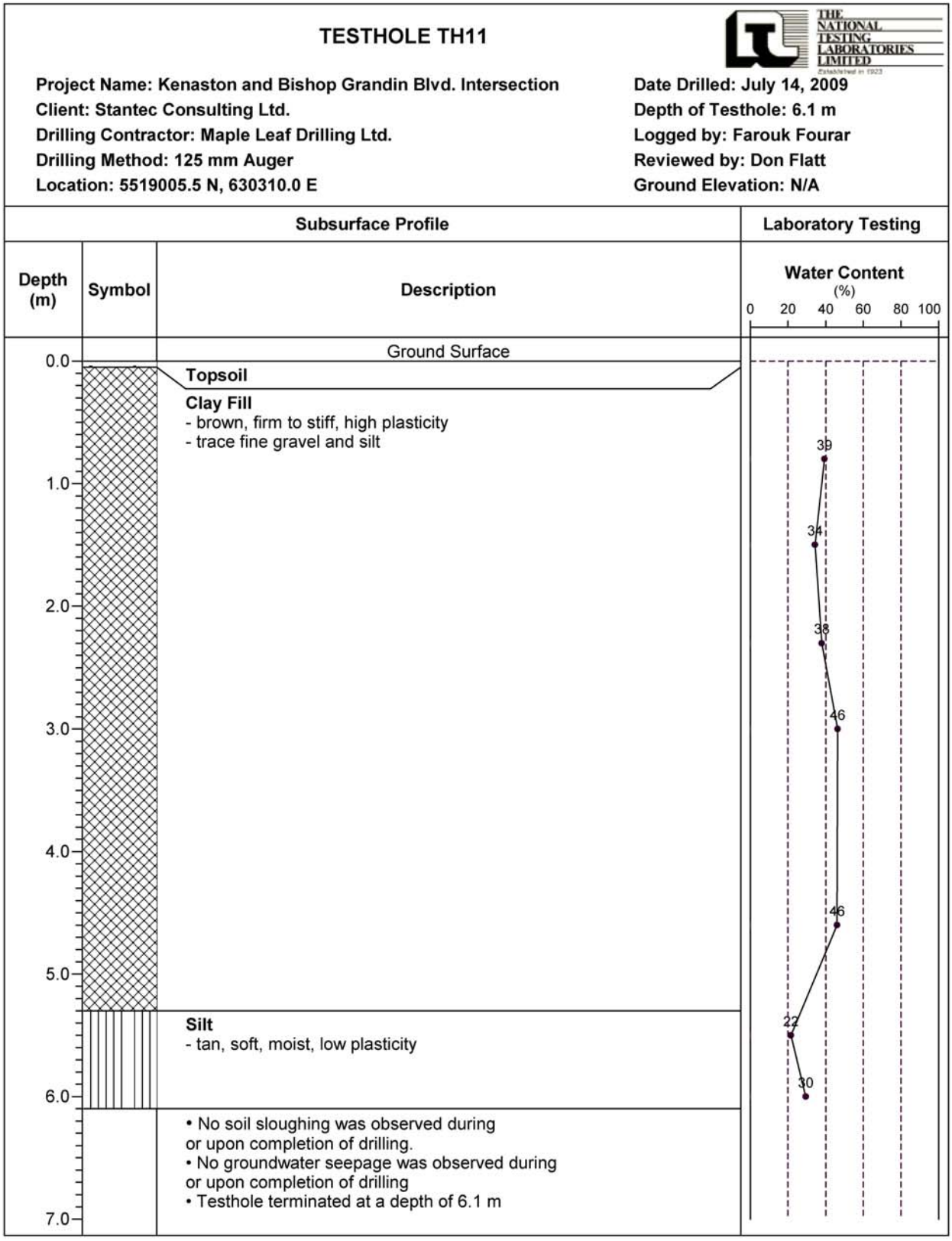
Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5518984.5 N, 630274.6 E

Date Drilled: July 14, 2009
Depth of Testhole: 6.1 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Depth (m)	Symbol	Description	Laboratory Testing: Water Content (%)
0.0		Ground Surface	
		Topsoil	
		Clay Fill - brown, stiff, moist, high plasticity clay - with some tan, soft, low plasticity silt - silty clay below 1.8 m - clay with silt seams below 3.4 m	20, 18, 21, 22, 30
5.0		**Silt** - tan, soft, moist, low plasticity - clayey below 5.8 m	20, 27
6.0		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 6.1 m	
7.0			

Water Content (%): 0 20 40 60 80 100

Test Hole Log for Test Hole #11



Test Hole Log for Test Hole #12

TESTHOLE TH12

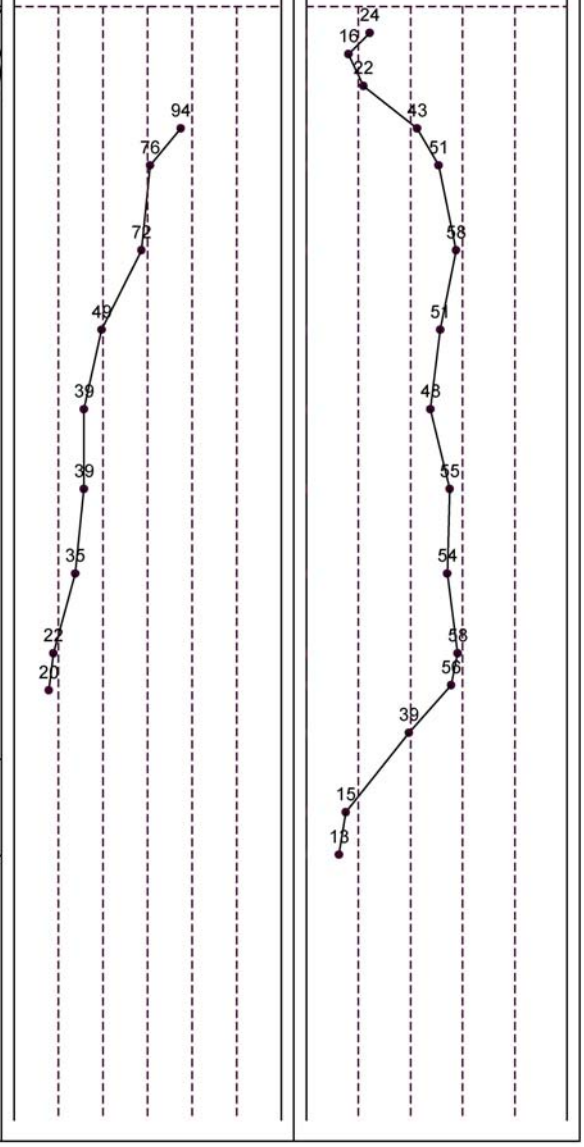
THE NATIONAL TESTING LABORATORIES LIMITED

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5519128.0 N, 630020.3 E

Date Drilled: July 13, 2009
Depth of Testhole: 16 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Elevation: N/A

Subsurface Profile | **Laboratory Testing**

Depth (m)	Symbol	Description
0		Ground Surface
0		**Topsoil**
1		**Clay** - brown, stiff, moist, high plasticity - trace organic material below 0.6 m
2		**Silt** - tan, soft, moist, low plasticity, trace clay
3		**Clay** - brown, stiff, moist, high plasticity - 0.15 m of silt at 2.4 m - grey, firm below 6.1 m - trace fine gravel below 8.5 m - trace silt till below 13.0 m
14		**Silt Till** - tan, loose to compact, moist, low plasticity - dense below 15.5 m
16		• No soil sloughing was observed during or upon completion of drilling. • Minor groundwater seepage was observed within the silt till layer. • Ground water level at a depth of 15.4 m upon completion of drilling. • Auger refusal at 16.0 m on suspected boulder



Test Hole Log for Test Hole #13

TESTHOLE TH13

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5519039.3 N, 630132.1 E

Date Drilled: July 13, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
0.0		Ground Surface	
		Topsoil	
		Clay Fill - brown, stiff, moist, high plasticity - trace silt and fine gravel	22
		Silt - tan, soft, moist, low plasticity	16
1.0			
		Clay - brown, stiff, moist, high plasticity	34
2.0			48
		Silt - tan, soft, moist, low plasticity	
		Clay - brown, stiff, moist, high plasticity	50
3.0		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at the depth of 3.0 m	

Test Hole Log for Test Hole #14

TESTHOLE TH14

THE NATIONAL TESTING LABORATORIES LIMITED

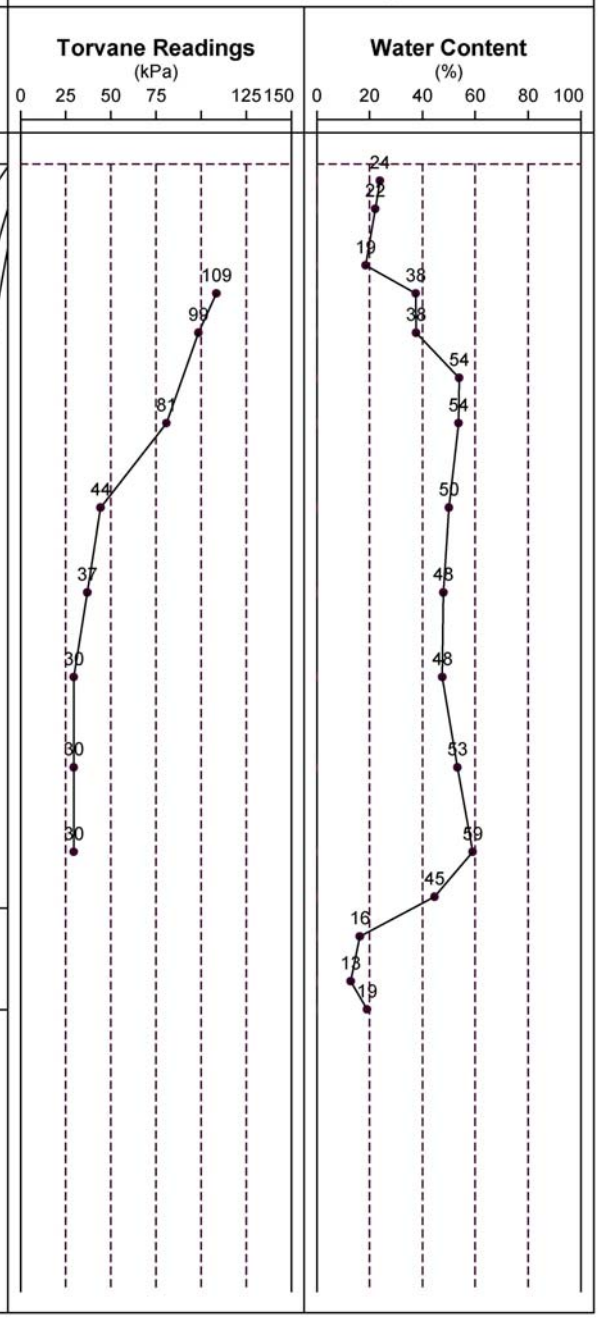
Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5519006.8 N, 630212.4 E

Date Drilled: July 13, 2009
Depth of Testhole: 15 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Elevation: N/A

Subsurface Profile

Depth (m)	Symbol	Description
0		Ground Surface
0		**Topsoil**
1		**Clay Fill** - brown, very stiff, moist, high plasticity with silt and trace fine gravel
2		**Silt** - tan, soft, moist, low plasticity, trace clay
3		**Clay** - brown, stiff, moist, high plasticity - grey below 5.5 m - firm below 6.1 m - trace silt till below 13.3 m
13		**Silt Till** - tan, compact, dry to moist, low plasticity
15		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling. • Auger refusal at 15.0 m on suspected boulder.
20		

Laboratory Testing



Test Hole Log for Test Hole #15

TESTHOLE TH15

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5519044.4 N, 630229.2 E

Date Drilled: July 13, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
0.0		Ground Surface	
		Topsoil	
		Clay - brown, stiff, moist, high plasticity - silty below 1.2 m	
1.0			38
			36
		Silt - tan, soft, moist, low plasticity	
		Clay - brown, stiff, moist, high plasticity	
2.0			48
			38
			55
3.0		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 3.0 m	

Test Hole Log for Test Hole #16

TESTHOLE TH16

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5519017.2 N, 630242.5 E

Date Drilled: July 15, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
0.0		Ground Surface	
		Topsoil	
		Clay - brown, stiff, moist, high plasticity - tace silt and fine gravel - silty below 0.3 m	27, 22
1.0		**Silt** - tan, soft, moist, low plasticity	
		Clay - brown, stiff, moist, high plasticity	28, 40
2.0			
3.0			57
		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 3.0 m	

Test Hole Log for Test Hole #17

TESTHOLE TH17

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5519029.5 N, 630263.0 E

Date Drilled: July 13, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
0.0		Ground Surface	
		Topsoil	
		Clay Fill - brown, stiff, moist, high plasticity - trace silt and fine gravel	32
1.0		**Silt** - tan, soft, moist, low plasticity	22
		Clay - brown, stiff, moist, high plasticity	29
2.0			39
3.0			55
		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 3.0 m	

Test Hole Log for Test Hole #18

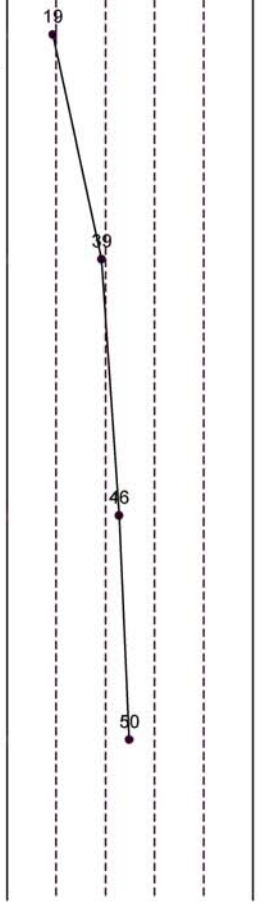
TESTHOLE TH18

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

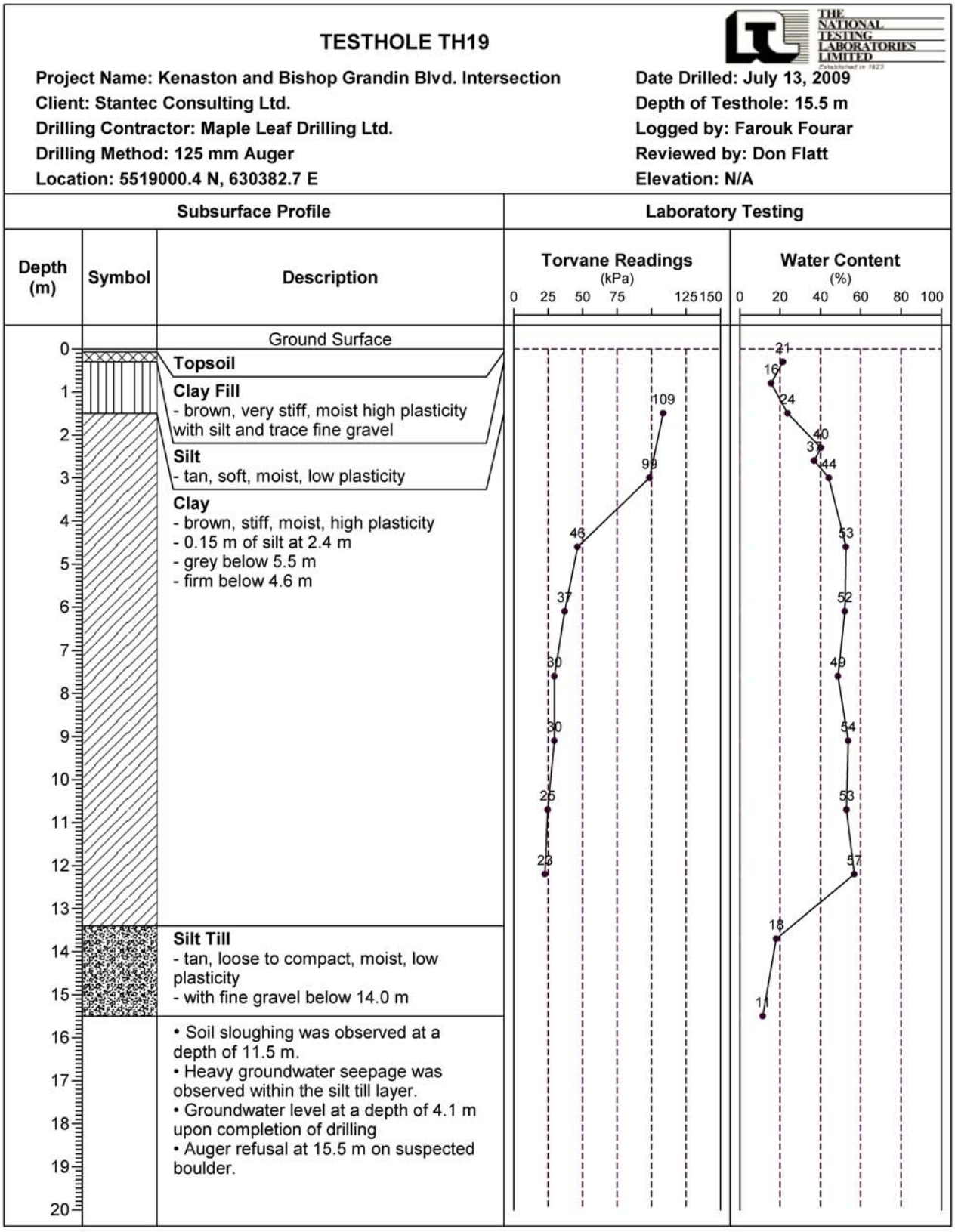
Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5518976.0 N, 630327.5 E

Date Drilled: July 13, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

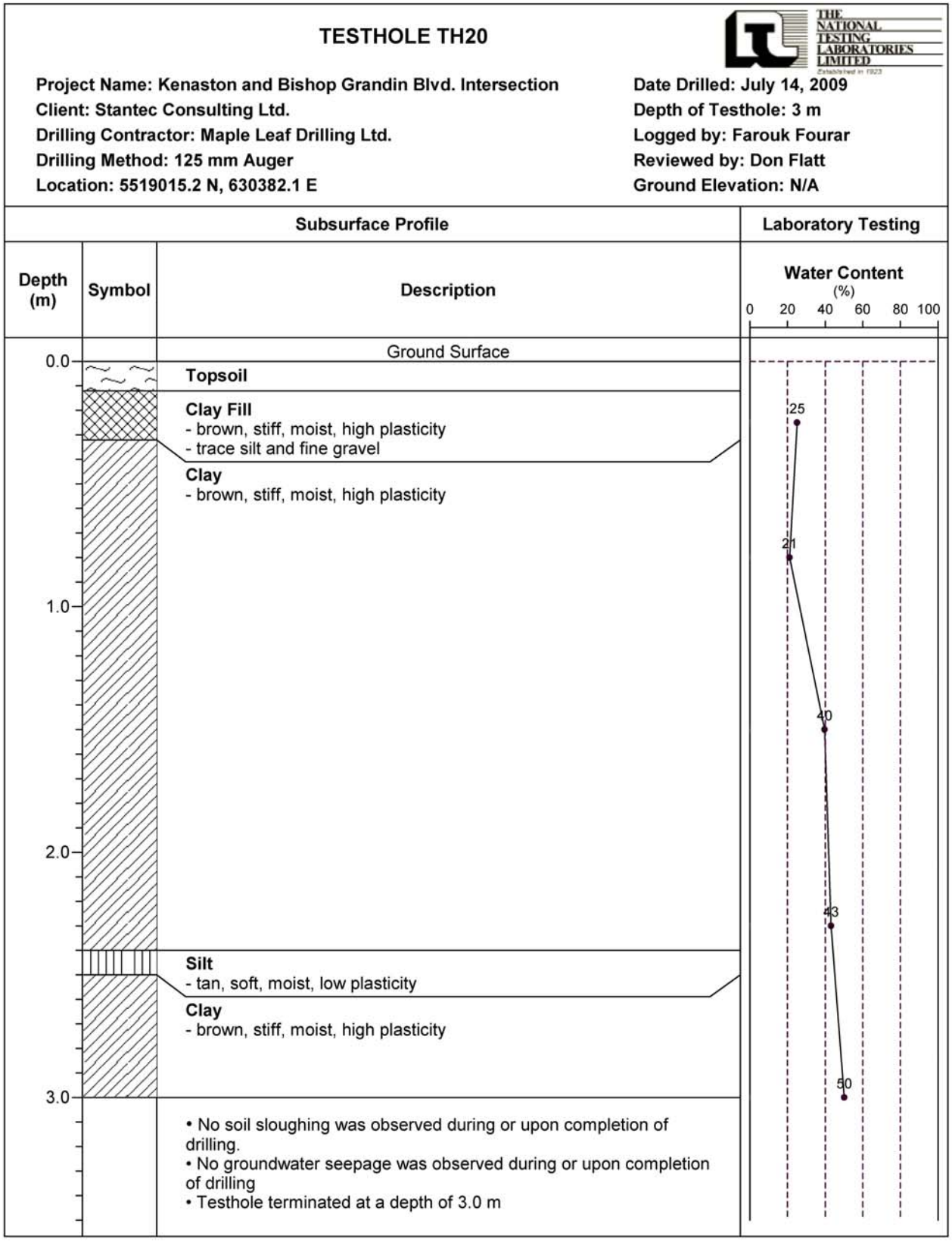
Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
0.0		Ground Surface	
		Topsoil	
		Silt - tan, soft, moist, low plasticity	
1.0		**Clay** - brown, stiff, moist, high plasticity - trace silt at 2.3 m	
2.0			
3.0		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 3.0 m	



Test Hole Log for Test Hole #19



Test Hole Log for Test Hole #20



Test Hole Log for Test Hole #21

TESTHOLE TH21

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5519026.7 N, 630402.8 E

Date Drilled: July 14, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
		Ground Surface	
0.0		**Topsoil**	
		Clay Fill - brown, stiff, moist, high plasticity - trace silt and fine gravel	27
		Clay - brown, stiff, moist, high plasticity	38
1.0			44
			38
2.0			50
		Silt - tan, soft, moist, low plasticity	
		Clay - brown, stiff, moist, high plasticity	
3.0			48
		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 3.0 m	

Test Hole Log for Test Hole #22

TESTHOLE TH22

THE NATIONAL TESTING LABORATORIES LIMITED

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5519114.3 N, 630598.0 E

Date Drilled: July 13, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
		Ground Surface	
0.0		**Topsoil**	
		Clay Fill - brown, stiff, moist, high plasticity - trace silt and fine gravel	33
		Clay - brown, stiff, moist, high plasticity	41
1.0		**Silt** - tan, soft, moist, low plasticity, trace clay	38
		Clay - brown, stiff, moist, high plasticity	
2.0			49
			51
3.0		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 3.0 m	

Test Hole Log for Test Hole #23

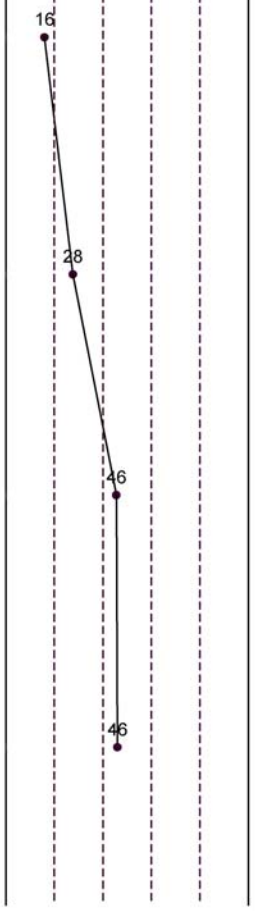
TESTHOLE TH23

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5519127.2 N, 630164.9 E

Date Drilled: July 13, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
0.0		Ground Surface	
		Topsoil	
		Silt - tan, soft, moist, medium plasticity, clayey	
1.0		**Clay** - brown, stiff, moist, high plasticity	
2.0		**Silt** - tan, soft, moist, low plasticity	
		Clay - brown, stiff, moist, high plasticity	
3.0		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 3.0 m	



Test Hole Log for Test Hole #24

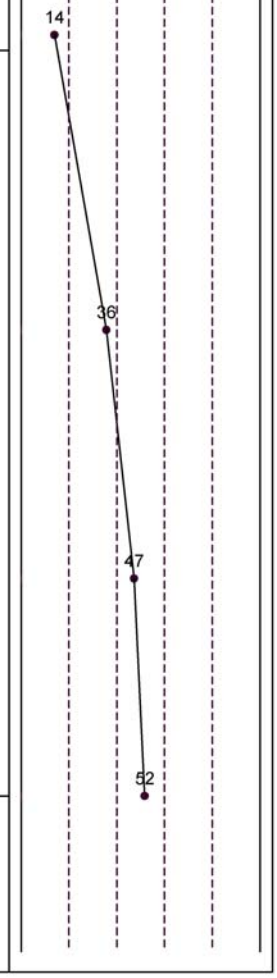
TESTHOLE TH24

THE NATIONAL TESTING LABORATORIES LIMITED
Established in 1923

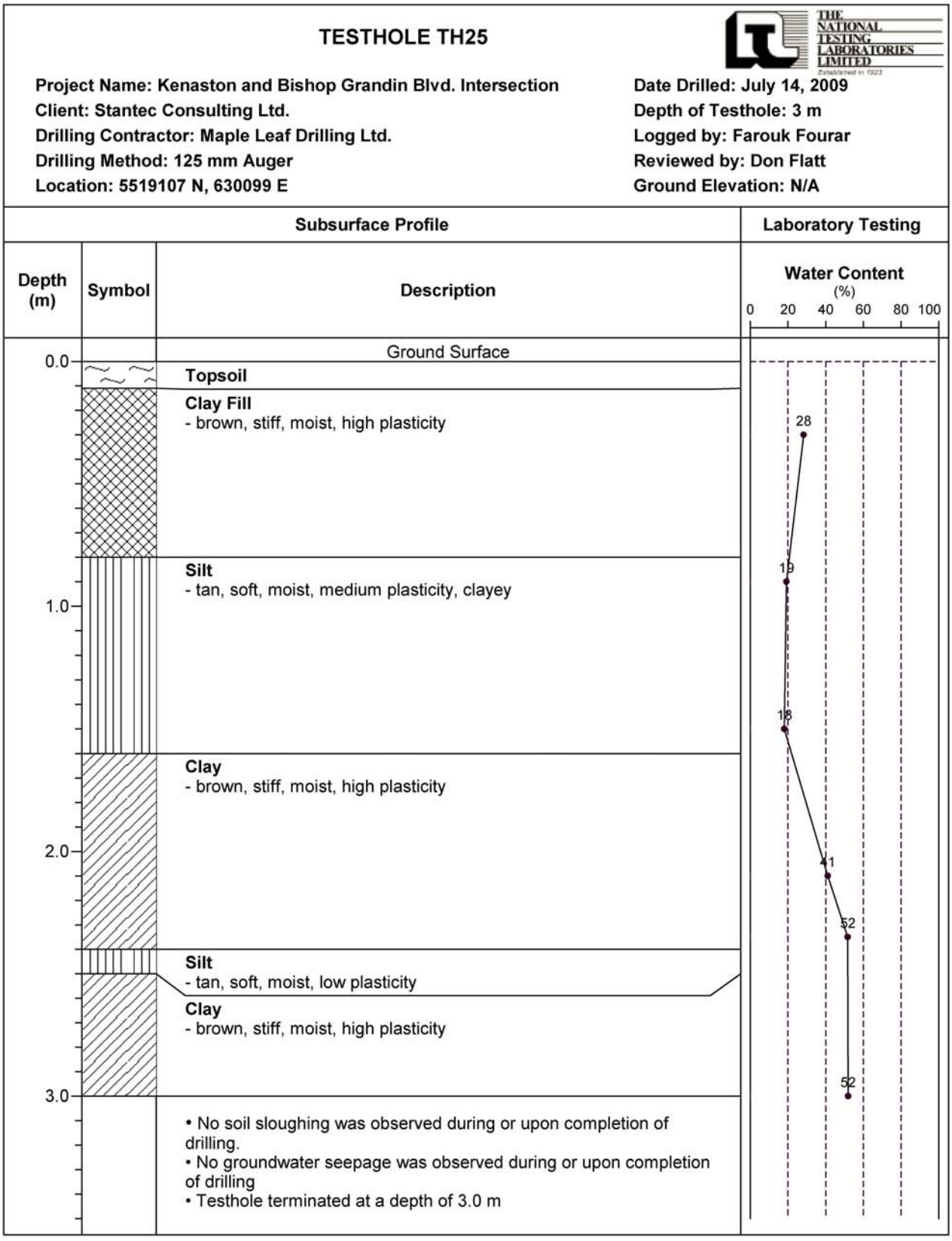
Project Name: Kenaston and Bishop Grandin Blvd. Intersection
Client: Stantec Consulting Ltd.
Drilling Contractor: Maple Leaf Drilling Ltd.
Drilling Method: 125 mm Auger
Location: 5519097.9 N, 630385.1 E

Date Drilled: July 13, 2009
Depth of Testhole: 3 m
Logged by: Farouk Fourar
Reviewed by: Don Flatt
Ground Elevation: N/A

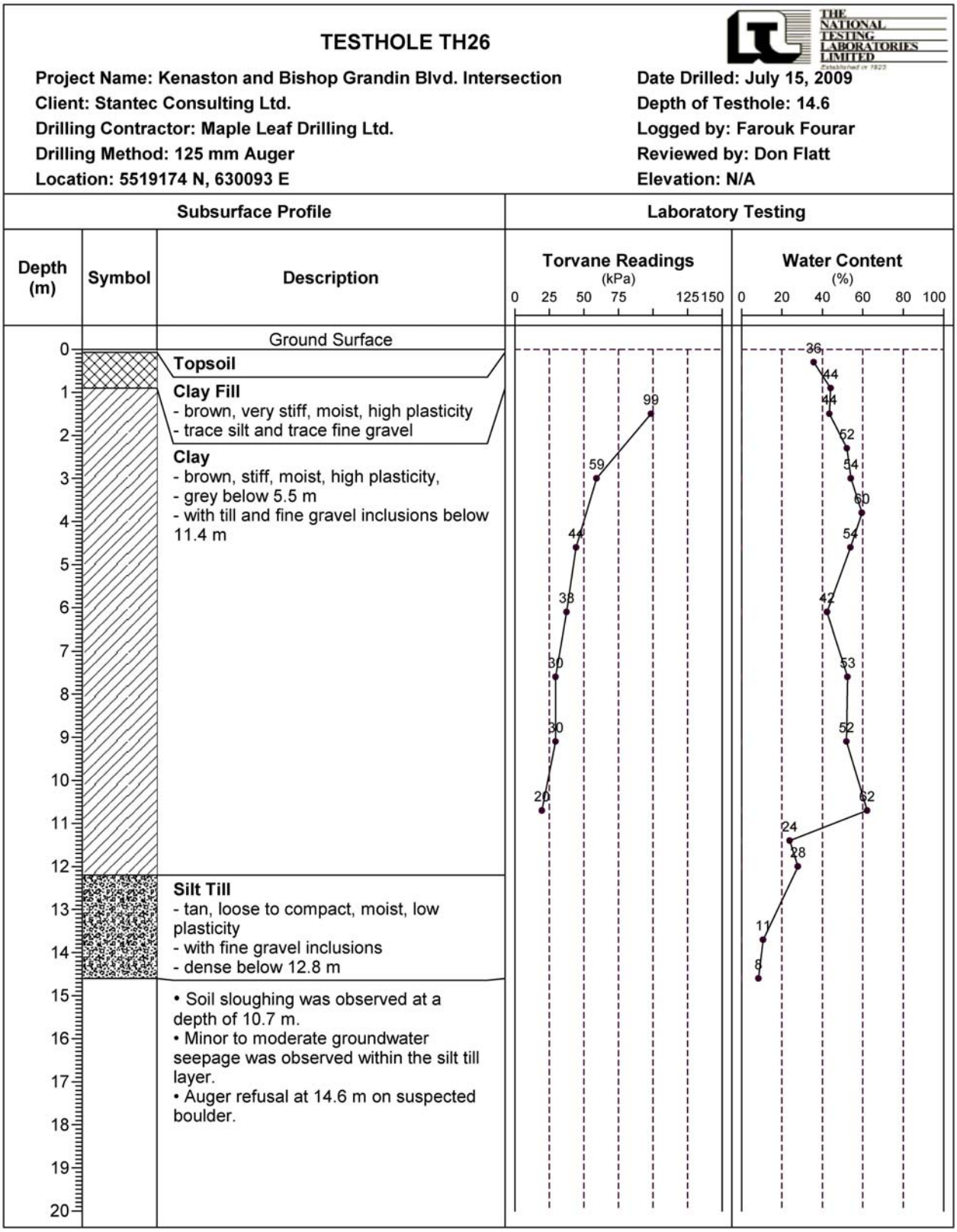
Subsurface Profile			Laboratory Testing
Depth (m)	Symbol	Description	Water Content (%) 0 20 40 60 80 100
0.0		Ground Surface	
		Topsoil	
		Silt - tan, soft, moist, low plasticity	
1.0		**Clay** - brown, stiff, moist, high plasticity, trace silt	
2.0			
3.0		• No soil sloughing was observed during or upon completion of drilling. • No groundwater seepage was observed during or upon completion of drilling • Testhole terminated at a depth of 3.0 m	



Test Hole Log for Test Hole #25



Test Hole Log for Test Hole #26



APPENDIX 'B'

ENVIRONMENTAL EFFECTS ANALYSIS SUMMARY – CONSTRUCTION PHASE

APPENDIX 'B' – ENVIRONMENTAL EFFECTS ANALYSIS SUMMARY – CONSTRUCTION PHASE

Potential Effect	Spatial Area	Frequency and Duration	Reversible	Magnitude	Nature of Impact	Mitigation/Comments	Significance
CONSTRUCTION							
Air Quality							
Construction vehicle/machinery emissions, including increase in greenhouse gases	Footprint and local area	Once/Short term	Yes	Low	Negative	• Construction vehicles and machinery will be kept in good working order and • Idling of construction vehicles will be kept to a minimum as feasible	Not Significant
Increase in airborne particulates (road dust) during road construction	Footprint and local area	Once/Short term, sporadic	Yes	Low to moderate	Negative	• Work areas will be dampened with water or approved chemicals to minimize airborne dust, as required • Trucks hauling excavated material will utilize tarpaulin covers during transport	Not Significant
Hydrology - Surface and Subsurface							
Effects to surface water quality due to sedimentation (runoff and culvert construction), road dust/particulates and potential contamination from land clearing, road construction machinery / vehicles	Local Area	Once/Short term	Yes	Low to moderate	Negative	• Measures outlined in the Environmental Protection Plan, DFO guidance and provincial stream crossing guidelines will be followed to minimize sedimentation and potential contamination of surface waters	Not Significant
Net increase in surface water runoff due to impermeable road surface as construction progresses	Local Area	Continuous/ Intermediate term	Yes	Low to moderate	Negative	• Sufficient drainage ditching / land contouring to contain and direct surface water runoff will be part of the Project design	Not Significant

Potential Effect	Spatial Area	Frequency and Duration	Reversible	Magnitude	Nature of Impact	Mitigation/Comments	Significance
Effects to groundwater quality due to hydrocarbon / other contaminants from road construction machinery / vehicles and site cleanup activities	Footprint Area	Once/Short term	Yes	Low to moderate	Negative	• Regulatory compliance, contract specifications and the Environmental Protection Plan will be followed to prevent and limit soil contamination	Not Significant
Changes to shallow groundwater flow and potential for seepage due to roadbed construction	Local Area	Continuous/ Intermediate term	Yes	Low	Negative	• Project design will minimize impacts/changes to the groundwater regime	Not Significant
Terrain and Soils							
Soil compaction, surface soil removal, erosion and rutting due to site access, land clearing, road construction and traffic	Footprint Area	Continuous/ Intermediate term for roads	Yes	High	Negative	• Soil will be retained to rehabilitate and revegetate disturbed areas not required for operations	Not Significant
Sub-surface soil disturbance due to roadbed construction	Footprint Area	Intermediate term	Yes	Low	Negative	• Subsurface soil disturbance will be minimized to the extent feasible and will be used as backfill as required	Not Significant
Terrestrial Environment							
Loss of vegetative communities on Project footprint	Footprint	Short to intermediate term	Yes	High	Negative	• Top soil will be retained to rehabilitate and revegetate disturbed areas not required for operation	Not Significant
Reduced use of local area by wildlife due to noise and human presence	Footprint and Local Area	Short to intermediate term	Yes	Low to moderate	Negative	• Clearing activities will take place outside the most sensitive breeding and brood-rearing season for birds and other wildlife (i.e., May, June and July)	Not Significant

Potential Effect	Spatial Area	Frequency and Duration	Reversible	Magnitude	Nature of Impact	Mitigation/Comments	Significance
Aquatic Environment							
Increase in total suspended solids concentration due to runoff during storm events, due to disturbed soils during construction activities	Footprint and Local Area	Sporadic (influenced by precipitation)	Yes	Low to Moderate	Negative	• Provincial and federal guidelines for fish habitat protection for road construction and stream crossings will be followed in accordance with the Environmental Protection Plan and DFO guidance conditions	Not Significant
Potential disruption of fish habitat from culvert extension construction	Footprint and Local Area	Once	Yes	High (for fish habitat); Moderate (for fish)	Negative	• Culvert will be constructed in accordance provincial stream crossing guidelines, the Environmental Protection Plan and DFO guidance conditions	Not Significant
Potential loss of aquatic vegetation due to culvert construction	Footprint and Local Area	Once	Yes	High	Negative	• Culvert will be constructed in accordance provincial stream crossing guidelines, the Environmental Protection Plan and DFO guidance conditions	Not Significant
Potential for the introduction of hazardous materials (e.g. fuel / oil) into nearby waterbodies	Footprint and Local Area	Sporadic	Yes	Low to Moderate	Negative	• Machinery / vehicle maintenance and refuelling will occur at a sufficient distance to minimize potential for hazardous substance introduction to adjacent waterbodies as per provincial and federal guidance	Not Significant
Noise / Vibration							
Increased noise and vibrations from construction machinery and vehicles	Local Area	Sporadic and short term	Yes	High	Negative	• Timing of construction activities will comply with the City of Winnipeg Neighbourhood Liveability By-law No. 1/2008 to minimize disturbance to local residents	Not Significant

Potential Effect	Spatial Area	Frequency and Duration	Reversible	Magnitude	Nature of Impact	Mitigation/Comments	Significance
Public Health / Well Being / Aesthetics							
Increased safety hazard associated with construction zone	Footprint and adjacent areas	Short term	Yes	Low to high	Negative	• Appropriate construction zone speed limit and warning signage will be posted in accordance with construction specification and the Environmental Protection Plan	Not Significant
Construction of the Project will temporarily decrease aesthetics of the area	Footprint and adjacent areas	Short term	Yes	High	Negative	• Materials handling and storage will be in accordance with construction specification and the Environmental Protection Plan	Not Significant
Heritage Resources							
Disturbance / destruction of undiscovered heritage resources	Footprint	Short term	Yes (heritage resources can be preserved)	Moderate	Negative	• If heritage material is located during construction, activities should be conducted in accordance with the Environmental Protection Plan	Not Significant
ACCIDENTS AND MALFUNCTIONS							
Soils, Surface and Groundwater Impacts							
Effects to soils, surface and groundwater quality due to leaks and spills of oil and gas from construction and maintenance machinery	Footprint Area	Sporadic/ Short term	Yes	High but very low probability	• Negative	• Hazardous material handling, storage and spill response should be conducted in accordance with provincial and federal legislation and the Environmental Protection Plan	Not Significant

Potential Effect	Spatial Area	Frequency and Duration	Reversible	Magnitude	Nature of Impact	Mitigation/Comments	Significance
Aquatic Environment							
Potential for contamination of aquatic habitat due to accidental spill or leak of hydrocarbons or other fluids during construction or operation and maintenance as a result of vehicle collision accidents	Footprint and Local Area	Sporadic in the Intermediate term	Yes	Low	Negative	• Hazardous materials will be handled in accordance with applicable provincial and federal guidelines; • All fuel storage and equipment servicing areas will be located a minimum of 100 m away from any waterbody and will have materials on-site to contain and recover fuel spills; • The Environmental Protection Plan for the Project outlines procedure s to attend to, report and clean-up accidental spills	Not Significant

APPENDIX 'C'

DFO GUIDANCE MATERIALS

APPENDIX 'C' – DFO GUIDANCE MATERIALS

From: Schwartz, Todd [mailto:Todd.Schwartz@dfo-mpo.gc.ca]
Sent: Wednesday, May 11, 2011 3:22 PM
To: Amy, Kevin
Cc: Newgard, Elizabeth; Janusz, Richard; Long, Jeff (WSD); MHarms@winnipeg.ca
Subject: Advice: Kenaston Culvert Extension, Lot 16 drain (WI-09-3720)

Kevin,

Subject: Proposal not likely to result in impacts to fish and fish habitat.

Fisheries and Oceans Canada - Fish Habitat Management Program (DFO) received your proposal from Stantec Consulting Ltd. (Kevin Amy) on December 24, 2009 for the extension of a culvert on Lot 16 Drain at Kenaston Boulevard, and received updated information on May 11, 2011. Please refer to the file number and title below:

DFO File No.:	**WI-09-3720**
DFO referral No.:	**09-HCAA-CA1-03720**
Title:	**Lot 16 Drain culvert extension at Route 90 (Kenaston Boulevard), in Winnipeg, Manitoba**

Your proposal has been reviewed to determine whether it is likely to result in impacts to fish and fish habitat which are prohibited by the habitat protection provisions of the *Fisheries Act* or those prohibitions of the *Species at Risk Act* that apply to aquatic species.*

Our review consisted of:

- Information provided by email from Stantec Consulting on December 24, 2009 including a project description, design drawings, photographs, map location and a description of best management practices to be followed during construction.

We understand that you propose to:

- Extend the existing box culver on Lot 16 Drain at Kenaston Boulevard from approximately 80.6 m to approximately 108 m in length to accommodate the construction of an additional lane of traffic.
- This project is funded in part through the Federal Building Canada Fund infrastructure program.

To reduce potential impacts to fish and fish habitat we are recommending the following mitigation measures be included into your plans:

1. Due to the presence of spring spawning fish species no culvert replacement works should occur between **April 1 and June 15** of any given year.
2. If possible works should be constructed during periods of no flow or very low flow. Flowing water should be diverted around the construction area using a dam and bypass pump or temporary flume (culvert) in a manner that avoids sediment generation to downstream areas and does not alter the volume of flow in the watercourse. Use coffer dams made of non-earthen material such as aqua-dams, sand bags, sheet pile or clean granular material wrapped in poly-plastic or other suitable isolation materials. Ensure any pump inlets are appropriately screened following the DFO Freshwater Intake End-of-Pipe fish Screen Guidelines. Ensure all isolation materials are completely removed from the watercourse once construction is complete.

2.1 Any fish trapped within the isolated area are captured and returned to the watercourse unharmed. Fish includes fin fish, crayfish, and mussels (clams).

3. All works are limited to within road's right of way.

4. Culverts are installed according to the "Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat" (Manitoba Natural Resources and DFO, 1996). The culverts should be embedded a minimum of 0.3 m or 10% of culvert vertical diameter, whichever is greater to maintain connectivity during lower flows in this forage fish stream.

5. The duration of the work and amount of disturbance to the bed and banks of the water body is minimized.

6. Appropriate precautions are taken to ensure waste construction materials do not enter the water and are removed to an appropriate landfill or storage facility.

7. Use only clean rock for armouring the inlets and outlets of the culvert, and haul it in from an appropriate land-based source. Avoid using poor quality limestone that breaks down quickly when exposed to the elements or acid generating rocks typical from metal mines. All rock should be clean and free of fine materials and of appropriate size to resist displacement during high flow events.

8. The rock is placed such that it does not constrict the channel or change the hydraulics in a way that might damage the bed and/or banks of the watercourse or interfere with fish passage.

9. Where grading of stream banks is required they are sloped by pulling material back from the water's edge. Stabilize any waste materials removed from the work site, above the ordinary high water mark, to prevent them from entering any water body. Spoil piles could be contained with silt fence, flattened, covered with biodegradable mats or tarps, and/or planted with preferably native grass or shrubs.

10. Excavation of the water body bed is limited to within the road right of way and is the minimum required for the proper placement of the culvert crossing.

11. Shoreline vegetation is retained to the greatest extent possible to maximize the stability of the banks.

12. The deposit of deleterious substances into water frequented by fish is prohibited under the ***Fisheries Act***. Appropriate precautions must therefore be taken to ensure that potentially deleterious substances (such as fuel, hydraulic fluids, oil, sediment etc.) do not enter any water body.

13. Operate machinery from outside of the water and in a manner that minimizes disturbance to the banks of the water body.

    13.1. Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.

    13.2. Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent deleterious substances from entering the water.

    13.3. Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.

14. Install effective sediment and erosion control measures before starting work in order to prevent the entry of sediment into the watercourse. Pay particular attention to the ditches of road approaches. Inspect them regularly during the course of the work and until vegetation is fully established to ensure they are functioning properly. Make all necessary repairs and adjustments if any damage is discovered or if these measures are not effective in controlling erosion and sedimentation.

15. Vegetate any disturbed areas by planting and seeding preferably native trees, shrubs or grasses and cover such areas with mulch or biodegradable erosion control blankets to prevent soil erosion and to help seeds germinate. If there is insufficient time in the growing season remaining for the seeds to

germinate, stabilize the site (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and then vegetate the following spring.

16. Maintain effective sediment and erosion control measures until complete re-vegetation of disturbed areas is achieved.

No fish species which are currently listed as species at risk in Canada are believed to use this area. If you would like more information about fish species at risk please visit the Species at Risk Act Public registry at www.sararegistry.gc.ca. (*Those sections most relevant to the review of development proposals include 20, 22, 32 and 35 of the *Fisheries Act* and sections 32, 33 and 58 of the *Species at Risk Act*. For more information please visit www.dfo-mpo.gc.ca.)

Provided that the additional mitigation measures described above are incorporated into your plans, DFO has concluded that your proposal is not likely to result in impacts to fish and fish habitat.

You will not need to obtain a formal approval from DFO in order to proceed with your proposal.

Please notify this office at least 10 days before starting the work. A copy of this letter should be kept on site while the work is in progress.

If the plans have changed or if the description of your proposal is incomplete you should contact this office to determine if the advice in this letter still applies

Please be advised that any impacts to fish and fish habitat which result from a failure to implement this proposal as described or incorporate the additional mitigation measures included in this letter could lead to corrective action such as enforcement.

If you have any questions please contact Todd Schwartz at our Winnipeg office at (204) 983-4231 by fax at (204) 984-2402 or by email at Todd.Schwartz@dfo-mpo.gc.ca.

Yours sincerely,

Todd Schwartz
Telephone/ Téléphone: 204 983-4231
Facsimile / Télécopieur: 204 984-2402
Email / Courriel: Todd.Schwartz@dfo-mpo.gc.ca

Fish Habitat Biologist.
Manitoba District.
Winnipeg Office.
Central and Arctic Region.
Fisheries and Oceans Canada.
501 University Crescent.
Winnipeg, MB R3T 2N6.
Government of Canada.

Biologiste, Habitat du poisson
District du Manitoba
Bureau de Winnipeg
Région du Centre et de l'Arctique
Pêches et Océans Canada
501 University Crescent
Winnipeg (Manitoba) R3T 2N6
Gouvernement du Canada

For more information on Fish and Fish Habitat and DFO Reviews Visit our Website
Oceans and Fish Habitat http://www.dfo-mpo.gc.ca/oceans-habitat/index_e.asp

Anseeuw, Carmen

From: Schwartz, Todd <Todd.Schwartz@dfo-mpo.gc.ca>
Sent: Tuesday, January 18, 2011 4:21 PM
To: Amy, Kevin
Subject: RE: Kenaston Culvert Extension, Lot 16 drain (WI-09-3720)

Kevin,

as discussed on the phone, the project should be low risk to fish and fish habitat as long as proper best management practices are followed. The following additional mitigation measures should be applied.

1) No inwater work from April 1 to June 15 to protect fish during spawning and rearing.
2) Sediment control should be applied to all inwater works to prevent the release or re-suspension of sediments to the watercourse. A turbidity curtain may be used to contain sediments from coffer dam construction/removal and riprap placement. This turbidity curtain should isolate as small an area as possible to complete the works, and should be completely removed once turbidity within the isolated area has returned to background levels. (note: some coffer dam construction and removal methods may generate essentially no sediment, and a turbidity curtain may not be necessary)

Todd Schwartz
Telephone/ Téléphone: 204 983-4231
Facsimile / Télécopieur: 204 984-2402
Email / Courriel: Todd.Schwartz@dfo-mpo.gc.ca

Fish Habitat Biologist.
Manitoba District.
Winnipeg Office.
Central and Arctic Region.
Fisheries and Oceans Canada.
501 University Crescent.
Winnipeg, MB R3T 2N6.
Government of Canada.

Biologiste, Habitat du poisson
District du Manitoba
Bureau de Winnipeg
Région du Centre et de l'Arctique
Pêches et Océans Canada
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Gouvernement du Canada

For more information on Fish and Fish Habitat and DFO Reviews Visit our Website
Oceans and Fish Habitat http://www.dfo-mpo.gc.ca/oceans-habitat/index_e.asp

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From: Amy, Kevin [mailto:kevin.amy@stantec.com]
Sent: 2011-January-18 1:43 PM
To: Schwartz, Todd
Subject: Kenaston Culvert Extension

Todd,

As discussed on the phone I have attached the Title page and the various site plans developed for this project for your review and information. Please call when you have had a chance to review this information.

As outlined on the Drawings we will Complete the Stage I works by March 15, 2011 and the Stage II works by July 29, 2011. Total completion by August 5, 2011.

Kevin Amy, M.Sc., P.Eng.
Bridge Project Manager
Stantec
100 - 1355 Taylor Avenue
Winnipeg MB R3M 3Y9
Ph: (204) 488-5743
Fx: (204) 453-9012
Cell: (204) 981-3481
kevin.amy@stantec.com
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Fisheries and Oceans Canada | Pêches et Océans Canada

Freshwater Institute
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501 University Crescent
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(204) 983-4231

Institut des eaux douces
Secteur des Prairies, District du Manitoba
501 University Crescent
Winnipeg, (Manitoba)
R3T 2N6
(204) 983-4231

Your file *Votre référence*

January 4, 2010

Our file *Notre référence*
WI-09-3720

Michelle Harms
City of Winnipeg, Public Works
106-1155 Pacific Ave
Winnipeg, MB R3E 3P1

Dear Mrs. Harms:

Subject: Proposal not likely to result in impacts to fish and fish habitat.

Fisheries and Oceans Canada - Fish Habitat Management Program (DFO) received your proposal from Stantec Consulting Ltd. (Kevin Amy) on December 24, 2009 for the extension of a culvert on Lot 16 Drain at Kenaston Boulevard. Please refer to the file number and title below:

DFO File No.:	**WI-09-3720**
Title:	**Lot 16 Drain culvert extension at Route 90 (Kenaston Boulevard), in Winnipeg, Manitoba**

Your proposal has been reviewed to determine whether it is likely to result in impacts to fish and fish habitat which are prohibited by the habitat protection provisions of the *Fisheries Act* or those prohibitions of the *Species at Risk Act* that apply to aquatic species.*

Our review consisted of:

- Information provided by email from Stantec Consulting on December 24, 2009 including a project description, design drawings, photographs, map location and a description of best management practices to be followed during construction.

We understand that you propose to:

- Extend the existing box culver on Lot 16 Drain at Kenaston Boulevard by 20 m in length to accommodate the construction of an additional lane of traffic.
- Construction will be completed by March 31, 2010
- This project is funded in part through the Federal Building Canada Fund infrastructure program.

No fish species which are currently listed as species at risk in Canada are believed to use this area. If you would like more information about fish species at risk please visit the *Species at Risk Act* Public registry at www.sararegistry.gc.ca.

*Those sections most relevant to the review of development proposals include 20, 22, 32 and 35 of the *Fisheries Act* and sections 32, 33 and 58 of the *Species at Risk Act*. For more information please visit www.dfo-mpo.gc.ca.

.../2

Canada

Provided that your plans are implemented as described DFO has concluded that your proposal is not likely to result in impacts to fish and fish habitat.

You will not need to obtain a formal approval from DFO in order to proceed with your proposal.

Please notify this office at least 10 days before starting the work. A copy of this letter should be kept on site while the work is in progress.

If the plans have changed or if the description of your proposal is incomplete you should contact this office to determine if the advice in this letter still applies.

Please be advised that any impacts to fish and fish habitat which result from a failure to implement this proposal as described could lead to corrective action such as enforcement.

If you have any questions please contact Todd Schwartz at our Winnipeg office at (204) 983-4231, by fax at (204) 984-2402, or by email at Todd.Schwartz@dfo-mpo.gc.ca.

Yours sincerely,

Todd Schwartz
Fish Habitat Biologist
Prairies Area, Winnipeg Office

cc: Winnipeg Distribution
J. Hunt (MB Water Stewardship, Winnipeg)
G. Klein (MB Water Stewardship, Gimli)
Jim Gallagher (Manitoba Housing Renewal Corporation, Winnipeg)
Elizabeth Newgard (Transport Canada, Ottawa)
Kevin Amy (Stantec Consulting Ltd., Winnipeg)

Stantec Consulting Ltd.
905 Waverley Street
Winnipeg MB R3T 5P4
Tel: (204) 489-5900
Fax: (204) 453-9012

December 24, 2009
File:

Department of Fisheries and Oceans
501 University Crescent
Winnipeg MB R3T 2N6

Attention: **Todd Schwartz**

Dear:

Reference: **Route 90 Extension Project**
Culvert Extension at Lot 16 Drain

1. Introduction

Originally the proposed Route 90 Extension Project was intended to be part of the planned Waverley West Arterial Road system and involved a cost share arrangement between the developer and the City of Winnipeg. The project involves several components, including construction of two interchanges, road widening, the realignment of existing roads, and other related road work along Waverley Street and Kenaston Boulevard in Winnipeg. The Project was expected to be constructed over two years beginning in 2010. With the recently announced Building Canada Fund - Major Infrastructure Component, this project may become subject to the funding structure of that program with a break down in funding as follows: 1/3 Federal Government, 1/3 Provincial Government and 1/3 City of Winnipeg. While the Building Canada Project boundaries are considerably more broad based and includes the extension of Kenaston Boulevard south to PTH 100, this submission deals specifically with the construction of a culvert extension at the Lot 16 Drain located at the existing transition between Bishop Grandin Boulevard and Kenaston Boulevard. Extension of this culvert is required to facilitate the construction of an intersection of Bishop Grandin Boulevard and Kenaston Boulevard allowing Kenaston Boulevard to extend south into the Waverley West lands and beyond

This submission is prepared and submitted on behalf of the Manitoba Housing Renewal Corporation; contact person is Jim Gallagher MCIP 2702-83 Garry Street Winnipeg, MB R3C 4J9. The end owner will be the City of Winnipeg; contact person is Michelle Harms, P.Eng. 106-1155 Pacific Ave. Winnipeg, MB R3E 3P1. The City of Winnipeg and the Manitoba Housing Renewal Corporation have a development agreement in place as related to this Project. requiring the developer to construct this intersection prior to the year 2011.

2. Project Need

Kenaston Boulevard has been identified as a Strategic and Economic Route for the City of Winnipeg and the Provincial Capital Region. It is also considered to be a key link in the Inner City Ring Road system proposed by the Mayor's Trade Council Report, which establishes a strategy for the future growth and economic development of Winnipeg as a major inland port and international

trade hub. It has become critical that an innovative and cost effective solution to projected traffic congestion be found for the important intersection of Bishop Grandin and Kenaston Boulevards. The intra-city commuter traffic volumes at this intersection, especially the south to east and west to north movements, are among the highest in the city. The projected additional traffic from the Waverley West development that will utilize this intersection reinforces the need to develop a long term solution at this location.

As the initial phase of the project, a new two lane road will extend north from the first collector street, North Town Road, in the Waverley West Development to Bishop Grandin Boulevard. The two new lane road will be an extension of Kenaston Boulevard and tee into Bishop Grandin. The simple tee intersection will be signalized.

A new two lane road will be built to the north of and paralleling the existing lanes along Bishop Grandin Boulevard allowing eastbound to north bound traffic to flow freely. The new two lane road to the north will connect into the existing road north of the existing culvert on the Lot 16 drain. Lot 16 drain culvert must be extended to accommodate the construction of the new two lane road to the north of the existing north bound lanes of Bishop Grandin Boulevard.

3. Project Description - Proposed Lot 16 Drain Culvert Extension

The proposed culvert extension will be proceeding to Tender mid January 2010 with construction of the proposed culvert extension to commence in early February 2010 and be completed by March 15, 2010. This is the first, critical step in the construction of the subsequent works such as the land drainage and sewers and the proposed roadways. Completion of the culvert extension within the winter months is critical to the overall project schedule.

The proposed culvert extension will be a 20m long cast-in-place concrete culvert having interior dimensions of 3.0x3.0m to match the existing culvert. The overall dimensions of the existing pipe, including grade will be matched by they proposed culvert extension. The headwall and wingwall geometries have been altered for the proposed culvert extension, as compared to the existing culvert, to address the revised proximity of the outlet to the Lot 16 Drain.

The existing headwall, wingwalls and apron are to be removed. To accomplish this, temporary shoring may be utilized to the north of the outlet of the culvert. The temporary shoring will allow for the dewatering of the Site, if the water is not frozen to the bottom of the drain at the time of construction. Should the drain be frozen through to the bottom of the drain the temporary shoring would not be installed. The Contractor will have the responsibility to design and submit for review a temporary shoring and dewatering plan. It is expected at this time, the temporary shoring, if required, will be constructed from steel sheet piling which will be removed upon the completion of the work. The existing concrete headwall, wingwalls and apron will be demolished and the ruble removed from the site and disposed of at an environmentally acceptable location/facility. As construction will be completed in the winter, as well as in the dry, the Contractor will be able to readily collect the rubble and thus it will not enter the drain.

Once the noted demolition of the existing culvert is complete the proposed culvert extension will then be constructed. The temporary shoring, if installed, would remain in place until the

Stantec

December 24, 2009
Todd Schwartz
Page 3 of 5

Reference: Route 90 Extension Project
Culvert Extension at Lot 16 Drain

construction of the proposed culvert is complete. The works included to complete the construction of the proposed culvert extension are the construction of a 75mm thick concrete working slab, use of untreated forms, placement of steel reinforcing and concrete, regarding of the Site, and riprap placement.

The embankments will be shaped locally around the headwall and wingwalls to provide a stable slope and to suit riprap placement. The embankments will be protected by a 1000mm thick layer of 250 to 650mm rock with 50% of the rock being at least 500mm. The riprap will be nominal field stone or quarried rock and will be clean and free of fines prior to placing. The embankments are not to be reshaped below the water level as the proposed grading is to match the elevation of the existing embankments at the waterline. The proposed extent of the riprap is shown on the attached site plan.

It should be noted that Stantec anticipates at this time to have a Site Plan and General Arrangement drawings completed early in the week of January 4, 2010. These drawings, once completed, will be submitted in addition to the drawings attached to this document, for review. The attached drawings (note that these are scans of larger drawings and the notes scale is no longer valid) are intended to demonstrate the intent and general limits of the project.

As it is Stantec's understanding that the existing culvert grades and invert elevations are functioning to ensure the culvert is not perched at low flows, the proposed culvert will match the existing culvert grade.

As apart of these works a retaining wall is to be constructed to the west of the culvert. This retaining wall, approximately 25m long, will be constructed of cast-in-place concrete but is not anticipated to be within the Lot 16 Drain waters at any time during construction. The slopes between the retaining wall and the drain will be covered by riprap details, as previously discussed, to ensure the long term stability of the retaining wall.
A hard copy of Stantec's letter requesting approval and the Letters of Advice, or approval letters, received will be attached to the tender documents forming part of the legal contract, if available at that time.

As part of our sediment and erosion control mitigation measures, Stantec will request the following task be implemented throughout the course of construction:

- Removing the debris from the ice.
- Installation of silt fences isolating the construction areas if the creek thaws (this is not anticipated to be an issue as construction should be completed during the winter months).
- Placement of coconut or straw blankets on all exposed slopes upon the completion of final grading.
- Re-vegetation of all disrupted areas of the embankment.
- No in-water construction to be undertaken between April 1 through June 30.
- Non-reusable demolition or construction materials will be disposed of in an authorized waste disposal facility.

Stantec

December 24, 2009
Todd Schwartz
Page 4 of 5

Reference: Route 90 Extension Project
Culvert Extension at Lot 16 Drain

- Demolition materials will not be allowed to enter Lot 16 Drain.
- Construction will be halted during periods of heavy rainfall (this is not anticipated to be an issue as construction should be completed during the winter months).
- Stock piled backfill material will be covered with poly during heavy rainfall events and if it is to remain on site for an extended period of time (this is not anticipated to be an issue as construction should be completed during the winter months).
- Riprap to be placed to the waters edge and to match the extent of the existing riprap.
- The riprap will be clean fieldstone or quarried rock free of fines.
- Construction machinery may not be refueled or serviced within 100m adjacent to any body of water.
- All construction work shall be performed in a workmanship like manner and shall be in accordance with "Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat".
- At no time shall the arm of a back-ho or any other machinery extensions enter the waterway where exposed hydraulic cylinders, engines or other devices containing grease, oil, gas and other toxins could enter and contaminate the waterway and environment.
- The contractor shall have on site at all times, oil absorbent pads in the event of an oil spill or accidental submergence of toxin covered machinery occurs.
- The excavated material for the culvert construction shall be placed where it is not likely to erode or be washed into the waterway.

Please contact the undersigned if you require further information, clarification or have comments.

Sincerely,

STANTEC CONSULTING LTD.

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Structural Engineer
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Attachment: Proposed Site Plan
Existing Culvert Drawings
Power Point Presentation

Stantec

December 24, 2009
Todd Schwartz
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Reference: Route 90 Extension Project
Culvert Extension at Lot 16 Drain

c.

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