
# THE CITY OF WINNIPEG

# REQUEST FOR PROPOSAL

**RFP NO. 838-2013**

**DESIGN AND CONSTRUCTION OF A SAND AND SALT FACILITY AT THE PUBLIC WORKS EAST YARDS COMPLEX – 960 THOMAS AVENUE**

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# PART B - BIDDING PROCEDURES

## B1. CONTRACT TITLE

B1.1 DESIGN AND CONSTRUCTION OF A SAND AND SALT FACILITY AT THE PUBLIC WORKS EAST YARDS COMPLEX – 960 THOMAS AVENUE

## B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 4:00 p.m. Winnipeg time, April 17, 2014.

B2.2 Proposals 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 The Bidder is responsible for determining:

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

(b) the nature of the surface and subsurface conditions at the Site;

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

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

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

(f) all other matters which could in any way affect his/her Proposal or the performance of the Work.

## B4. ENQUIRIES

B4.1 All enquiries shall be directed to the Contract Administrator identified in D4.1.

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

B4.3 If the Bidder is unsure of the meaning or intent of any provision therein, the Bidder should request clarification as to the meaning or intent prior to the Submission Deadline.

B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Request for Proposal will be provided by the Contract Administrator to all Bidders by issuing an addendum.

B4.5 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Request for Proposal will be provided by the Contract Administrator only to the Bidder who made the enquiry.

B4.6 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B4 unless that response or interpretation is provided by the Contract Administrator in writing.

## B5. CONFIDENTIALITY

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

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

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

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

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

## B6. ADDENDA

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

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

B6.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/bidopp.asp.

B6.2.2 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the Materials Management Division website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.

B6.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 9 of Form A: Proposal. Failure to acknowledge receipt of an addendum may render a Proposal non-responsive.

## B7. SUBSTITUTES

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

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

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

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

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

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

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

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

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

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

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

B7.6.1 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/she wishes to inform.

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

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

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

B7.10 Notwithstanding B7.2 to B7.9 and in accordance with B8.8, deviations to terms and conditions inconsistent with the Proposal document shall be evaluated in accordance with B18.1(a).

## B8. PROPOSAL SUBMISSION

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

(a) Form A: Proposal;

(b) Form B: Prices;

(c) Description of the Design Build Team in B11;

(d) Proposed Project Delivery Methodology in B12;

(e) Project Schedule in B13;

(f) Detailed Structure Description in B14;

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

B8.3 All components of the Proposal 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 Proposal.

B8.3.1 Bidders should submit one (1) unbound original 216 mm x 279 mm (8.5” x 11”) original (marked “original”) including drawings and six (6) copies.

B8.3.2 Bidders should submit one electronic copy in PDF format on DVD or flash memory media.

B8.3.3 Units of measure in Proposals should be SI metric units.

B8.4 Bidders are advised not to include any information/literature except as requested in accordance with B8.1.

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

B8.6 The Proposal should be submitted enclosed and sealed in an envelope clearly marked with the RFP number and the Bidder's name and address.

B8.6.1 Samples or other components of the Proposal which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the RFP number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Proposal Submission.

B8.7 Proposals submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.

B8.8 Proposals shall be submitted to:

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

**B9. PROPOSAL**

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

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

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

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

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

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

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

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

B9.4 Paragraph 11 of Form A: Proposal shall be signed in accordance with the following requirements:

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

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

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

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

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

B9.5 If a Proposal 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 Proposal and the Contract, when awarded, shall be both joint and several.

**B10. PRICES**

B10.1 The Bidder shall state the lump sum price in Canadian funds for the Work on Form B: Prices.

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

B10.2 The Bidder shall state the lump sum price for which he is submitting a bid.

B10.3 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

**B11. DESCRIPTION OF THE DESIGN BUILD TEAM**

(i) an organization chart for the Work;
(ii) general profile, history, and relevant qualifications and experience for each member firm of the Design Build Team;
(iii) Proposed key personnel, their roles for the Work, their time allotment to this Work as a percentage of their average work load during design and construction;
(iv) curriculum vitae for key personnel including relevant education, certifications and experience.

**B12. PROPOSED PROJECT DELIVERY METHODOLOGY**

(i) quality control & assurance;
(ii) communications/reporting plan;
(iii) scope and budget control procedures;
(iv) project estimating and value analysis;
(v) project documentation procedures and controls;
(vi) construction coordination & administration;
(vii) change notices & change orders;
(viii) commissioning and warranties.

**B13. PROJECT SCHEDULE**

(i) a critical path method (C.P.M.) schedule for the Work;
(ii) a Gantt chart for the Work based on the C.P.M. schedule.

**B14. DETAILED STRUCTURE DESCRIPTION**

(i) name of designer;
(ii) name of fabricator;
(iii) detailed product data for fabric;
(iv) detailed product data for frame.

**B15. QUALIFICATION**

B15.1 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, or if the Bidder does not carry on business in Manitoba, in the jurisdiction where the Bidder does carry on business; 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.

B15.2 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.

B15.3 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);

B15.4 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.

B15.5 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.

B15.6 Further to B12.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

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

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

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

B15.7 The Bidder shall submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B15.8 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

## B16. OPENING OF PROPOSALS AND RELEASE OF INFORMATION

B16.1 Proposals will not be opened publicly.

B16.2 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/ .

B16.3 To the extent permitted, the City shall treat all Proposal Submissions as confidential, however the Bidder is advised that any information contained in any Proposal 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.

B16.4 Following the award of Contract, a Bidder will be provided with information related to the evaluation of his/her submission upon written request to the Contract Administrator.

## B17. IRREVOCABLE OFFER

B17.1 The Proposal(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 10 of Form A: Proposal.

B17.2 The acceptance by the City of any Proposal shall not release the Proposals of the other responsive Bidders and these Bidders shall be bound by their offers on such Work until a Contract for the Work has been duly executed and the performance security furnished as herein provided, but any offer shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 10 of Form A: Proposal.

## B18. WITHDRAWAL OF OFFERS

B18.1 A Bidder may withdraw his/her Proposal without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B18.1.1 Notwithstanding C23.3, the time and date of receipt of any notice withdrawing a Proposal shall be the time and date of receipt as determined by the Manager of Materials.

B18.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Proposal or the Bidder's authorized representatives named in Paragraph 11 of Form A: Proposal, and only such person, has authority to give notice of withdrawal.

B18.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials will:

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

(b) open the Proposal to identify the contact person named in Paragraph 3 of Form A: Proposal and the Bidder's authorized representatives named in Paragraph 11 of Form A: Proposal; and

(c) if the notice has been given by any one of the persons specified in B15.1.3(b), declare the Proposal withdrawn.

B18.2 A Bidder who withdraws his/her Proposal after the Submission Deadline but before his/her offer has been released or has lapsed as provided for in B14.2 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.

## B19. INTERVIEWS

B19.1 The Contract Administrator may, in his/her sole discretion, interview Bidders during the evaluation process.

## B20. NEGOTIATIONS

B20.1 The City reserves the right to negotiate details of the Contract with any Bidder. Bidders are advised to present their best offer, not a starting point for negotiations in their Proposal Submission.

B20.2 The City may negotiate with the Bidders submitting, in the City's opinion, the most advantageous Proposals. The City may enter into negotiations with one or more Bidders without being obligated to offer the same opportunity to any other Bidders. Negotiations may be concurrent and will involve each Bidder individually. The City shall incur no liability to any Bidder as a result of such negotiations.

B20.3 If, in the course of negotiations pursuant to B17.2 or otherwise, the Bidder amends or modifies a Proposal after the Submission Deadline, the City may consider the amended Proposal as an alternative to the Proposal already submitted without releasing the Bidder from the Proposal as originally submitted.

## B21. EVALUATION OF PROPOSALS

B21.1 Award of the Contract shall be based on the following evaluation criteria:

(a) compliance by the Proponent with the requirements of the Request for Proposal or acceptable deviation therefrom; (pass/fail)

(b) qualifications of the Proponent and the Subconsultants, if any, pursuant to B12; (pass/fail)

| | | |
|---|---|---|
| (c) | Total Bid Price, | 40% |
| (d) | Description of the Design Build Team; | 20% |
| (e) | Proposed Project Delivery Methodology; | 10% |
| (f) | Project Schedule; | 15% |
| (g) | Detailed Structure Description; | 15% |

B21.2 Further to B18.1(a), the Award Authority may reject a Proposal as being non-responsive if the Proposal Submission is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Proposal, or waive technical requirements or minor informalities or irregularities if the interests of the City so require.

B21.3 Further to B18.1(b), the Award Authority shall reject any Proposal submitted by a Bidder who does not demonstrate, in his/her Proposal or in other information required to be submitted, that he/she is responsible and qualified.

B21.4 If, in the sole opinion of the City, a Proposal does not achieve a pass rating for B18.1(a) and B18.1(b), the Proposal may be determined to be non-responsive and will not be further evaluated.

B21.4 Further to B18.1(c), the Total Bid Price shall be the lump sum price shown on Form B: Prices.

B21.5 Further to B21.1(d), Description of the Design Build Team will be evaluated considering B11.

B21.6 Further to B21.1(e), Proposed Project Delivery Methodology will be evaluated considering B12.

B21.7 Further to B21.1(f), Project Schedule will be evaluated considering B13.

B21.8 Further to B21.1(g), Detailed Structure Description will be evaluated considering B14.

## B22. AWARD OF CONTRACT

B22.1 The City will give notice of the award of the Contract, or will give notice that no award will be made.

B22.2 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 Proposals are determined to be responsive.

B22.2.1 Without limiting the generality of B19.2, the City will have no obligation to award a Contract where:

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

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

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

(d) only one Proposal 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.

B22.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Proponent submitting the most advantageous bid in accordance with B18.1

B22.3.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his/her Proposal 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 Request for Proposal 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 the design and construction of a sand and salt facility at the Public Works East Yard Facility Complex.

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

(a) Detailed design of the sand and salt facility, and site servicing including but not limited to:

(i) Sand and salt building;

(ii) Salt and brine process systems;

(iii) Access roads and approaches;

(iv) Access control, fences and gates;

(v) Building and site lighting;

(vi) Landscaping and site restoration;

(vii) Relocation of existing brine equipment from 849 Ravelston Ave. W to 960 Thomas Ave.;

(b) Preparation of Construction Documents;

(c) Construction of sand and salt facility, and site servicing.

D2.3 The Work includes the work of all trades and all MasterFormat Divisions whether specifically cited in the Specifications or not.

### D3. DEFINITIONS

D3.1 When used in this Request for Proposal:

(a) "**Construction Documents**" means Construction Drawings and Construction Specifications;

(b) "**Construction Drawings**" means drawings prepared based on the Contract by or on behalf of the Contractor;

(c) ""**Design Build Team**" means the Contractor and his Subcontractors which may include the architects, engineers, builders and any other persons required to complete the Work.

### D4. CONTRACT ADMINISTRATOR

D4.1 The Contract Administrator is:

Andy M. Urbanowicz, C.E.T.
Project Officer

Telephone No. 204-986-2311
Facsimile No. 204-986-7311

D4.2 At the pre-commencement meeting, the Contract Administrator will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D4.3 Bids Submissions must be submitted to the address in B8.11.

## D5. CONTRACTOR'S SUPERVISOR

D5.1 Further to C6.21, before commencement of Work, the Contractor shall identify his/her designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

## D6. OWNERSHIP OF INFORMATION, CONFIDENTIALITY AND NON DISCLOSURE

D6.1 The Contract, all deliverables produced or developed, and information provided to or acquired by the Contractor are the property of the City and shall not be appropriated for the Contractors own use, or for the use of any third party.

D6.2 The Contractor shall not make any public announcements or press releases regarding the Contract, without the prior written authorization of the Contract Administrator.

D6.3 The following shall be confidential and shall not be disclosed by the Contractor to the media or any member of the public without the prior written authorization of the Contract Administrator;

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

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

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

D6.4 A Contractor who violates any provision of D6 may be determined to be in breach of Contract.

## D7. NOTICES

D7.1 Notwithstanding C23.2.2, 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

## D8. FURNISHING OF DOCUMENTS

D8.1 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

## D9. AUTHORITY TO CARRY ON BUSINESS

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

## D10. SAFE WORK PLAN

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

D10.2 The Safe Work Plan should be prepared and submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg,

Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/safety/default.stm .

## D11. INSURANCE

D11.1 The Contractor shall provide and maintain the following insurance coverage at all times during the performance of the Work and until the date of Total performance.

(a) Wrap Up Liability insurance in an amount of no less than five million dollars ($5,000,000) inclusive per occurrence written in the name of the Contractor, subcontractors, Consultants, sub-consultants and The City of Winnipeg, covering bodily injury, personal injury, property damage and products and completed operations consistent with industry standard insurance policy wordings. Wrap Up Liability insurance to also include evidence of contractual liability, unlicensed motor vehicle liability, cross liability, and 24 months completed operations;

(b) All risks course of construction insurance, including testing and commissioning, in the amount of 100% of the total contract price, written in the name of the Contractor, sub-contractors and The City of Winnipeg, policy to remain in place at all times during the performance of the Work and until the date of Total Performance;

(c) Automobile Liability insurance for owned and non-owned automobiles used for or in connection with the Work in the amount of at least two million dollars ($2,000,000);

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

(e) Contractors Pollution Liability (CPL) insurance in the amount of at least two million dollars ($2,000,000) per occurrence and two million dollars ($2,000,000) aggregate insuring against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder performed by the Contractor, its agents, representatives, employees or subcontractors. Coverage to include:

(i) Bodily injury, sickness, disease, mental anguish or shock sustaining by any person, including death;

(ii) Property damage including physical injury to or destruction of tangible property and the resulting loss or use thereof; loss of use of tangible property that has not been physically injured or destroyed; diminution in value; and Natural Resource Damages;

(iii) Cleanup costs (including restoration/replacement costs);

(iv) Defense including costs, charges and expenses incurred in the investigation, adjustment or defense of claims for such compensatory damages;

(v) Transported cargo and non-owned disposal sites (blanket basis).

D11.1.1 Coverage shall apply to both sudden and gradual pollution conditions, including the further disruption of pre-existing conditions, arising from the services rendered by the Contractor or others on their behalf. Further, coverage shall apply to conditions on, at, under and emanating from the job site including the discharge, dispersal, release, or escape of smoke, vapours, soot, fumes, acids, alkalis, toxic chemicals, liquids or gases, waste materials or other irritants, contaminants or pollutants into or upon land, structures thereupon, the atmosphere or any watercourse or body of water, which results in any loss or damages defined above. Coverage shall not contain any “Insured vs Insured” exclusion preventing the City from bringing a claim against the Contractor, nor any restrictions for property of others in the care, custody or control of the Contractor, CPL to remain in place during the performance of the Work and for 24 months after completion.

D11.2 The Contractor shall ensure that any Consultants and/or Sub-Consultants hired in connection with the design or subsurface Work provide the following insurances to The City of Winnipeg:

(a) Professional Liability Insurance in the amount of at least $2,000,000 per claim and $2,000,000 aggregate;

(b) The Consultants Professional Liability insurance shall remain in place for the duration of the Project and for 24 months after completion.

D11.3 Deductibles shall be borne by the Contractor.

D11.4 The Contractor shall provide the Contract Administrator 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 on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

D11.5 The Contractor shall not cancel, materially later, or cause the policy to lapse without providing at least thirty ( 30) Calendar Days prior written notice to the Contract Administrator.

D11.6 All policies shall be taken out with insurers licensed to carry on business in the Province of Manitoba.

## D12. PERFORMANCE SECURITY

D12.1 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.

D12.1.1 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.

D12.2 The Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award and prior to the commencement of any Work on the Site.

## D13. SUBCONTRACTOR LIST

D13.1 The Contractor shall provide the Contract Administrator with a complete list of the Subcontractors whom the Contractor proposes to engage (Form J: Subcontractor List) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract.

## D14. DETAILED PRICES

D14.1 The Contractor shall provide the Contract Administrator with a detailed price breakdown (Form 1: Detailed Prices) 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 C4.1 for the return of the executed Contract.

D14.2 The Contractor shall state a price for each item or sub-item of the Work identified on Form 1: Detailed Prices. The detailed prices must be consistent with the price(s) provided in the Contractor’s Bid.

## D15. DETAILED WORK SCHEDULE

D15.1 The Contractor shall provide the Contract Administrator with an updated detailed work schedule based on current timelines within seven (7) Calendar Days of notification of the award.

D15.2 The detailed work schedule shall consist of the following:

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

(b) a Gantt chart for the Work based on the C.P.M. schedule; and

(c) a daily manpower schedule for the Work

all acceptable to the Contract Administrator.

D15.3 Further to D14.2(a), the C.P.M. schedule shall clearly identify the start and completion dates of all of the following activities/tasks making up the Work as well as showing those activities/tasks on the critical path:

(a) detailed design;

(b) submission, review and approval of Construction Documents;

(c) submission, review and approval of Shop Drawing;

(d) procurement of critical materials including but not limited to:

(i) framed fabric structure;

(ii) process equipment;

(e) relocation of City-furnished Products;

(f) construction of structural concrete elements;

(g) erection of framed fabric structure;

(h) installation and commissioning of plumbing, HVAC and electrical systems;

(i) installation and commissioning of process equipment;

(j) construction of roadways;

(k) installation of fences and gates;

(l) landscaping and site restoration.

D15.4 Further to D14.2(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.

D15.5 Further to D14.2(c), the daily manpower schedule shall list the daily number of individuals on the Site for each trade.

D15.6 During the performance of the Work, the Contractor shall update the detailed work schedule monthly to show actual completion dates and revised estimated dates, and submit a copy to the Contract Administrator.

**SCHEDULE OF WORK**

**D16. COMMENCEMENT**

D16.1 The Contractor shall not commence any Work until he/she is in receipt of a notice of award from the City authorizing the commencement of the Work.

D16.2 The Contractor shall not commence any Work on the Site until:

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

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

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

(iii) the Safe Work Plan specified in D10;

(iv) evidence of the insurance specified in D11;

(v) the performance security specified in D12;

(vi) the Subcontractor list specified in D13;

(vii) the Detailed Prices specified in D14; and

(viii) the Detailed Work Schedule in D15.

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

(c) the Contract Administrator has confirmed receipt and approval of the Construction Documents.

D16.3 The City intends to award this Contract by May 16, 2014.

## D17. SUBSTANTIAL PERFORMANCE

D17.1 The Contractor shall achieve Substantial Performance by July 30, 2014.

D17.2 When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D17.3 The date on which the Work has been certified by the Contract Administrator as being substantially performed to the requirements of the Contract through the issue of a certificate of Substantial Performance is the date on which Substantial Performance has been achieved.

## D18. TOTAL PERFORMANCE

D18.1 The Contractor shall achieve Total Performance by August 29, 2014.

D18.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D18.3 The date on which the Work has been certified by the Contract Administrator as being totally performed to the requirements of the Contract through the issue of a certificate of Total Performance is the date on which Total Performance has been achieved.

## D19. LIQUIDATED DAMAGES

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

(a) Substantial Performance – two thousand dollars ($2,000);

(b) Total Performance – five hundred dollars ($500).

D19.2 The amounts specified for liquidated damages in D19.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve Substantial Performance or Total Performance by the days fixed herein for same.

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

## D20. SCHEDULED MAINTENANCE

D20.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

(a) Turf Areas as specified in E62;

(b) Trees and Shrubs as specified in E63.

D20.2 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

## D21. JOB MEETINGS

D21.1 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.

D21.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.

## D22. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D22.1 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).

## D23. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

D23.1 Further to B12.6, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety and Health Act (Manitoba). At any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require updated proof of compliance, as set out in B12.6.

## MEASUREMENT AND PAYMENT

## D24. PAYMENT

D24.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

## WARRANTY

## D25. WARRANTY

D25.1 Notwithstanding C13.2, the warranty period shall begin on the date of Total Performance and shall expire one (1) year thereafter, except where longer warranty periods are specified in the respective Specification sections, unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.

D25.1.1 For the purpose of the performance security, the warranty period shall be one (1) year.

D25.2 Notwithstanding C13.2, the Contract Administrator may permit the warranty period for a portion or portions of the Work to begin prior to the date of Total Performance if a 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.

D25.2.1 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 D12)

KNOW ALL MEN BY THESE PRESENTS THAT

_____
(hereinafter called the "Principal"), and

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

_____

_____ dollars ($_____.____)

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

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

RFP NO. 838-2013

DESIGN AND CONSTRUCTION OF A SAND AND SALT FACILITY AT THE PUBLIC WORKS EAST YARDS COMPLEX – 960 THOMAS AVENUE

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 D12)

_____
(Date)

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

RE: PERFORMANCE SECURITY – RFP NO. 838-2013

DESIGN AND CONSTRUCTION OF A SAND AND SALT FACILITY AT THE PUBLIC WORKS EAST YARDS COMPLEX – 960 THOMAS AVENUE

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

_____ ,
(Name of Contractor)

_____
(Address of Contractor)

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

_____

_____ Canadian dollars.

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

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

Partial drawings are permitted.

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

_____
(Address)

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

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

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

_____ .
(Date)

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

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

This credit is subject to the Uniform Customs and Practice for Documentary Credit (2007 Revision), International Chamber of Commerce Publication Number 600.

_____
(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

**FORM I: DETAILED PRICES**
(See D14)

DESIGN AND CONSTRUCTION OF A SAND AND SALT FACILITY AT THE PUBLIC WORKS EAST YARDS COMPLEX – 960 THOMAS AVENUE

| Description | Price |
|---|---|
| GENERAL CONDITIONS<br>Part C – General Conditions & Part D – Supplemental Conditions | $ _____ |
| DIVISION 01 – GENERAL REQUIREMENTS | _____ |
| DIVISION 02 – EXISTING CONDITIONS | _____ |
| DIVISION 03 – CONCRETE | _____ |
| DIVISION 04 – MASONRY | _____ |
| DIVISION 05 – METALS | _____ |
| DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES | _____ |
| DIVISION 07 – THERMAL AND MOISTURE PROTECTION | _____ |
| DIVISION 08 – OPENINGS | _____ |
| DIVISION 09 – FINISHES | _____ |
| DIVISION 10 – SPECIALTIES | _____ |
| DIVISION 11 – EQUIPMENT | _____ |
| DIVISION 12 – FURNISHINGS | _____ |
| DIVISION 13 – SPECIAL CONSTRUCTION | _____ |
| DIVISION 14 – CONVEYING EQUIPMENT | _____ |
| DIVISION 21 – FIRE SUPPRESSION | _____ |
| DIVISION 22 – PLUMBING | _____ |
| DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING | _____ |
| DIVISION 25 – INTEGRATED AUTOMATION | _____ |

| | |
|---|---|
| DIVISION 26 – ELECTRICAL | _____ |
| DIVISION 27 – COMMUNICATIONS | _____ |
| DIVISION 28 – ELECTRONIC SAFETY AND SECURITY | _____ |
| DIVISION 31 – EARTHWORK | _____ |
| DIVISION 32 – EXTERIOR IMPROVEMENTS | _____ |
| DIVISION 33 – UTILITIES | _____ |
| DIVISION 34 – TRANSPORTATION | _____ |
| DIVISION 35 – WATERWAY AND MARINE CONSTRUCTION | _____ |
| DIVISION 40 – PROCESS INTEGRATION | _____ |
| DIVISION 41 – MATERIAL PROCESSING AND HANDLING EQUIPMENT | _____ |
| DIVISION 42 – PROCESS HEATING, COOLING, AND DRYING EQUIPMENT | _____ |
| DIVISION 43 – PROCESS GAS AND LIQUID HANDLING, PURIFICATION, AND STORAGE EQUIPMENT | _____ |
| DIVISION 44 – POLUTION AND WASTE CONTROL EQUIPMENT | _____ |
| DIVISION 45 – INDUSTRY-SPECIFIC MANUFACTURING EQUIPMENT | _____ |
| DIVISION 46 – WATER AND WASTEWATER EQUIPMENT | _____ |
| DIVISION 48 – ELECTRICAL POWER GENERATION | _____ |
| **TOTAL** | _____ |

_____
Name of Bidder

Note: Form I lists all current Divisions of MasterFormat 2014, some of which may not be applicable to the Work. The Bidder should enter “0” or “nil” for Divisions not applicable to his proposal.

**FORM J: SUBCONTRACTOR LIST**
(See D13)

DESIGN AND CONSTRUCTION OF A SAND AND SALT FACILITY AT THE PUBLIC WORKS EAST YARDS COMPLEX – 960 THOMAS AVENUE

| Name | Address |
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# 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 |
|---|---|
| L-1001 | Site Plan Layout with Surfacing Materials, Planting Plan and Details |
| C-1001 | Conceptual Site Servicing Plan and Details |
| C-1002 | Existing Partial Site Plan |
| C-4001 | Miscellaneous Details and Cross Sections |
| E-1001 | Electrical Site Plan |
| A-1 | Proposed Building Views |
| A-2 | Proposed Building Plan |
| A-3 | Proposed Building Elevations |
| A-4 | Proposed Building Sections |
| M-1001 | Mechanical Calcium and Sodium Chloride Flow Diagrams |
| M-1002 | Mechanical Control Panel and Sequence of Operation |
| E-1002 | Electrical Floor Plan Category Classification |

| Appendix No. | Content |
|---|---|
| Appendix 1 | Final Preliminary Site Condition Assessment Report – December 2008 |
| Appendix 2 | Background Information – February 2011 |
| Appendix 3 | Soils Quality Assessment – April 2012 |

### E2. SITE INVESTIGATION REPORT

E2.1 Further to C3.1, the geotechnical report in Appendix 1 is provided for reference only. This report was prepared for a previous project in the general area and may not reflect conditions at the Site.

E2.2 The Contractor is responsible for conducting their own investigations for the Work.

## DIVISION 01 GENERAL REQUIREMENTS

### E3. DESIGN

E3.1 Design in accordance with:

(a) the Contract;

(b) all applicable laws, by-laws, regulations, codes and standards;

(c) the City of Winnipeg Universal Design Policy; and

(d) the City of Winnipeg Accessibility Design Standard.

## E4. CONSTRUCTION DOCUMENTS

E4.1 Provide Construction Documents that describe details of the design required for the Work.

E4.1.1 Provide Construction Drawings in printed copy and electronic (pdf). Provide "As-Built" Construction Drawings in printed copy and AutoCAD format.

E4.1.2 Provide Construction Specifications in CSI/CSC MasterFormat 2012 format.

E4.1.3 All Contract Documents shall be signed and sealed by the Contractor's Engineer.

E4.1.4 Provide Construction Specifications in electronic Microsoft Word format on 216 x 279 mm sheets (8½" x 11").

E4.1.5 The complete working drawings shall be done on computer using AutoCAD 2000 or later format. Drawing layering standards shall conform to American Institute of Architects (AIA) long format layering convention. Maximum standard size of drawings shall be metric sheet size A1 (594 x 841mm) with standard smaller sizes to be A4 (210 x 297 mm) sheets.

E4.2 During the progress of the Work, submit Construction Documents to the Contract Administrator. At the time of submission notify the Contract Administrator in writing of any deviations in the Construction Documents from the requirements of the Contract.

E4.3 The Contract Administrator will review the Construction Documents with reasonable promptness so as to cause no delay. The Contract Administrator's review is for conformity to the intent of the Contract and shall not relieve the Contractor of the responsibility for errors or omissions in the Construction Documents or for meeting all requirements of the Contract unless the Contract Administrator expressly accepts in writing a deviation from the Contract.

E4.4 No later than five (5) Business Days after completing the review, the Contract Administrator will notify the Contractor in writing that the City has accepted the Construction Documents or shall notify the Contractor, giving reasons in writing, why the City rejects the Construction Documents. The Contractor shall revise and resubmit Construction Documents which the City has rejected.

E4.5 When the Construction Documents are accepted by the City, the documents will be signed by the appropriate City Authorities and the Contractor, and the Construction Documents shall become part of the Contract.

E4.6 Further to GC:2.4, in event of conflicts between portions of the Contract and the Construction Documents, the Contract shall govern unless these conflicts have been expressly overridden in writing by the Contract Administrator.

## E5. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

E5.1 Further to CW1110, provide Shop Drawings, product data and samples as required by the Contract or as may reasonably be requested by the Contract Administrator.

E5.1.1 Shop Drawings shall be originals prepared by Contractor, Subcontractor or product manufacturer. Submit reproducible transparency and four (4) opaque prints of each Shop Drawing to the Contract Administrator for review. Sepia will be returned to Contractor following review.

E5.2 Have Shop Drawings, product data and samples reviewed and approved in writing by Contractor's Engineer.

E5.3 Submit two copies of approved Shop Drawings, product data and samples to the Contract Administrator for review.

E5.4 The Contract Administrator's review is for conformity to the intent of the Contract and for general arrangement only. The Contract Administrator's review shall not relieve the Contractor of the responsibility for errors or omissions in the Shop Drawings or for meeting all requirements of the Contract unless the Contract Administrator expressly accepts a deviation from the Contract in writing.

## E6. CODES AND STANDARDS

E6.1 Do all Work in conformance with the National Building Code, the Manitoba Building Code, the Manitoba Fire Code, the Manitoba Electrical Code and all other applicable Federal, Provincial, and Municipal codes, by-laws, and regulations.

## E7. REFERENCES

E7.1 Within the text of the Specifications, reference may be made to the following codes, standards and organizations:

| | |
|---|---|
| AIA | American Institute of Architects |
| AMCA | Air Movement and Control Association International, Inc. |
| ANSI | American National Standards Institute |
| ASHRAE | American Society of Heating, Refrigerating and Air Conditioning Engineers |
| ASTM | ASTM International (formerly American Society for Testing and Materials) |
| CAN | National Standard of Canada |
| CEC | Canadian Electrical Code |
| CGSB | Canadian General Standards Board |
| CISC | Canadian Institute of Steel Construction |
| CSA | Canadian Standards Association |
| CSC | Construction Specifications Canada |
| CSDMA | Canadian Steel Door Manufacturers Association |
| CSI | Construction Specifications Institute |
| ISA | Instrumentation, Systems, and Automation Society |
| ISEA | International Safety Equipment Association |
| ISO | International Organization for Standardization |
| MPI | Master Painters Institute |
| NBC | National Building Code of Canada |
| NEMA | National Electrical Manufacturers Association |
| RSIC | Reinforcing Steel Institute of Canada |
| SI | International System of Units |
| TAC | Transportation Association of Canada |
| TIAC | Thermal Insulation Association of Canada |

E7.2 Unless otherwise required by code, by-law or regulation, conform to the latest edition or revision of referenced standards, including amendments and revisions.

## E8. QUALITY MANAGEMENT

E8.1 Adhere to quality management plan submitted in Proposal Submission.

E8.1.1 Quality management plan to be consistent with:

(a) Contractor's general quality management system.

(b) Subcontractors' general quality management systems.

(c) Contractor's Engineer's general quality management system.

(d) Requirements of City of Winnipeg Standard Construction Specifications.

## E9. ENVIRONMENTAL PROTECTION PLAN

E9.1 The following environmental protection measures shall apply to the Work:

(a) Materials Handling and Storage

(i) Storage of construction materials and equipment shall be confined within a fenced area or at a location approved by the Contract Administrator with environmental protection (e.g., silt fence) as appropriate.

(ii) Construction materials shall not be deposited or stored on or near watercourses including land drainage sewer inlets unless written acceptance from the Contract Administrator is received in advance.

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

(iv) Construction materials and debris shall be prevented from entering watercourses. In the event that materials and/or debris inadvertently enter the land drainage system, the Contractor shall 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 shall obtain all necessary permits from Manitoba Conservation and Water Stewardship for the handling and storage of fuel products and shall provide copies to the Contract Administrator.

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

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

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

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

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

(vii) When servicing requires the drainage or pumping of fuels, lubricating oils or other fluids from equipment, a groundsheet of suitable material (such as HDPE) and size shall be spread on the ground to catch the fluid in the event of a leak or spill.

(viii) 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 shall be distinctly marked and kept clear of snow and debris to allow for routine inspection and leak detection.

(x) Machinery is to arrive on Site in a clean condition and is to be maintained free of fluid leaks.

(xi) A sufficient supply of materials, such as absorbent material and plastic oil booms, to clean up minor spills shall be stored nearby on Site. The Contractor shall ensure that additional material can be made available on short notice. Additionally, appropriate staff on Site shall be trained 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 shall be kept clean and orderly at all times and at the completion of construction.

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

(iii) The Contractor shall, during and at the completion of construction, clean up the construction area and all resulting debris shall be deposited at a Waste Disposal Ground operating under the authority of 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 shall be removed on a weekly basis.

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

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

(vii) No burning of waste or other materials is permitted.

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

(ix) Runoff from a waste storage area shall not be allowed to cause siltation of a watercourse.

(x) Waste storage areas shall be left in a neat and finished appearance and/or restored to their original condition to the satisfaction of the Contract Administrator.

(d) Dangerous Goods/Hazardous Waste Handling and Disposal

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

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

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

(iv) Different waste streams shall not be mixed.

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

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

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

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

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

(x) Runoff from a dangerous goods/hazardous waste storage area shall not be allowed to cause siltation of a watercourse.

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

(e) Emergency Response

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

(ii) The Contractor shall report all major spills of petroleum products or other hazardous substances with significant impact on the environment and threat to human health and safety (as defined in Table 1 below) to Manitoba Conservation and Water Stewardship, immediately after occurrence of the environmental accident, by calling the 24-hour emergency phone number (204) 944-4888.

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

(iv) The following actions shall be taken by the person in charge of the spilled material or the first person(s) arriving at the scene of a hazardous material accident or the on Site emergency response 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 and Water Stewardship 24-hour Spill Response Line (204) 944-4888, 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 shall ensure that all environmental accidents involving contaminants shall be documented and reported to Manitoba Conservation and Water Stewardship according to The Dangerous Goods Handling and Transportation Act Environmental Accident Reporting 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 and Water Stewardship.

(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 and Water Stewardship [(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 1 L |
| Packing Group III | Oxidizer | 50 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) Noise generating activities shall be limited to the hours indicated in the City of Winnipeg Neighbourhood Liveability By-law No. 1/2008. The activities shall 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 shall be permitted for pile driving activities.

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

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

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

(g) Dust and Emissions

(i) Construction vehicles and machinery shall be kept in good working order by the Contractor through the use of inspection and maintenance.

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

(iii) Dust control practices implemented by the Contractor during construction shall 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 shall be used for dust control. The use of waste petroleum or petroleum by-products is not permitted.

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

(vi) Stockpiled soils shall be wetted down or covered with tarpaulin covers to prevent the creation of dust, when appropriate.

(h) Erosion Control

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

(ii) Effective sediment and erosion control measures (e.g., straw mulch, erosion control blankets, interceptor ditches) shall be used both during construction and until vegetation is re-established to prevent sediment-laden runoff from entering watercourses.

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

(iv) The disturbed surface shall 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.

(v) 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.

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

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

(i) Runoff Control

(i) Measures shall be undertaken to ensure that runoff containing suspended soil particles is minimized from entering the 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 shall be dyked to redirect surface runoff around the area prior to spring runoff.

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

(iv) Soil and fill shall not be stockpiled on immediate watercourse bank areas.

(j) Construction Traffic

(i) Large equipment shall be equipped with flashing beacons and/or an audible “back up” warning device that is audible when the transmission is in reverse.

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

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

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

(k) Access

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

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

E9.2 The Environmental Protection Plan shall be considered incidental to the Work and as such no measurement or payment will be made for this item.

## E10. TEMPORARY TREE AND PLANT PROTECTION

E10.1 Take the following precautionary steps to prevent damage from construction activities to existing trees within the limits of the construction area:

(a) Do not stockpile materials and soil or park vehicles and equipment within 2 metres of trees.

(b) Protect trees identified by the Contract Administrator to be at risk by strapping with 25 x 100 x 2400mm wood planks, or as otherwise approved by the Contract Administrator.

(c) Perform excavation to minimize damage to the existing root systems. Where possible, keep edge of excavation a minimum distance of 18 times the diameter of the tree from the closest edge of the trunk. Where roots must be cut to facilitate excavation, prune neatly at the face of excavation.

(d) Minimize operation of equipment within the dripline of the trees. Do not park, repair or refuel equipment within the driplines of trees. Do not store construction materials within the driplines of trees. Do not stockpile earth materials 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.

(e) Ensure that the operations do not cause flooding or sediment deposition on areas where trees are located.

(f) Minimize damage to existing tree branches. Where damage to branches does occur, prune neatly.

E10.2 Repair damage to existing trees caused by the Contractor's activities to the requirements and satisfaction of the Contract Administrator and the City Forester or his designate.

E10.3 Elm trees cannot be trimmed between April 1 and July 31, inclusive.

## E11. COMMON PRODUCT REQUIREMENTS

E11.1 Where possible, provide same make and model of products as installed elsewhere in the Public Works East Yards.

E11.2 Use materials and products suitable for the intended application.

## E12. CITY-FURNISHED PRODUCTS

E12.1 The City will furnish:

(a) one used Accubrine automated brine maker.

(b) two used 20,000 litre salt brine tanks

(c) two used 20,000 litre calcium chloride tanks.

(d) dispensing equipment: 2 manual valves, 2 meters, and 2 hose (one set for salt brine dispensing; one set for calcium chloride dispensing)

located at 849 Ravelston Ave. W.

E12.2 Inspect City-furnished products at 849 Ravelston Ave. W. in Contract Administrator's presence. Identify any existing damage or deficiencies to Contract Administrator in writing. Obtain Contract Administrator's acceptance of damage report before taking possession of products.

E12.3 Remove and transport City-furnished products to Site for reuse.

E12.3.1 Remove City-furnished products from 849 Ravelston Ave W. by date specified in D16.1. If necessary, store on Site or elsewhere until installation.

## E13. OPERATION AND MAINTENANCE DATA

E13.1 Prepare and submit to the Contract Administrator three (3) copies of detailed operation and maintenance manuals. Include the following information:

(a) Table of Contents listing each section by number, title as shown on divider tabs. List Appendices separately.

(b) Maintenance instructions for finished surfaces and materials.

(c) Copy of hardware and paint schedules.

(d) Description, operation, maintenance and lubrication instructions, including daily, weekly, monthly, semi-annual and annual checks for equipment and systems, including complete list of equipment. Indicate nameplate information such as make, size, capacity and serial number.

(e) General overall equipment layouts with details of each unit with parts list, complete with a list of recommended spare parts.

(f) Detailed instructions on adjustment of wear and replacement of parts.

(g) Names, addresses and telephone numbers of installing Contractors and local service representatives.

(h) Guarantees and warranties showing:

(i) Name and address of project.

(ii) Guarantee/warranty commencement date (date of Total Performance of the Work).

(iii) Duration of guarantees(s).

(iv) Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.

(v) Signature and seal of Contractor.

(i) Manufacturer's literature shall show the name, address and telephone number of the local agent or supplier.

(j) Final Shop Drawings in the appropriate sections, indicating corrections and changes made during fabrication and installation. Bind Shop Drawings in manuals such that drawings may be used without dismantling manuals.

E13.1.1 Insert sheets larger than 280mm x 430mm in plastic sleeves complete with identification as to drawing title and number.

E13.2 Submit three (3) copies of draft Operation and Maintenance Manual to Contract Administrator for approval. Submission of individual data will not be accepted unless so directed by the Contract Administrator.

E13.3 Make changes as required and re-submit as directed by the Contract Administrator.

## E14. PROJECT RECORD DOCUMENTS

E14.1 Keep one record copy of all Specifications, Drawings, Addenda, Construction Documents, Operation and Maintenance Manuals, Shop Drawings and samples at the Site in good order and record thereon all changes made during the construction of the Work as they occur. Make record copies available to the Contract Administrator during construction and deliver to the Contract Administrator upon completion of the Work.

E14.2 Prior to Total Performance the Contractor shall prepare and deliver to the Contract Administrator:

(a) One complete (1) set of "As-built" Construction Documents in hard copy and on electronic media (CD or DVD);

(b) a complete full-size set of hard copy "As-built" Construction Drawings on mylar;

(c) four sets of instruction manuals each consisting of installation data, parts list, operating instruction and recommended maintenance procedures (Operation and Maintenance Manuals).

E14.2.1 Total Performance of this Contract will not be achieved until the City has received all "As built" drawings, Operation and Maintenance Manuals to the satisfaction of the Contract Administrator.

## E15. SPARE PARTS

E15.1 Provide spare parts as indicated.

## E16. DEMONSTRATION AND TRAINING

E16.1 At least 60 Calendar Days before anticipated date of Substantial Performance, submit detailed demonstration and training plan to Contract Administrator for review and approval.

E16.2 Adhere to approved demonstration and training plan.

## E17. COMMISSIONING

E17.1 At least 60 Calendar Days before anticipated date of Substantial Performance, submit detailed commissioning plan to Contract Administrator for review and approval.

E17.2 Adhere to approved commissioning plan.

# DIVISION 02 EXISTING CONDITIONS

## E18. GEOTECHNICAL INVESTIGATION

E18.1 Conduct geotechnical investigation as required.

## E19. REMOVAL AND SALVAGE OF EXISTING CHAIN LINK FENCE

E19.1 Remove and salvage existing chain link fence as required for the Work.

E19.2 Reuse salvaged materials if authorized by the Contract Administrator.

E19.3 Placed unused salvaged materials into storage on Site as directed by the Contract Administrator.

## DIVISION 03 CONCRETE

### E20. CONCRETE

E20.1 Provide cast-in-place concrete foundations, slabs, walls and buttresses as indicated on the Drawings.

E20.2 Do Work to:

(a) CSA A23.1, Concrete Materials and Methods of Concrete Construction.

(b) CSA A23.2, Methods of Test for Concrete

(c) CSA A23.3, Design of Concrete Structures (Structures Design)

(d) CSA A23.4, Precast Concrete – Materials and Construction

(e) CSA A3001, Cementitious Materials for Use in Concrete

(f) CSA G30.18, Carbon Steel Bars for Concrete Reinforcement

(g) RSIC Reinforcing Steel Manual of Standard Practice

E20.3 Design requirements:

(a) Coordinate design with design of framed fabric structure (Division 13) and design of pile foundations (Division 31).

(b) Coordinate concrete and reinforcement with base plates and location of anchors. Anchor bolts shall be farther from the exterior face of concrete than reinforcing steel.

(c) Top of building floor slab: nominal elevation 233.300 m AMSL; coordinate with asphaltic concrete floor and roads (Division 32); obtain Contract Administrator's approval.

(d) Concrete to Exposure Class C-1.

(e) Floor Sealer to concrete floor slabs in; Brine Room, Chemical Tank Area, drive through slab, and approach slabs.

E20.4 Submit Shop Drawings bearing the seal of a Professional Engineer registered in the Province of Manitoba.

### E21. ASPHALTIC CONCRETE FLOOR

E21.1 Provide asphaltic concrete floor inside building as indicated on the Drawings.

E21.2 Do Work to CW 3410 - Asphaltic Concrete Pavement Works.

E21.3 Design requirements:

(a) Top of asphaltic concrete floor: nominal elevation 233.300 m AMSL; coordinate with cast-in-place concrete and roads (Division 32); obtain Contract Administrator's approval.

## DIVISION 05 METALS

### E22. GENERAL REQUIREMENTS

E22.1 Isolate dissimilar metals.

E22.2 Isolate aluminum from Portland cement concrete

### E23. METAL SUPPORT ASSEMBLIES

E23.1 Provide metal support assemblies for all building and process components including but not limited to plumbing, HVAC, electrical, and process equipment.

E23.2 Design requirements:

(a) Coordinate design with design of framed fabric structure (Division 13).

E23.3 Materials: stainless steel or hot-dip galvanized steel.

## DIVISION 07 THERMAL & MOISTURE PROTECTION

### E24. INSULATION

E24.1 Provide 50 mm Concrete Faced Insulation (CFI) board for interior walls and underside of roof of Brine Room.

## DIVISION 08 OPENINGS

### E25. STEEL DOORS AND FRAMES

E25.1 Provide steel doors and frames in locations indicated on the Drawings:

E25.2 Provide steel doors and frames to:

(a) CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames

(b) CSDMA Recommended Selection and Usage Guide for Commercial Steel Door and Frame Products

(c) CSDMA Recommended Specifications for Commercial Steel Door and Frame Products.

(d) CSDMA Canadian Fire Labeling Guide for Commercial Steel Doors and Frames

(e) CSDMA Guide Specification for Installation and Storage of Hollow Metal Doors and Frames

E25.2.1 Where possible, provide same make and model of doors and frames as installed elsewhere in the Public Works East Yards.

E25.3 Design requirements:

(a) Exterior frame assembly to accommodate expansion and contraction when subjected to minimum and maximum surface temperature of -40°C to 35°C.

(b) Deflection for exterior steel entrance doors under wind load of 1.2 kPa not to exceed 1/175 of span.

(c) Insulated doors to Brine Room.

E25.4 Materials: Hot dipped galvanized steel sheet to ASTM A653/A653M, ZF275; minimum base steel thickness in accordance with CSDMA Table 1 – Thickness for Component Parts.

E25.5 Submit Shop Drawings including:

(a) Each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, arrangement of hardware and finishes.

(b) Each type frame material, core thickness, reinforcements, location of anchors and exposed fastenings finishes.

(c) Schedule identifying each unit, with door marks and numbers.

### E26. OVERHEAD COILING METAL DOOR

E26.1 Provide exterior grade overhead coiling metal door with operators in location indicated on the Drawings or as directed by Contract Administrator.

E26.2 Materials:

(a) Door face: hot dipped galvanized steel sheet to ASTM A653/A653M, ZF275.

(b) Ferrous hardware items, other than stainless steel: hot dipped galvanized to ASTM A123/A123M Coating Grade 45.

E26.3 Submit Shop Drawings including:

(a) dimensions

(b) service rating

(c) materials

(d) operating mechanisms

(e) hardware and accessories

(f) required clearances

(g) electrical connections.

E26.4 Include operation and maintenance data in operations and maintenance manual.

E26.5 Provide spare parts:

(a) Curtain slats (installed or separately): 1 metre.

(b) Bottom bar: 1

(c) Weatherstripping: 2 sets

E26.6 Operation by:

(a) Electric motor operator.

(b) Manual operator.

## E27. OVERHEAD SECTIONAL METAL DOORS

E27.1 Provide exterior grade overhead sectional metal doors with operators in locations indicated on the Drawings or as directed by Contract Administrator.

E27.1.1 If possible, provide same make and model of sectional doors and operators as installed elsewhere in the Public Works East Yards.

E27.2 Design requirements:

(a) Horizontal deflection under wind load of 1 kPa not to exceed 1/240 of opening width.

(b) Withstand minimum 2000 cycles per annum, and 25 years total life cycle.

E27.3 Materials:

(a) Door face: hot dipped galvanized steel sheet to ASTM A653/A653M, ZF275, prefinished with minimum 22 micron factory-applied polyvinylidene fluoride.

(b) Ferrous hardware items, other than stainless steel: hot dipped galvanized to ASTM A123/A123M Coating Grade 45.

E27.4 Submit Shop Drawings including:

(a) dimensions

(b) service rating

(c) materials

(d) operating mechanisms

(e) glazing locations and details

(f) hardware and accessories

(g) required clearances

(h) electrical connections.

E27.5 Include operation and maintenance data in operations and maintenance manual.

E27.6 Provide spare parts:

(a) Door panels: 8.

(b) Door rollers: 12.

(c) Weatherstripping: 4 sets

(d) Springs and cables: 2 sets.

E27.6.1 Deliver spare parts to location determined by the Contract Administrator. Store where directed. Identify each part and reference to appropriate door.

E27.7 Operation by:

(a) Chain hoist with galvanized steel chain.

(b) Cable fail safe device able to stop door immediately if cable breaks on door free fall.

(c) Jack shaft side mounted type electric motor operator.

## E28. DOOR HARDWARE

E28.1 Provide hardware for all doors and frames:

(a) Exterior man doors:

(i) Heavy duty, corrosion-resistant hardware

(ii) Weather stripping and threshold sweep/seal

(iii) Keyed locksets

(b) Interior doors:

(i) Heavy duty, corrosion-resistant hardware

(ii) Weather stripping and threshold sweep/seal

(iii) Brine Room: card access

E28.1.1 Where possible, provide same make and model of hardware as installed elsewhere in the Public Works East Yards.

# DIVISION 09 FINISHES

## E29. PAINTING AND COATING

E29.1 Provide paint and coatings to suit substrates and exposure.

E29.2 Do Work to MPI Architectural Painting Specification Manual.

E29.3 Where relevant type or category of product is included in MPI Approved Products List, provide listed approved product.

# DIVISION 10 SPECIALTIES

## E30. FIRE EXTINGUISHERS

E30.1 Provide portable fire extinguishers to National Fire Code of Canada as amended by Manitoba Fire Code.

# DIVISION 13 SPECIAL CONSTRUCTION

## E31. FRAMED FABRIC STRUCTURE

E31.1 Provide framed fabric structure and enclosure to dimensions shown on Drawings.

E31.2 Design Requirements:

(a) Non-combustible or combustible construction in accordance with the National Building Code of Canada for use and occupancy specified.

(b) Fire resistive building elements in accordance with the National Building Code of Canada for use and occupancy specified.

(c) Generally, the building is intended for sand and salt storage.

(d) The building shall be a clear span, totally enclosed weather-tight building, with no exterior purlins or exterior guy ropes or cables for anchoring the structure.

(e) The building shall be a clear span, stressed membrane structure approximately 30 m wide by 86 m long with a 3.6 high concrete base wall (4.3 m high base wall at Brine Room) and deep pile foundation.

(f) The centre line interior height of the building shall be 15.0 m or greater with a minimum 6.0 m clearance within 0.9 m of the side of the building.

(g) The building shall be constructed with vertical end walls to maximize space usage.

(h) Design building to allow for thermal movement of component materials caused by ambient temperature range of 80 deg. C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.

(i) Provide for positive drainage of rain and snow melt to exterior face to prevent water entering at joints.

(j) Design for location based on minimum hourly velocity pressure of 0.42 kPa for 1/30 probability. In addition to uniform live load, design for full live load on leeward half of building frame and zero live load on windward half.

(k) Design building enclosure elements to accommodate movements without permanent distortion, damage to infills, racking of joints, breakage of seals or water penetration.

(l) Design deep pile foundations in accordance with NBC requirements and in accordance with the recommendations identified by the geotechnical investigation conducted pursuant to E8.1.

(m) Coordinate design of base plates and location of anchors for framed fabric structure with design of concrete foundations, walls and buttresses. Anchor bolts shall be farther from the exterior face of concrete than reinforcing steel.

(n) Design, assemble and secure building elements to building frame to ensure stresses in sealants and seals are within manufacturer's recommended maximum.

(o) Design building assembly to permit easy replacement of components.

(p) Openings generally to sizes and locations indicated on Drawings. Coordinate exact sizes and locations with other Divisions.

(q) Allow for HVAC (Division 23), Electrical (Division 26) and other dead loads imposed on this structure.

E31.3 Performance Requirements:

(a) Maximum deflection for framed fabric structure under full specified live load: 1/180 of clear span.

(b) Maximum deflection for fabric under full specified exterior wind induced loads: 1/90 of clear span.

(c) Maintain following fabrication and erection tolerances for building structure and enclosure elements.

(i) Maximum variation from plane or location shown on Shop Drawings: 1 mm/1 m of length and up to 1 mm/5 m maximum.

(ii) Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.75 mm.

E31.4 Submit Shop Drawings bearing the seal of a Professional Engineer registered in the Province of Manitoba.

(a) Indicate plans and grid lines, structural members and connection details, bearing, anchorage and embedment details, stressed membrane, framed openings, accessories, schedule of materials and finished, camber and loadings, fasteners and welds.

(b) Indicate detailed description of mechanical, electrical and other systems in work.

(c) Before construction, submit for review erection drawings indicating dimensions and methods.

E31.5 Provide three (3) year warranty for framed fabric structure. Provide ten (10) year pro-rated warranty for fabric.

E31.6 Materials:

(a) Main structural components shall be steel, or aluminum:

(i) Steel structural components: galvanized steel with corrosion resistant coatings; Allied Tube &Conduit Corp. Gatorshield Galvanized Steel Tubing. Treat welded connections with corrosion resistant finish equal to original product.

(ii) Aluminum structural components: extruded 6061 aluminum alloy; isolate from contact with concrete with 2 coats of bituminous paint.

(b) Threaded fasteners:

(i) For steel structural components: to ASTM A325, minimum Grade 5, hot-dip galvanized.

(ii) For aluminum structural components: Type 316 stainless steel bolts; isolate from contact with concrete by coating with 2 coats of bituminous paint.

(c) Fabric:

(i) Woven HDPE scrim with LDPE coating; Intertape Polymer Group NovaShield II with ArmorKote FRU88X-6, 400.

(ii) White

(iii) Minimum 10 year pro-rated warranty.

## DIVISION 22 PLUMBING

### E32. GENERAL REQUIREMENTS

E32.1 Do Work to applicable codes and bylaws including the National Plumbing Code, Manitoba Plumbing Code Regulation 32/2011, and City of Winnipeg bylaws.

E32.2 All domestic water plumbing shall be copper pipe, and brass or copper fittings.

E32.3 All DWV systems shall be ABS or PVC piping and fittings.

### E33. FLOOR DRAINS

E33.1 Provide building floor drains, trench drains and catchbasins as indicated on Drawings.

E33.1.1 Connect drains to catchbasins connected to wastewater sewer system.

### E34. EYEWASH EQUIPMENT

E34.1 Provide tepid water eyewash station in Brine Room to ANSI/ISEA Z358.1.

E34.1.1 Provide suitable tempering valve to maintain water temperature at the eyewash at approximately 27ºC.

E34.1.2 Provide electric hot water tank heater, located adjacent to the eyewash station, with capacity for the required flow rate and duration, with recovery within 2 hours of use of the eyewash station.

E34.1.3 Station may drain directly onto floor.

## DIVISION 23 HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

### E35. GENERAL REQUIREMENTS

E35.1 Provide complete functional ventilation system.

E35.2 Provide electric heating for Brine Room.

E35.3 Mount HVAC equipment in Mechanical/Electrical Equipment Fixture Zone (see Drawing A-4).

### E36. DESIGN

E36.1 Design parameters:

(a) Outdoor

(i) Winter: $T_{db}$= -34°C (January 1%) $T_{db\ extreme}$ = - 40°C

(ii) Summer: $T_{db}$= 30°C $T_{wb}$= 22°C (July 2.5%)

(iii) Rainfall: D= 28 mm based on 15 minute rainfall

(b) Indoor

(i) Main Area: $T_{db\ Min.}$ = Ambient – unheated $T_{db\ Max}$ = Ambient – no cooling

(ii) Brine Room: $T_{db\ Min.}$ = 15°C – heated $T_{db\ Max}$ = Ambient – no cooling

E36.2 Design requirements – General:

(a) Equipment locations indicated on the Drawings are approximate only. Coordinate equipment location with the building structure and features, and lighting arrangement.

(b) Maximum individual equipment noise level: 75 dBA at 1 metre.

(c) Use corrosion resistant materials suitable for the intended use of the building.

E36.3 Design requirements – Main Area:

(a) Design to limit contaminants to less than Occupational Exposure Limits (OEL) when the storage facility is at maximum stockpile level, with minimal airspace in the building:

(i) CO: less than 25ppm

(ii) NO: less than 25ppm and

(b) Contaminant generation calculation and ventilation design based on diesel exhaust emissions from:

(i) Semi-tractor up to 300 hp idling 15 minutes per hour, and

(ii) One 175 hp loader operating 1 out of 2 hours, using average of 50 hp.

(c) Natural ventilation from airspace between fabric roof and building walls, and from open doors.

(d) Mechanical ventilation shall activate upon reaching ½ of either of the above OEL.

(e) End wall exhaust fans with gravity back draft dampers.

(f) Opposite end wall louvered or hooded air intakes, without dampers.

(g) Provide supports and frame openings for fans and louvers/hoods without load on fabric. Seam and fasten fabric to framing of openings.

E36.4 Design requirements – Brine Room:

(a) Supply outside air, based on regular ASHRAE 62.1 warehouse type occupancy requirements of 0.3 litres per second per square metre.

(b) Ventilation actuated to operate when room lighting switch is on.

(c) Outside air supply fan for salt dust control when filling hopper.

(i) Fan to provide additional minimum airflow of 2,100 L/s.

(ii) To be operated from 0 – 30 minute mechanical timer adjacent to overhead door, or automatic timer synchronized with opening of overhead door.

(d) Room pressure relief gravity damper discharging through east wall into Sand Storage area suitable for full flow from both fans with less than 25Pa restriction.

(e) Electrical unit heaters with common wall thermostat.

(f) Heating capacity for design set point space heat losses and for heat losses for outside air occupancy supply identified in (a) above. Heating capacity not required to include for heat loss for additional airflow identified in (c) above.

E36.5 Submit design calculations confirming sufficient ventilation to remain below stated OEL limits.

E36.6 Submit Shop Drawings for including:

(a) Dimensions and free area.

(b) Noise level and throw characteristics at the specified air volumes.

(c) Mounting methods.

(d) Finish.

(e) Accessories.

## DIVISION 26 ELECTRICAL

### E37. GENERAL REQUIREMENTS

E37.1 Provide complete functional electrical systems including but not limited to:

(a) Connections to existing central distribution panel CDP “700”.

(b) New distribution panel: 347/600 V (See Drawing E-1001)

(c) New transformer: minimum 45 kVA transformer, 600V to 120/208 V including concrete pad (See Drawing E-1001)

(d) New power panel: 120/208 V, 3 phase, 4 wire, minimum 200 A main lug

(e) Electrical power supply for:

(i) Door operators (Division 08)

(ii) Eyewash station and water heater (Division 22)

(iii) HVAC (Division 23)

(iv) Access control

(v) CCTV

(vi) Electronic safety and security (Division 28)

(vii) Process instrumentation and controls (Division 40)

(viii) Process equipment (Division 43)

(f) Convenience receptacles.

(g) Building interior lighting.

(h) Building emergency lighting and exit signs.

(i) Building exterior lighting.

(j) Yard lighting.

E37.2 Do Work in accordance with Canadian Electrical Code (CEC).

E37.3 Mount electrical equipment in Mechanical/Electrical Equipment Fixture Zone (see Drawing A-4).

E37.4 Provide as-built single line diagram.

## E38. DESIGN

E38.1 Design Basis:

(a) Main Service Capacity

(i) 347/600V, 3 phase, 4 wire, 225A main bus with 200A main breaker distribution panel is fed from a minimum 100A circuit breaker in existing CDP “700”. Existing CDP “700” panel is located in fleet maintenance building in Public Work East Yard Complex.

(ii) 120/208V, three phase, 4 wire, and 200A main lug only panel is powered from a minimum 60A circuit breaker in 347/600V distribution panel via a minimum 45KVA transformer (600V to 120/208V).

E38.2 Design Parameters:

(a) Entire area in building is considered Category 2 as defined by Section 22 of the CEC.

(b) Electrical System Capacity, future considerations: 30KVA at 600V spare; 20KVA at 208V spare

(c) Equipment sizing and feeder capacity: 600V, minimum 100A cable (#4/0 AWG or bigger cable to allow for voltage drop) from CDP panel to 347/600V distribution panel. Submit voltage drop calculation to 208V branch circuit level. Maximum voltage drop from consumer terminals to utilization point is 4%.

(d) System flexibility, ease of maintenance: transformer and panels located outside building

(e) Service Ground: transformer secondary neutral points shall be solidly grounded wye with ground rods

(f) Voltages: 347/600V, 3 phase, 4 wire and 120/208V 3 phase, 4 wire system

(g) Provide surge suppression for electronic systems at service entrance from existing building and service entrance of new building.

E38.3 Provide identification for:

(a) Panelboards

(b) Terminal cabinets, junction boxes, and pull boxes

(c) Transformers

(d) Receptacles

(e) Conduit, cables, and wiring

(f) Other equipment as required

E38.3.1 Identify electrical equipment with nameplates as follows:

(a) Lamicoid 3 mm thick plastic engraving sheet, black face, black white core, mechanically attached with self tapping screws.

| NAMEPLATE SIZES | | | |
|---|---|---|---|
| Size 1 | 10 x 50 mm | 1 line | 3 mm high letters |
| Size 2 | 12 x 70 mm | 1 line | 5 mm high letters |
| Size 3 | 12 x 70 mm | 2 lines | 3 mm high letters |
| Size 4 | 20 x 90 mm | 1 line | 8 mm high letters |
| Size 5 | 20 x 90 mm | 2 lines | 5 mm high letters |
| Size 6 | 25 x 100 mm | 1 line | 12 mm high letters |

| | | | |
|---|---|---|---|
| Size 7 | 25 x 100 mm | 2 lines | 6 mm high letters |

(b) Wording on nameplates to be approved by Contract Administrator prior to manufacture.

(c) Allow for average of twenty-five (25) letters per nameplate.

(d) Disconnects, starters and contactors: indicate equipment being controlled and voltage.

(e) Terminal cabinets, junction boxes, pull boxes: indicate system and voltage.

(f) Transformers: indicate capacity, primary and secondary voltages.

(g) Receptacles: indicate circuit number.

E38.4 Identify conduit and cable Identification with colour code plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

E38.4.1 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

| | **Prime** | **Auxiliary** |
|---|---|---|
| Up to 250 V | Yellow | |
| Up to 600 V | Yellow | Green |
| Up to 5 kV | Yellow | Blue |
| Up to 15 kV | Yellow | Red |
| Telephone | Green | |
| Other | Green | Blue |
| Communication Systems | | |
| Fire Alarm | Red | |
| Emergency | Red | Blue |
| Voice | | |
| Other | Red | Yellow |
| Security Systems | | |

E38.4.1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

(a) Maintain phase sequence and colour coding throughout.

(b) Colour code: to CSA C22.1.

## E39. EQUIPMENT DISCONNECTS

E39.1 Coordinate with equipment.

## E40. PANEL BOARDS

E40.1 Provide two panel boards as indicated on Drawings.

## E41. CONVENIENCE RECEPTACLES

E41.1 Provide:

(a) one duplex receptacle inside building adjacent to each man door.

(b) one duplex receptacle at each corner inside building.

(c) duplex receptacles evenly spaced not more than 30 metres apart along inside perimeter of Salt Storage area and Sand Storage area.

(d) duplex receptacles evenly spaced not more than 5 metres apart along inside perimeter of Brine Room and Chemical Tank Area.

E41.1.1 Provide device mounted weatherproof receptacle covers with self-closing caps.

## E42. WIRE, CABLE, CONDUIT AND CONDUIT FITTINGS

E42.1 Design Requirements

(a) Conduit buried below grade to be PVC.

(b) Conduit in building to be surface mounted PVC complete with PVC fittings.

(c) Use stainless steel or PVC mounting hardware for all electrical conduits.

(d) Run electrical conduit at locations to minimize risk of damage from operations.

(e) In Sand Storage area and Salt Storage area, route conduit and locate receptacles 150 mm below the top of the concrete wall to avoid damage from sand and salt pile.

(f) Provide sleeves where conduits pass through concrete.

(g) Motor connections to be PVC jacketed watertight flexible metal conduit.

## E43. INSTALLATION OF CABLES IN TRENCHES AND IN DUCTS

E43.1 Do excavating and backfilling to Section CW 2030 - Excavating, Trenching and Backfilling.

E43.2 Provide cable protection and markers:

(a) Cable protection: 38 x 140 mm planks pressure treated with 5% pentachlorophenol solution, water repellent preservative.

(b) Trench cable markers: 75 mm wide yellow foil backed buried utility marking tape. Buried at 300 below finished grade.

## E44. BUILDING INTERIOR LIGHTING

E44.1 Illuminate Sand Storage area, Salt Storage area and Chemical Tank Area with metal halide HID or LED lights to a minimum of 100 lux average at 1500mm above finished floor. Mount luminaries in Mechanical/Electrical Equipment Fixture Zone (see Drawing A-4).

E44.1.1 Controlled by manual control switch, motion sensor and photoelectric sensor. Provide auto/off/on override for maintenance. Zone switching: minimum of 4 zones. Controls shall be adjustable for motion sensitivity, on/off limits for ambient light, duration of on period.

E44.2 Illuminate Brine Room with fluorescent luminaries to a minimum of 300 lux average at 760mm above finished floor.

E44.2.1 Controlled by manual switch.

E44.3 Where possible, provide same make and model of products as installed elsewhere in the Public Works East Yards.

E44.4 Submit Product Data.

## E45. EMERGENCY LIGHTING AND EXIT SIGNS

E45.1 Provide each man door with an exit sign – pictogram symbol.

E45.2 Exit sign and emergency lighting lamps to be LED type.

E45.3 Exit sign to be complete with two LED emergency lighting heads, internal battery, battery charger and battery heating element.

E45.4 Where possible, provide same make and model of products as installed elsewhere in the Public Works East Yards.

E45.5 Submit Product Data.

## E46. BUILDING EXTERIOR LIGHTING

E46.1 Provide building exterior lighting as indicated on Drawings.

E46.2 Illuminate each man door with one metal halide HID or LED weather proof wall pack style luminaire.

E46.2.1 Controlled by photoelectric sensors mounted on the exterior door frame. Controls shall be adjustable for on/off limits for ambient light.

E46.3 Illuminate each overhead sectional door with metal halide HID or LED lighting fixtures to a minimum of 50 lux average at ground level.

E46.3.1 Fixtures mounted on posts or on adjacent buttresses.

E46.3.2 Controlled by photoelectric sensors. Controls shall be adjustable for on/off limits for ambient light.

E46.4 Illuminate conveying area outside the south overhead sectional door to a minimum of 100 lux average at ground level.

E46.4.1 Pole mounted metal halide HID or LED flood lighting fixtures

E46.4.2 Manual control switch located at inside of the building beside south overhead sectional door. Refer to Drawing E-1001 for conveying area, lighting pole and lighting switch location.

E46.5 Mount and aim building exterior lighting to minimize glare for vehicles entering and leaving the storage facility.

E46.6 Where possible, provide same make and model of products as installed elsewhere in the Public Works East Yards.

E46.7 Submit Product Data.

## E47. YARD LIGHTING

E47.1 Provide pole mounted metal halide HID or LED yard lighting as indicated on Drawings.

E47.2 Illuminate yard to a minimum of 20 lux average at ground level.

E47.2.1 Controlled by photoelectric sensors. Controls shall be adjustable for on/off limits for ambient light.

E47.3 Illuminate entrance motorized gate area to a minimum of 50 lux average at ground level

E47.3.1 Controlled by photoelectric sensors. Controls shall be adjustable for on/off limits for ambient light.

E47.4 Where possible, provide same make and model of products as installed elsewhere in the Public Works East Yards.

E47.5 Submit Product Data.

## DIVISION 28 ELECTRONIC SAFETY AND SECURITY

### E48. ACCESS CONTROL

E48.1 Provide card reader access control stations at:

(a) Entrance motorized gate area

(b) Brine Room man door.

E48.1.1 Connect card reader to existing Public Works east Yards access control system.

E48.1.2 Locate service entrance for access control on exterior panel backboard.

E48.2 Where possible, provide same make and model of products as installed elsewhere in the Public Works East Yards.

E48.3 Submit Product Data.

### E49. CCTV

E49.1 Provide:

(a) two CCTV cameras at entrance motorized gate areas to monitor both inside and outside of the gate, cameras to be capable of capturing vehicle license identification and vehicle occupants for varying vehicle types,

(b) four pole mounted cameras above the concrete wall at inside of building (two located at corner of the building and two located at inside of building beside overhead sectional door to monitor dispensing area),

(c) two pole mounted cameras above the buttress outside the East and West overhead sectional doors (one camera at each door).

(d) Refer to drawing E-1001 for camera locations.

E49.1.1 Connect cameras to existing Public Works east Yards CCTV system.

E49.1.2 Locate service entrance for CCTV on exterior panel backboard.

E49.2 Where possible, provide same make and model of products as installed elsewhere in the Public Works East Yards.

E49.3 Submit Product Data.

## DIVISION 31 EARTHWORK

### E50. METHANE MITIGATION

E50.1 Provide methane mitigation measures.

E50.2 Do Work to City of Winnipeg Standards and Guidelines for the Mitigation of Methane Gas at Buildings and Utilities and Guidelines for Construction on Landfill Sites.

E50.3 Avoid accumulation of methane gas within underground utilities, trenches, under buildings and structures, and excavations, which are potential conduits for gas migration.

E50.4 Ensure open void utilities (e.g., sewers, culverts, communication conduits, etc.) are constructed of an appropriate material, and in a manner which ensures air and water tightness.

E50.5 For new and existing utilities in trenches and excavations, provide measures to mitigate the potential for methane gas migration within the backfilled trench or excavation.

E50.5.1 Provide utility trench landfill gas barriers in strategic locations to mitigate the potential for methane gas migration within the backfilled trench or excavation.

E50.5.2 Provide passive utility trench venting in strategic locations, extending from the bedding and initial backfill to (600 mm typ.) above the ground surface, allowing potential methane gas accumulations to escape to the atmosphere. Avoid conflict between vent placement and other site surface features.

E50.6 For under-floor piping and utilities:

(a) Penetrations of the floor slab from underground to the main floor are to be sealed gas-tight to prevent the migration of methane gas into the building.

(b) Provide support for underground piping from the main floor slab that is both rigid, and durable to prevent changes in slope or losses in pipe integrity due to settlement, heaving or corrosion.

(c) Make connections to floor drains, cleanouts, and floor outlet fixtures with rigid mechanical joining methods that will resist pull-out and deflection. Do not use slip-joint pipe joining methods below the floor slab of building.

(d) Arrange piping to compensate for pipe expansion and contraction as the soil temperature and temperature of the pipe changes due to its contents and ambient temperatures.

E50.7 Provide active building under-floor ventilation to prevent accumulation of methane in any local area or in general that will exceed 25% of the lower explosive limit for methane.

E50.7.1 Provide ventilation with outdoor air, distribution and/or exhaust pick-up ductwork and detection equipment are required in order to control fan performance.

E50.7.2 Fans and other moving or rotating equipment shall be aluminum, stainless steel or FRP to prevent corrosion, and meet an AMCA Class B spark-resistant design.

E50.7.3 The under-floor methane piping beneath the floor slab and within the perimeter foundation shall be maintained at negative 25 Pa with respect to the building space pressure above the floor.

E50.8 Provide non-explosive level monitoring sensors for methane level within air in methane piping.

(a) Range of measurement: 0 to 100% of lower explosive limit (0 to 50,000 ppm).

(b) Accuracy of measurement: +/- 0.5% LEL between 15 and 30 degrees C range, +/-1% outside.

(c) Operating temperature range: -30°C to 50°C at +/- 0.5°C accuracy on temperature reading.

(d) Outputs to be 4-20 mA, 0-10 V analog or RS232 digital.

(e) Metal housing for wall mounting in non-hazardous areas.

(f) CSA Certified for operation on 12-24 VDC or 24 VAC power.

## E51. EARTHWORK AND GRADING

E51.1 Do Work to:

(a) CW 3010 – Clearing and Grubbing

(b) CW 3110 – Sub-grade, Sub-base and Base Course Construction

(c) CW 3150 – Gravel Surfacing

(d) CW 3170 – Earthwork and Grading.

E51.2 Further to CW 3170 9.4 and CW 1130 3.4, the excavation, placement and removal of impacted soils, as determined by the Contract Administrator, shall be completed in accordance with E53.

## E52. EXCAVATION AND FILL

E52.1 Do Work to CW 2030 – Excavating, Trenching and Backfilling.

E52.2 Further to CW 2030 3.6 and CW 1130 3.4, the excavation, placement and removal of impacted soils, as determined by the Contract Administrator, shall be completed in accordance with E53.

## E53. REMOVAL OF IMPACTED SOILS OFF-SITE

E53.1 It is recommended, but not required, that the Site be planned in such a way as to obtain a net zero cut and fill profile. This is to say that the proposed site design is accomplished with no soils being removed from Site and no fill being brought to Site. It is recommended that available soil is used to create onsite berms.

E53.2 An initial assessment of the soil on the Site has been completed. This report has been issued for information only to assist in the understanding of impact to local soils from previous Site use. It is the responsibility of the Contractor to obtain further information as necessary to complete the Work. The report can be found in Appendix 1.

E53.3 If the Design Build Team proposes the removal of existing soil off-site, further sub-surface investigation to characterize existing soil shall be undertaken by the successful Design Build Team to the satisfaction of the Contract Administrator. Testing shall include at a minimum, borehole logs and analytical data of the soil characterization. All testing shall be completed under the supervision of a Professional Engineer or Geoscientist registered with the Associate of Professional Engineers and Geoscientists of Manitoba (APEGM). Upon completion of the sub-surface testing, the Design Build Team shall submit a letter report sealed by a P.Eng or P.Geo, registered with APEGM, to the Contract Administrator for review.

E53.4 The Contract Administrator will be permitted 10 working days to review the sub-surface testing results.

E53.5 If the Contract Administrator determines that existing soil on-site is impacted to a degree that warrants a Remedial Action Plan (RAP), the Contract Administrator will prepare the RAP and submit it to Manitoba Conservation. Every effort will be made to produce the RAP within the schedule outlined by the Design Build Team. However, the approval process will be dependent on Manitoba Conservation. The Design Build Team may be required to alter the location of their disposal site to meet the requirements of the RAP. The Design Build Team will not be permitted to commence removal of existing material off-site until approval from the Contract Administrator has been obtained.

E53.6 The Design Build Team will be required to supply any information to the Contract Administrator that is required to complete the RAP. This may include, but is not limited to, excavation plans and location of the original proposed disposal site(s).

E53.7 If an alternative disposal site to that proposed by the Design Build Team is required to meet the RAP, and the site is located outside of the City of Winnipeg Limits, the City shall pay $0.08/tonne-km from the alternative disposal site to the nearest point of the City of Winnipeg Limits from the alternative disposal site on the shortest designated truck route as approved by the Contract Administrator. No payment for additional hauling shall be made for alternative disposal sites located within the City of Winnipeg Limits or to Brady Landfill.

E53.8 If tipping fees apply to the alternative disposal site, the fees plus a maximum of 2% mark-up for the Design Build Team's expenses will be paid for by the City. The Design Build Team must submit evidence of these costs to the satisfaction of the Contract Administrator.

E53.9 The City will not provide compensation for lost revenue due to the disposal of existing Site material to an alternative disposal site to meet the requirements of the RAP.

E53.10 If the Contract Administrator determines that existing soil on-site is not impacted, the Design Build Team shall be disposed of as per CW 1130 3.4, CW 2030 3.6 and CW 3170 9.4.0

E53.11 Regardless of the outcome of testing noted in E53.4, material hauled off-site shall not be placed on land that is designated or zoned for residential use.

## E54. PILE FOUNDATIONS

E54.1 Provide deep pile foundations designed to Site conditions.

E54.2 Do Work to:

(a) CSA A23.1, Concrete Materials and Methods of Concrete Construction.

(b) CSA A23.2, Methods of Test for Concrete

(c) CSA A23.3, Design of Concrete Structures (Structures Design)

(d) CSA A23.4, Precast Concrete – Materials and Construction

(e) CSA A3001, Cementitious Materials for Use in Concrete

(f) CSA G30.18, Carbon steel bars for concrete reinforcement

(g) CISC Handbook of Steel Construction

E54.3 Submit Shop Drawings bearing the seal of a Professional Engineer registered in the Province of Manitoba.

E54.4 Maintain record for each pile, including tip elevation, and length of pile. Provide Contract Administrator with three copies of records.

# DIVISION 32 EXTERIOR IMPROVEMENTS

## E55. GENERAL REQUIREMENTS

E55.1 Do Work to:

(a) Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads;

(b) Transportation Association of Canada (TAC) Synthesis of Best Practices Road Salt Management – 7.0 Design and Operation of Road Maintenance Yards.

(c) City of Winnipeg's Transportation Standards Manual;

(d) City of Winnipeg Standard Construction Specifications.

(e) City of Winnipeg Standards and Guidelines for the Mitigation of Methane Gas at Buildings and Utilities

(f) City of Winnipeg Guidelines for Construction on Landfill Sites.

(g) Drainage Criteria Manual for The City of Winnipeg

(h) City of Winnipeg Culvert and Drainage Inlet/Outlet Safety Guidelines

(i) City of Winnipeg Forestry Guidelines

(j) City of Winnipeg Zoning By-Law

(k) Landscape Canada Guidelines

E55.2 Design Requirements:

(a) Building to be 30 m wide and 86 m long

(b) Through access - both sides - for truck loading to accommodate tandem trucks

(c) Truck access door at rear for sand and salt unloading using a conveyor system up to 30 m long

(d) Two-way approach off Thomas Avenue opposite small mall on north side of road.

(e) Two-way security gate off main approach: card-operated gates as per main yard sized to accommodate large trucks

(f) Truck loop to accommodate tandem trucks passing through the sand & salt building

(g) Service road to south end of building to accommodate tandem trucks

(h) Access pad on west side of building for outside storage bins

(i) Sliding gate to centre of East Area Parks/Centralized Parks Vehicle Storage area in main Public Works Yard

(j) Swale drainage for site

**E56. DESIGN PARAMETERS - ROADS**

(a) Classification: Internal Roads

(b) Design Speed: 25 km/h

(c) Design Vehicle: WB-19 truck

(d) Lane Widths: 7.5 m through Thomas Avenue approach

(e) 5.0 m minimum on the service road section

(f) Gradient: 0.5% minimum

(g) Cross Fall: 2% minimum (except through building area)

(h) Swales: 10 - 12 m wide, 0.1% minimum longitudinal grade

(i) Elevation: nominal elevation at building 233.300 m AMSL; coordinate with building design; obtain approval of Contract Administrator.

**E57. GRAVEL SURFACING**

E57.1 Provide gravel surfacing as indicated on Drawings.

E57.2 Do Work to CW 3150 – Gravel Surfacing.

**E58. PORTLAND CEMENT CONCRETE PAVEMENT**

E58.1 Provide Portland cement concrete pavement as indicated on Drawings.

E58.2 Do Work to CW 3310 - Portland Cement Concrete Pavement Works.

E58.3 Concrete pavement shall be 230 mm thick plain-dowelled.

E58.4 Modified barrier curb is to be placed at locations shown on the Drawings. Modified barrier curb shall be in accordance with Standard Detail SD-203B.

E58.5 Ramp curb shall be constructed at all locations where existing or proposed sidewalk meets the proposed reinforced concrete pavement. Ramp curb shall be in accordance with Standard Detail SD-229C.

E58.6 If the existing edge of pavement is chipped or fractured, 150 mm of pavement shall be sawed off to provide a clean tie-in.

E58.7 Where manholes fall within pavement, construct manhole isolation in accordance with Standard Detail SD-220A, complete with 50mm cast iron lifter ring insert and 50mm asphaltic concrete overlay.

**E59. ASPHALTIC CONCRETE PAVEMENT**

E59.1 Provide Portland cement concrete pavement as indicated on Drawings.

E59.2 Do Work to CW 3410 - Asphaltic Concrete Pavement Works.

**E60. CHAIN LINK FENCE AND GATE**

E60.1 Provide chain link fences and gates, including motorized sliding gates as indicated on Drawings.

E60.1.1 Motorized sliding gates shall be Card Access controlled.

E60.2 Do Work to CW 3550 - Chain Link Fencing.

E60.2.1 Where possible, provide same make and model of products as installed elsewhere in the Public Works East Yards.

E60.3 Submit Shop Drawings for motorized sliding gates showing construction details.

## E61. BOLLARDS

E61.1 Provide concrete filled, painted steel pipe bollards complete with cast-in-place piles as shown on the Drawings and as otherwise required.

## E62. TURF AREAS

E62.1 Provide turf areas as indicated on the Drawings.

E62.2 Do Work to CW 3510 - Sodding.

## E63. TREES AND SHRUBS

E63.1 Provide trees and shrubs in areas as indicated on the Drawings.

E63.2 Plant trees and shrubs using the following soil mixture:

(a) Topsoil: 60% loose by volume

(b) Peat moss: 20% loose by volume

(c) Sand: 20% loose by volume

(d) Bone meal: 3 kg/$m^3$ of soil mixture

E63.2.1 Topsoil: to CW 3540 – Topsoil and Finish Grading for Establishment of Turf Areas.

E63.2.2 Peat moss: partially decomposed species of Sphagnum mosses; elastic and homogenous, brown in colour; free of decomposed colloidal residue, wood, sulphur, iron or other deleterious material which could affect healthy plant growth; minimum 60% organic matter by weight; maximum moisture content 15%; maximum shredded particle size 5 mm; pH 4.5 to 7.0.

E63.2.3 Sand: medium to coarse textured silica sand to CSA A82.56, well washed and free of impurities, chemical or organic matter.

E63.2.4 Bone meal: raw bone meal, finely ground; minimum N-P-K rating 3-12-0.

E63.3 Fertilize with slow-release organic fertilizers (nitrates and phosphates) applied at rates determined by the soil analyses.

E63.4 Spread wood chip mulch in even 75 mm deep layers over all planting beds once planting operations are complete. Spread wood chip mulch 50 mm deep over tree saucers.

E63.4.1 Wood chips mulch shall be clean softwood chips at least 30 mm x 40 mm in area and 5 mm thick. Mulch shall contain no more than 20% conifer needles.

E63.5 Maintain trees for a period of two years following completion of planting operations, as determined by the City of Winnipeg.

E63.5.1 Water trees once a week for first four weeks following installation and once every second week, thereafter. Ensure adequate moisture in root zone at freeze-up, especially for evergreen material.

E63.5.2 Keep mulched tree saucers free from weeds by manually removing weeds during the maintenance period.

E63.5.3 Spray trees to combat pests and diseases. Use organic chemicals approved by Agriculture Canada.

E63.5.4 Make adjustments requested by the Contract Administrator, including straightening trees, tightening guy wires and removing tree stakes.

E63.6 During the first two years following completion of planting operations, remove from Site any plant material that has died or failed to grow satisfactorily as determined by the Contract Administrator. Replace with new plant material to match plants displaying satisfactory growth.

## DIVISION 33 UTILITIES

### E64. WATERMAINS

E64.1 Provide watermains and appurtenances as shown on the Drawings.

E64.2 Do Work to CW 2110 - Watermains.

E64.3 Provide same make and model of hydrants as installed elsewhere in the Public Works East Yards.

### E65. WASTEWATER SEWERS

E65.1 Provide wastewater sewers and appurtenances as shown on the Drawings.

E65.2 Do Work to CW 2130 – Gravity Sewers.

E65.2.1 Install manholes in accordance with Standard Drawing SD-010 or SD-011. Install a 750 mm x 150 mm precast concrete adjustment ring immediately below the frame.

E65.2.2 Install catchbasins in accordance with Standard Drawing SD-025. Install a 750 mm x 150 mm precast concrete adjustment ring immediately below the frame.

E65.3 Do television inspection to CW 2145 – Sewer and Manhole Inspection.

### E66. LAND DRAINAGE SEWERS

E66.1 Provide wastewater sewers and appurtenances as shown on the Drawings.

E66.2 Do Work to CW 2130 – Gravity Sewers.

E66.2.1 Install manholes in accordance with Standard Drawing SD-010 or SD-011. Install a 750 mm x 150 mm precast concrete adjustment ring immediately below the frame.

E66.2.2 Install catchbasins in accordance with Standard Drawing SD-025. Install a 750 mm x 150 mm precast concrete adjustment ring immediately below the frame.

E66.3 Do television inspection to CW 2145 – Sewer and Manhole Inspection.

## DIVISION 40 PROCESS INTEGRATION

### E67. GENERAL REQUIREMENTS

E67.1 Refer to Calcium and Sodium Chloride Flow Diagrams (Drawing No. M-1001).

E67.2 Do Work to applicable codes, bylaws and Transportation Association of Canada (TAC) – Synthesis of Best Practices Road Salt Management – 7.0 Design and Operation of Road Maintenance Yards.

E67.3 Mount process piping and equipment in Mechanical/Electrical Equipment Fixture Zone (see Drawing A-4).

E67.4 Provide materials, equipment and systems suitable for the applications and environment.

E67.5 Submit Shop Drawings and Product Data for all equipment and systems.

E67.6 Provide spare parts and one set of special tools required to service equipment as recommended by manufacturers.

E67.7 Identification of piping systems: to CAN/CGSB 24.3.

**E68. UNDERGROUND PIPING**

E68.1 Underground piping installation (where used):

(a) Provide complete double containment prefabricated polypropylene dual pipe system, approved for the application by the manufacturer, and installed as per manufacturer's recommendations.

(b) Provide inspection port(s) with removable cover for piping containment inspection.

(c) Provide suitable drains and vents to allow complete drainage of both primary and secondary containment piping. Provide interstitial supporting devices within the secondary containment pipe, manufactured by the piping manufacturer and designed to allow continuous drainage in annular space to drain points. Provide drain fittings with valves. All fittings to be pre-assembled and pretested by the double containment piping system Manufacturer.

**E69. CONTROLS**

E69.1 Provide controls to achieve the sequence of operation and design conditions shown on the Drawings and to provide fully functional systems to suit application.

E69.1.1 Provide control transformers, relays, control wiring, corrosion proof and water proof controls enclosure and switches, control valves, valve actuators, indicators, conduit, starters, etc.

E69.1.2 Provide liquid level sensors for all tanks.

E69.2 Coordinate sensor/device installation requirement and electrical requirements with all other trades.

**DIVISION 43 PROCESS GAS AND LIQUID HANDLING, PURIFICATION, AND STORAGE EQUIPMENT**

**E70. GENERAL REQUIREMENTS**

E70.1 Refer to flow diagram drawing.

E70.2 Do Work to applicable codes, bylaws and Transportation Association of Canada (TAC) – Synthesis of Best Practices Road Salt Management – 7.0 Design and Operation of Road Maintenance Yards.

E70.3 Mount process piping and equipment in Mechanical/Electrical Equipment Fixture Zone (see Drawing A-4).

E70.4 Provide materials, equipment and systems suitable for the applications and environment.

E70.5 Provide unions, couplings and flanges for ease of maintenance and disassembly.

E70.6 Provide clearance and space for servicing, disassembly and removal of equipment and components as recommended by manufacturer or as indicated on Drawings.

E70.7 Motors:

(a) under 373 W (½ HP): speed as indicated, continuous duty, built-in overload protection, resilient mount, single phase, 120V, unless otherwise specified or indicated.

(b) 373 W (½ HP) and larger, or VFD controlled: NEMA MG-1 Design B, squirrel cage induction, speed as indicated, continuous duty, drip proof, ball bearing, maximum temperature rise 40°C (72°F), 3 phase, voltage as indicated, unless otherwise specified or indicated.

E70.8 Provide guards for unprotected drives.

E70.8.1 Provide means to permit lubrication and use of test instruments with guards in place.

E70.8.2 Guard for flexible coupling:

(a) "U" shaped, minimum 1.6 mm thick (16 gauge) galvanized steel.

(b) Securely fasten in place.

(c) Removable for servicing.

E70.9 Submit Shop Drawings and Product Data for all equipment and systems.

E70.10 Provide spare parts and one set of special tools required to service equipment as recommended by manufacturers.

## E71. SALT BRINE PRODUCTION, HANDLING AND STORAGE SYSTEM

E71.1 Provide salt brine production, handling and storage system including:

(a) Relocating packaged Accubrine automated brine maker complete with automatic controls, and recirculation and transfer pumps from existing 849 Ravelston Ave.W. location to Site.

(b) Four 20,000 litre tanks and appurtenances for storage of salt brine:

(i) relocating two 20,000 litre tanks from existing 849 Ravelston Ave.W. location to Site;

(ii) supplying two new 20,000 litre polyethylene tanks.

(c) PVC pipe system for filling tanks from salt brine production system

(d) PVC pipe system for distribution via two transfer pumps to two indoor dispensing truck fill stations with PVC valves and stainless steel solenoid valves controlled from truck fill stations

(e) Pump(s) for filling dispensing trucks

(f) Two indoor dispensing truck fill stations including:

(i) controls

(ii) pivoting hose arm

(iii) truck filling hoses and end connectors

E71.1.1 Relocate existing dispensing station equipment from existing 849 Ravelston Ave.W. location to Site and reuse if suitable. Supply additional new equipment as required.

E71.2 Provide electric immersion heaters and heat tracing, recirculation pumps and other means as necessary to maintain salt brine system at warmer than -18°C.

E71.3 Design requirements:

(a) Located Indoors, in unheated area.

(b) Salt brine: 23.3% by weight sodium chloride (95% purity) in water

(c) Dispensing truck fill rate: 2.5 L/s (40 USgpm) per truck operating simultaneously.

(d) Dispensing truck fill point: located on driver's side.

(e) Locate truck stations to allow filling of 2 tandem axle dispensing trucks while a 3rd tandem axle dispensing truck can still pass by.

## E72. LIQUID CALCIUM CHLORIDE HANDLING AND STORAGE SYSTEM

E72.1 Provide liquid calcium chloride handling and storage system including:

(a) Relocating two 20,000 litre tanks and appurtenances for storage of liquid calcium chloride from existing 849 Ravelston Ave.W. location to Site.

(b) PVC pipe system for filling tanks from supply trucks from either of two indoor supply truck unloading /dispensing stations with PVC valves and stainless steel solenoid valves controlled from supply/dispensing truck stations

(c) PVC pipe system for distribution via two transfer pumps to two indoor supply truck unloading /dispensing truck fill stations with PVC valves and stainless steel solenoid valves controlled from supply/dispensing truck stations.

(d) Pump(s) for unloading supply trucks without on-board transfer pumps

(e) Pump(s) for unloading supply trucks and filling dispensing trucks

(f) Two indoor supply truck unloading/dispensing truck fill stations including:

(i) controls

(ii) pivoting hose arm

(iii) supply truck unloading hoses and end connectors

(iv) dispensing truck filling hoses and end connectors

E72.1.1 Relocate existing dispensing station equipment from existing 849 Ravelston Ave.W. location to Site and reuse if suitable. Supply additional new equipment as required.

E72.2 Design requirements:

(a) Located indoors, in unheated area.

(b) Liquid calcium chloride: minimum 25% by weight calcium chloride in water

(c) Supply truck unloading rate: 2.5 L/s (40 USgpm) from either truck station.

(d) Provide capability to unload supply truck by:

(i) truck mounted transfer pump;

(ii) gravity drop to facility pump.

(e) Dispensing truck fill rate: 2.5 L/s (40 USgpm) per truck station operating simultaneously.

(f) Dispensing truck fill point: located on driver's side.

(g) Systems for unloading supply trucks and for filling dispensing trucks may include shared components provided that the two truck stations can independently perform opposite functions.

(h) Locate truck stations to allow filling of 2 tandem axle dispensing trucks while a 3rd tandem axle dispensing truck can still pass by.

## E73. PUMPS

E73.1 Provide pump(s) for salt brine and liquid calcium chloride handling and storage systems.

E73.1.1 Locate all pumps in the Brine Room, or provide heating to maintain pumps above congealing temperature of pumped fluid.

E73.1.2 Reuse existing transfer and recirculation pumps in existing Accubrine automated brine maker if suitable. Supply new pumps if required.

E73.1.3 Provide supports and vibration isolation for pump(s).

E73.2 Submit Shop Drawings and Product Data including:

(a) detailed composite wiring diagrams for control systems showing factory installed wiring and equipment or required for controlling devices or ancillaries, accessories and controllers.

(b) supports and vibration isolation

(c) piping, valves and fittings shipped loose by pump supplier, showing their final location in field assembly.

(d) product data of pump curves for review showing point of operation

(e) information and calculations for pump sizing

E73.3 Submit operation and maintenance data.

E73.4 Design requirements:

(a) Self-priming pumps

(b) Suitable for application and environment.

(c) Suitable for winter/summer design outdoor air temperature.

(d) Impeller: cast iron or stainless steel.

(e) Casing: Rugged cast iron or stainless steel, self-cleaning and facilitates long life.

(f) Seal assembly: made of stainless steel with Viton bellows or better.

(g) Motor: 230 V, single phase, suitable for application.

(h) Pressure and temperature rating: 107°C (225°F) and 1200 kPa (175 psi).

## E74. SUPPLY TRUCK UNLOADING/DISPENSING TRUCK FILLING STATIONS

E74.1 Provide two stations for:

(a) Unloading calcium chloride supply trucks

(b) Filling dispensing truck with salt brine and calcium chloride.

E74.2 Hose Support Pivot Arm:

(a) Suitable for product and environmental conditions of use.

(b) Allow minimum 180 degree pivot of the arm.

(c) Stainless steel fabrication.

(d) Ball bearing pivot mechanism.

(e) Dual seals.

(f) Acceptable product: OPW swivel components or assembly, or approved substitute.

E74.3 Flexible rubber hose:

(a) Heavy duty, flexible, suitable for all season application.

(b) Temperature range: -50°C to 90°C.

(c) Size to suit calcium chloride supply trucks and dispensing trucks.

(d) Hoses for calcium chloride suitable for discharge and suction service.

## E75. SALT BRINE STORAGE TANKS

E75.1 Provide four 20,000 litre tanks and appurtenances for storage of salt brine by:

(a) relocating two 20,000 litre tank from existing 849 Ravelston Ave.W. location;

(b) supplying two new 20,000 litre polyethylene tanks.

E75.1.1 Provide:

(a) secondary containment by curbed-in area(s)

(b) electric immersion heating for tanks to maintain solution at warmer than -18°C

(c) level monitoring connected to salt brine production

(d) PVC equalization piping between tanks, with isolation valves (manual PVC ball valves)

E75.2 Connect to:

(a) PVC pipe system for filling from salt brine production system via PVC pipe system with solenoid valve control (Division 40).

(b) PVC pipe system for distribution via two transfer pumps to two indoor dispensing truck fill stations with PVC valves and stainless steel solenoid valves controlled from truck fill stations (Division 40).

## E76. LIQUID CALCIUM CHLORIDE STORAGE TANKS

E76.1 Provide two 20,000 litre tanks by relocating two 20,000 litre tank from existing 849 Ravelston Ave.W. location.

E76.1.1 Provide:

(a) secondary containment by curbed-in area(s)

(b) level monitoring with alarm

(c) PVC equalization piping between all tanks, with isolation valves (manual PVC ball valves)

E76.2 Connect to:

(a) PVC pipe system for filling tanks from supply truck from either of two indoor supply/dispensing stations with PVC valves and stainless steel solenoid valves controlled from supply/dispensing truck stations (Division 40).

(b) PVC pipe system for distribution via two transfer pumps to two indoor supply/dispensing truck fill stations with PVC valves and stainless steel solenoid valves controlled from supply/dispensing truck stations (Division 40).