Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

INVITATION TO TENDER

FOR

EMERGENCY GENERATOR INSTALLATION
Building 56
Project: CEF13 0013

CENTRAL EXPERIMENTAL FARM (CEF)
Agriculture and Agri-Food Canada (AAFC)
K.W. Neatby Building, Main Entrance
960 Carling Avenue
Ottawa, Ontario K1A 0C6

SOLICITATION #13-1427

Jean-Pierre Simard
Senior Contracts Officer
613 759-6157
jean-pierre.simard@agr.gc.ca

CLOSING: Monday March 10, 2014 at 02:00 p.m. Eastern Standard Time (EST)

IMPORTANT NOTICE TO BIDDERS

THIS DOCUMENT CONTAINS A SECURITY REQUIREMENT
For further instructions please consult “Special Instruction to Bidders”, SI10, “Security related requirements” and “Supplementary Conditions” SC01 “Security related requirements”.

INSURANCE TERMS
The Insurance Terms have been amended. Refer to the Supplementary Conditions.

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SPECIAL INSTRUCTIONS TO BIDDERS (SI)

SI01 CODE OF CONDUCT AND CERTIFICATIONS - RELATED DOCUMENTATION

By submitting a bid, the Bidder certifies that the Bidder and its affiliates are in compliance with the provisions as stated in GI01 "Code of Conduct and Certifications – Bid" of the General Instructions to Bidders. The related documentation therein required will assist Canada in confirming that the certifications are true.

SI02 BID DOCUMENTS

1) The following are the bid documents:

   a) Invitation to Tender - Page 1;
   b) Special Instructions to Bidders;
   c) General Instructions to Bidders;
   d) Clauses & Conditions identified in "Contract Documents";
   e) Drawings and Specifications;
   f) Bid and Acceptance Form and related Appendix(s); and
   g) Any amendment issued prior to solicitation closing.

Submission of a bid constitutes acknowledgement that the Bidder has read and agrees to be bound by these documents.

SI03 ENQUIRIES DURING THE SOLICITATION PERIOD

1) Enquiries regarding this bid must be submitted in writing as early as possible within the solicitation period to:

   Jean-Pierre Simard
   Senior Contracts Officer
   Agriculture and Agri-Food Canada
   960 Carling Ave. (K.W. Neatby building)
   Ottawa, Ontario
   K1A 0C6
   Telephone: 613 759-6157
   Facsimile: 613 759-7005
   Jean-pierre.simard@agr.gc.ca

   Except for the approval of alternative materials as described in GI15 of the "General Instructions to Bidders", enquiries should be received no later than five (5) calendar days prior to the date set for solicitation closing to allow sufficient time to provide a response. Enquiries received after that time may not result in an answer being provided.

2) To ensure consistency and quality of the information provided to Bidders, the Contracting Officer shall examine the content of the enquiry and shall decide whether or not to issue an amendment.

3) All enquiries and other communications related to this bid sent throughout the solicitation period are to be directed ONLY to the Contracting Officer named herein. Failure to comply with this requirement may result in the bid being declared non-responsive.

SI04 MANDATORY SITE VISIT

It is mandatory that the Bidder or a representative of the Bidder visit the work site. Arrangements have been made for site visit to be held on **Tuesday February 25, 2014 at 10:00 am** at 960 Carling Avenue, K.W. Neatby building, Ottawa. Bidders will be required to sign an attendance form. Bidders should confirm in their bids that they have attended the site visit. Bidders who do not attend or send a representative will not be given an alternative appointment and their bids will be rejected as non-compliant. Any clarifications or changes to the bid solicitation resulting from the site visit will be included as an amendment to the bid solicitation.

SI05 REVISION OF BID
A bid may be revised by letter in accordance with GI10 of the “General Instructions to Bidders“.

SI06 BID RESULTS
Following solicitation closing, bidders may ask the results of the bid opening by calling the CEF at Telephone No. (613) 759-6157.

SI07 INSUFFICIENT FUNDING
In the event that the lowest compliant bid exceeds the amount of funding allocated for the Work, Canada in its sole discretion may:

a) cancel the solicitation; or

b) obtain additional funding and award the Contract to the Bidder submitting the lowest compliant bid; and/or

c) negotiate a reduction in the bid price and/or scope of work of not more than 15% with the Bidder submitting the lowest compliant bid. Should an agreement satisfactory to Canada not be reached, Canada shall exercise option (a) or (b).

SI08 BID VALIDITY PERIOD
1) Canada reserves the right to seek an extension to the bid validity period prescribed in BA04 of the Bid and Acceptance Form. Upon notification in writing from Canada, Bidders shall have the option to either accept or reject the proposed extension.

2) If the extension referred to in paragraph 1) of SI08 is accepted, in writing, by all those who submitted bids, then Canada shall continue immediately with the evaluation of the bids and its approvals processes.

3) If the extension referred to in paragraph 1) of SI08 is not accepted in writing by all those who submitted bids then Canada shall, at its sole discretion, either

   a) continue to evaluate the bids of those who have accepted the proposed extension and seek the necessary approvals; or

   b) cancel the invitation to tender.

4) The provisions expressed herein do not in any manner limit Canada’s rights in law or under GI11 of the “General Instructions to Bidders “.

SI09 CONSTRUCTION DOCUMENTS
The successful contractor will be provided with one paper copy of the sealed and signed drawings, the specifications and the amendments upon acceptance of the offer. Obtaining more copies shall be the responsibility of the contractor including costs.

SI10 SECURITY RELATED REQUIREMENTS
This document contains a mandatory security requirement for the performance of the subsequent contract (refer to clause SC01 of the Supplementary Conditions included herein).

1) The Successful Bidder's personnel, as well as any subcontractor and its personnel, who are required to perform any part of the work pursuant to the subsequent contract must meet the mandatory security requirement as indicated in section SC01 of the Supplementary Conditions. **Individuals who do not have the required level of security will not be allowed on site.** It is the responsibility of the successful bidder to ensure that the security requirements are met throughout the performance of the contract. Canada will not be held liable or accountable for any delays or additional costs associated with the successful bidder's non-compliance with the mandatory security requirement.

2) For any enquiries concerning the project security requirement, during the bidding period, the Bidder must follow the instructions as detailed in SI03 "Enquiries during the Solicitation Period". Additional information on security can also be found on the following web site: http://ssi-iss.tpsgc-pwgsc.gc.ca/index-eng.html or by dialling 1-866-368-4646 (Toll free).

SI11 WEB SITES

The connection to some of the Web sites in the solicitation documents is established by the use of hyperlinks. The following is a list of the addresses of the Web sites:

Treasury Board Appendix L, Acceptable Bonding Companies:
http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=14494&section=text#appL

Contracts Canada (Buy and Sell):
https://www.achatsetventes-buyandsell.gc.ca/eng/welcome

Canadian economic sanctions:
http://www.international.gc.ca/sanctions/index.aspx?lang=eng

Contractor Performance Evaluation Report (Form PWGSC-TPSGC 2913):
http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/2913.pdf

Certificate of Insurance (form PWGSC-TPSGC 357):
http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/357.pdf

SACC Manual:
http://ccua-sacc.tpsgc-pwgsc.gc.ca/pub/acho-eng.jsp

Schedules of Wage Rates for Federal Construction Contracts:
http://www.rhdcc-hrsdc.gc.ca/eng/labour/employment_standards/contracts/schedule/index.shtml

PWGSC, Industrial Security Services
Http://ssi-iss.tpsgc-pwgsc.gc.ca/index-eng.html

GENERAL INSTRUCTIONS TO BIDDERS (GI)

GI01 Code of Conduct and Certifications – Bid

1. Bidders must comply with the *Code of Conduct for Procurement*. In addition to the *Code of Conduct for Procurement*, bidders must:

    a. respond to bid solicitations in an honest, fair and comprehensive manner,

    b. accurately reflect their capacity to satisfy the requirements stipulated in the bid solicitations and resulting contracts,

    c. submit bids and enter into contracts only if they will fulfill all obligations of the Contract.

2. Bidders further understand that, to ensure fairness, openness and transparency in the procurement process, the commission of certain acts or offences will render them ineligible to be awarded a contract. Canada will declare non-responsive any bid in respect of which the information herein requested is missing or inaccurate, or in respect of which the information contained in the certifications specified hereinafter is found to be untrue, in any respect, by Canada. If it is determined, after contract award, that the Bidder made a false declaration, Canada will have the right to terminate the Contract for default. The Bidder will be required to diligently maintain up-to-date the information herein requested. The Bidder and any of the Bidder's affiliates, will also be required to remain free and clear of any acts or convictions specified herein during the period of any contract arising from this bid solicitation.

3. For the purpose of this section, everyone, including but not limited to organizations, bodies corporate, societies, companies, firms, partnerships, associations of persons, parent companies, and subsidiaries, whether partly or wholly-owned, as well as individuals, and directors, are Bidder's affiliates if:

    a. directly or indirectly either one controls or has the power to control the other, or

    b. a third party has the power to control both.

    Indicia of control, include, but are not limited to, interlocking management or ownership, identity of interests among family members, shared facilities and equipment, common use of employees, or a business entity created following the acts or convictions specified in this section which has the same or similar management, ownership, or principal employees, as the case may be.

4. Bidders who are incorporated, including those bidding as a joint venture, must provide with their bid or promptly thereafter a complete list of names of all individuals who are currently directors of the Bidder. Bidders bidding as sole proprietorship, including those bidding as a joint venture, must provide with their bid or promptly thereafter the name of the owner. Bidders bidding as societies, firms, or partnerships do not need to provide lists of names. If the required names have not been received by the time the evaluation of bids is completed, Canada will inform the Bidder of a time frame within which to provide the information. Failure to comply will render the bid non-responsive. Providing the required names is a mandatory requirement for contract award.

    Canada may, at any time, request that a Bidder provide properly completed and Signed Consent Forms (Consent to a Criminal Record Verification form - PWGSC-TPSGC 229) for any or all individuals aforementioned within the time specified. Failure to provide such Consent Forms within the time period provided will result in the bid being declared non-responsive.
5. The Bidder must diligently maintain an up-to-date list of names by informing Canada in writing of any change occurring during the validity period of the bid as well as during the period of any contract arising from this bid solicitation. The Bidder must also, when so requested, provide Canada with the corresponding Consent Forms.

6. By submitting a bid, the Bidder certifies that it is aware, and that its affiliates are aware, that Canada may request additional information, certifications, consent forms and other evidentiary elements proving identity or eligibility. Canada may also verify the information provided by the Bidder, including the information relating to the acts or convictions specified herein, through independent research, use of any government resources or by contacting third parties.

7. By submitting a bid, the Bidder certifies that neither the Bidder nor any of the Bidder's affiliates have directly or indirectly, paid or agreed to pay, and will not, directly or indirectly, pay a contingency fee to any individual for the solicitation, negotiation or obtaining of the Contract if the payment of the fee would require the individual to file a return under section 5 of the *Lobbying Act*.

8. By submitting a bid, the Bidder certifies that no one convicted under any of the provisions under a) or b) are to receive any benefit under a contract arising from this bid solicitation. In addition, the Bidder certifies that except for those offences where a criminal pardon or a record suspension has been obtained or capacities restored by the Governor in Council, neither the Bidder nor any of the Bidder's affiliates has ever been convicted of an offence under any of the following provisions:

    a. paragraph 80(1)(d) (*False entry, certificate or return*), subsection 80(2) (*Fraud against Her Majesty*) or section 154.01 (*Fraud against Her Majesty*) of the *Financial Administration Act*, or

    b. section 121 (*Frauds on the government and Contractor subscribing to election fund*), section 124 (*Selling or Purchasing Office*), section 380 (*Fraud*) for fraud committed against Her Majesty or section 418 (*Selling defective stores to Her Majesty*) of the *Criminal Code* of Canada, or

    c. section 462.31 (*Laundering proceeds of crime*) or sections 467.11 to 467.13 (*Participation in activities of criminal organization*) of the *Criminal Code* of Canada, or

    d. section 45 (*Conspiracies, agreements or arrangements between competitors*), 46 (*Foreign directives*) 47 (*Bid rigging*), 49 (*Agreements or arrangements of federal financial institutions*), 52 (*False or misleading representation*), 53 (*Deceptive notice of winning a prize*) under the *Competition Act*, or

    e. section 239 (*False or deceptive statements*) of the *Income Tax Act*, or

    f. section 327 (*False or deceptive statements*) of the *Excise Tax Act*, or

    g. section 3 (*Bribing a foreign public official*) of the *Corruption of Foreign Public Officials Act*, or

    h. section 5 (*Trafficking in substance*), section 6 (*Importing and exporting*), or section 7 (*Production of substance*) of the *Controlled Drugs and Substance Act*.

9. In circumstances where a criminal pardon or a record suspension has been obtained, or capacities have been restored by the Governor in Council, the Bidder must provide with its bid or promptly thereafter a copy of confirming documentation from an official source. If such documentation has not been received by the time the evaluation of bids is completed, Canada will inform the Bidder of a time frame within which to provide the information. Failure to comply will render the bid non-responsive.

10. Bidders understand that Canada may contract outside of the present solicitation process with a supplier who has been convicted of an offense enumerated under c) to h) of the paragraph hereinabove, or who is affiliated with someone who has been convicted of an offense enumerated under c) to h) of the paragraph hereinabove, when required to do so by law or legal proceedings, or when Canada considers it necessary to the public interest for reasons which include, but are not limited to:

    - Only one person is capable of performing the contract;

- Emergency;
- National security;
- Health and safety;
- Economic harm;

Canada reserves the right to impose additional conditions or measures to ensure the integrity of the procurement process.

GI02 Completion of Bid

1. The bid shall be:

    a. submitted on the Bid and Acceptance Form provided in the solicitation or a clear and legible reproduced copy of such Bid and Acceptance Form that must be identical in content and format to the Bid and Acceptance Form provided in the solicitation;

    b. based on the Bid Documents listed in the Special Instructions to Bidders;

    c. correctly completed in all respects;

    d. signed by a duly authorized representative of the Bidder; and

    e. accompanied by:

        i. bid security as specified in GI08; and

        ii. any other document or documents specified elsewhere in the solicitation where it is stipulated that said documents are to accompany the bid.

2. Subject to paragraph 6) of GI11, any alteration to the pre-printed or pre-typed sections of the Bid and Acceptance Form, or any condition or qualification placed upon the bid shall be cause for disqualification. Alterations, corrections, changes or erasures made to statements or figures entered on the Bid and Acceptance Form by the Bidder shall be initialed by the person or persons signing the bid. Alterations, corrections, changes or erasures that are not initialed shall be deemed void and without effect.

3. Unless otherwise noted elsewhere in the Bid Documents, facsimile copies of bids are not acceptable.

GI03 Identity or Legal Capacity of the Bidder

1. In order to confirm the authority of the person or persons signing the bid or to establish the legal capacity under which the Bidder proposes to enter into Contract, any Bidder who carries on business in other than its own personal name shall, if requested by Canada, provide satisfactory proof of

    a. such signing authority; and
    b. the legal capacity under which it carries on business;

    prior to contract award. Proof of signing authority may be in the form of a certified copy of a resolution naming the signatory(ies) that is (are) authorized to sign this bid on behalf of the corporation or partnership. Proof of legal capacity may be in the form of a copy of the articles of incorporation or the registration of the business name of a sole proprietor or partnership.

GI04 Applicable Taxes

1. “Applicable Taxes” means the Goods and Services Tax (GST), the Harmonized Sales Tax (HST), and any provincial tax, by law, payable by Canada such as, the Quebec Sales Tax (QST) as of April 1, 2013.

GI05 Capital Development and Redevelopment Charges

1. For the purposes of GC1.8, "Laws, Permits and Taxes", in the General Conditions of the Contract, only fees or charges directly related to the processing and issuing of building permits shall be included. The Bidder shall not include any monies in the bid amount for special municipal development, redevelopment or other fees or charges which a municipal authority may seek as a prerequisite to the issuance of building permits.

GI06 Registry and Pre-qualification of Floating Plant

1. Dredges or other floating plant to be used in the performance of the Work must be on Canadian registry. For dredges or other floating plant that are not of Canadian make or manufacture, the Bidder must obtain a certificate of qualification from Industry Canada as described in the Floating Plant Appendix of the Bid and Acceptance Form, and this certificate must accompany the bid. Plant so qualified by Industry Canada may be accepted on this project

GI07 Listing of Subcontractors and Suppliers

1. Notwithstanding any list of Subcontractors that the Bidder may be required to submit as part of the bid, the Bidder shall, within forty-eight (48) hours of receipt of a notice to do so, submit all information requested in the said notice including the names of Subcontractors and Suppliers for the part or parts of the Work listed. Failure to do so shall result in the disqualification of its bid.

GI08 Bid Security Requirements

1. The Bidder shall submit bid security with the bid in the form of a bid bond or a security deposit in an amount that is equal to not less than 10 percent of the bid amount. The maximum amount of bid security required with any bid is $2,000,000.

2. A bid bond (form PWGSC-TPSGC 504) shall be in an approved form, properly completed, with original signatures and issued by an approved company whose bonds are acceptable to Canada either at the time of solicitation closing or as identified in Treasury Board Appendix L, Acceptable Bonding Companies.

3. A security deposit shall be an original, properly completed, signed where required and be either:

    a. a bill of exchange, bank draft or money order made payable to the Receiver General for Canada and certified by an approved financial institution or drawn by an approved financial institution on itself; or

    b. bonds of, or unconditionally guaranteed as to principal and interest by, the Government of Canada.

4. For the purposes of subparagraph 3. a. of GI08:

    a. a bill of exchange is an unconditional order in writing signed by the Bidder and addressed to an approved financial institution, requiring the said institution to pay, on demand, at a fixed or determinable future time a sum certain of money to, or to the order of, the Receiver General for Canada;

    b. if a bill of exchange, bank draft or money order is certified by or drawn on an institution or corporation other than a chartered bank, it must be accompanied by proof that the said institution or corporation meets at least one of the criteria described in subparagraph 4.c. of GI08, either by letter or by a stamped certification on the bill of exchange, bank draft or money; and

    c. An approved financial institution is:

i. a corporation or institution that is a member of the Canadian Payments Association as defined in the *Canadian Payments Act*;

ii. a corporation that accepts deposits that are insured, to the maximum permitted by law, by the Canada Deposit Insurance Corporation or the "Autorité des marchés financiers";

iii. a corporation that accepts deposits from the public if repayment of the deposit is guaranteed by Her Majesty the Queen in right of a province;

iv. a corporation, association or federation incorporated or organized as a credit union or co-operative credit society that conforms to the requirements of a credit union which are more particularly described in paragraph 137(6) of the *Income Tax Act*; or

v. Canada Post Corporation.

5. Bonds referred to in subparagraph 3. b. of GI08 shall be provided on the basis of their market value current at the date of solicitation closing, and shall be:

a. payable to bearer;

b. accompanied by a duly executed instrument of transfer of the bonds to the Receiver General for Canada in the form prescribed by the Domestic Bonds of Canada Regulations; or

c. registered as to principal or as to principal and interest in the name of the Receiver General for Canada pursuant to the Domestic Bonds of Canada Regulations.

6. As an alternative to a security deposit an irrevocable standby letter of credit is acceptable to Canada and the amount shall be determined in the same manner as a security deposit referred to above.

7. An irrevocable standby letter of credit referred to in paragraph 8) of GI08 shall:

a. be an arrangement, however named or described, whereby a financial institution (the "Issuer") acting at the request and on the instructions of a customer (the "Applicant") or on its own behalf,

i. is to make a payment to, or to the order of, the Receiver General for Canada as the beneficiary;

ii. is to accept and pay bills of exchange drawn by the Receiver General for Canada;

iii. authorizes another financial institution to effect such payment or accept and pay such bills of exchange; or

iv. authorizes another financial institution to negotiate against written demand(s) for payment provided that the terms and conditions of the letter of credit are complied with;

b. state the face amount which may be drawn against it;

c. state its expiry date;

d. provide for sight payment to the Receiver General for Canada by way of the financial institution's draft against presentation of a written demand for payment signed by the Departmental Representative identified in the letter of credit by his/her office;

e. provide that more than one written demand for payment may be presented subject to the sum of those demands not exceeding the face value of the letter of credit;

f. provide that it is subject to the International Chamber of Commerce (ICC) *Uniform Customs and Practice (UCP) for Documentary Credits, 2007 Revision*, ICC Publication No. 600, Pursuant to the ICC UCP, a credit is irrevocable even if there is no indication to that effect; and

g. be issued or confirmed, in either official language, by a financial institution which is a member of the Canadian Payments Association and is on the letterhead of the Issuer or Confirmer. The format is left to the discretion of the Issuer or Confirmer.

8. Bid security shall lapse or be returned as soon as practical following:

    a. the solicitation closing date, for those Bidders submitting non-compliant bids; and

    b. the administrative bid review, for those Bidders submitting compliant bids ranked fourth to last on the schedule of bids; and

    c. the award of contract, for those Bidders submitting the second and third ranked bids; and

    d. the receipt of contract security, for the successful Bidder; or

    e. the cancellation of the solicitation, for all Bidders.

9. Notwithstanding the provisions of paragraph 8 of GI08 and provided more than three compliant bids have been received, if one or more of the bids ranked third to first is withdrawn or rejected for whatever reason then Canada reserves the right to hold the security of the next highest ranked compliant bid in order to retain the bid security of at least three valid and compliant bids.

GI09 Submission of Bid

1. The Bid and Acceptance Form, duly completed, shall be enclosed and sealed in an envelope provided by the Bidder, and shall be addressed and submitted to the office designated on the Front Page "Invitation to Tender" for the receipt of bids. The bid must be received on or before the date and time set for solicitation closing.

2. Unless otherwise specified in the Special Instructions to Bidders:

    a. the bid shall be in Canadian currency;
    b. exchange rate fluctuation protection is not offered; and
    c. any request for exchange rate fluctuation protection shall not be considered.

3. Prior to submitting the bid, the Bidder shall ensure that the following information is clearly printed or typed on the face of the bid envelope:

    a. Solicitation Number;
    b. Name of Bidder;
    c. Return address; and
    d. Closing Date and Time.

4. Timely and correct delivery of bids is the sole responsibility of the Bidder.

GI10 Revision of Bid

1. A bid submitted in accordance with these instructions may be revised by letter provided the revision is received at the office designated for the receipt of bids, on or before the date and time set for the

closing of the solicitation. The letter shall bear the Bidder's letterhead or a signature that identifies the Bidder.

2. A revision to a bid that includes unit prices must clearly identify the change(s) in the unit price(s) and the specific item(s) to which each change applies.

3. A letter submitted to confirm an earlier revision shall be clearly identified as a confirmation.

4. Failure to comply with any of the above provisions shall result in the rejection of the non-compliant revision(s) only. The bid shall be evaluated based on the original bid submitted and all other compliant revision(s).

GI11 Rejection of Bid

1. Canada may accept any bid, whether it is the lowest or not, or may reject any or all bids.

2. Without limiting the generality of paragraph 1) of GI11, Canada may reject a bid if any of the following circumstances is present:

    a. the Bidder's bidding privileges are suspended or are in the process of being suspended;

    b. the bidding privileges of any employee or subcontractor included as part of the bid are suspended or are in the process of being suspended, which suspension or pending suspension would render that employee or subcontractor ineligible to bid on the Work, or the portion of the Work the employee or subcontractor is to perform;

    c. the Bidder is bankrupt, or where for whatever reason, its activities are rendered inoperable for an extended period;
    d. evidence, satisfactory to Canada, of fraud, bribery, fraudulent misrepresentation or failure to comply with any law protecting individuals against any manner of discrimination, has been received with respect to the Bidder, any of its employees or any subcontractor included as part of its bid;

    e. evidence satisfactory to Canada that based on past conduct or behavior, the Bidder, a sub-contractor or a person who is to perform the Work is unsuitable or has conducted himself/herself improperly;

    f. with respect to current or prior transactions with Canada:

        i. Canada has exercised, or intends to exercise, the contractual remedy of taking the work out of the contractor's hands with respect to a contract with the Bidder, any of its employees or any subcontractor included as part of its bid; or

        ii. Canada determines that the Bidder's performance on other contracts is sufficiently poor to jeopardize the successful completion of the requirement being bid on.

3. In assessing the Bidder's performance on other contracts pursuant to subparagraph 2.f. i & ii of GI11, Canada may consider, but not be limited to, such matters as:

    a. the quality of workmanship in performing the Work;
    b. the timeliness of completion of the Work;
    c. the overall management of the Work and its effect on the level of effort demanded of the department and its representative; and
    d. the completeness and effectiveness of the Contractor's safety program during the performance of the Work.

4. Without limiting the generality of paragraphs 1), 2) and 3) of GI11, Canada may reject any bid based on an unfavourable assessment of the:

    a. adequacy of the bid price to permit the work to be carried out and, in the case of a bid providing prices per unit, whether each such price reasonably reflects the cost of performing the part of the work to which that price applies;

    b. Bidder's ability to provide the necessary management structure, skilled personnel, experience and equipment to perform competently the work under the Contract; and

    c. Bidder's performance on other contracts.

5. When Canada intends to reject a bid pursuant to a provision of paragraphs 1), 2), 3) or 4) of GI11, other than subparagraph 2)(a) of GI11, the Contracting Authority will inform the Bidder and provide the Bidder ten (10) days within which to make representations, before making a final decision on the bid rejection.

6. Canada may waive informalities and minor irregularities in bids received if Canada determines that the variation of the bid from the exact requirements set out in the Bid Documents can be corrected or waived without being prejudicial to other Bidders.

GI12 Bid Costs

1. No payment will be made for costs incurred in the preparation and submission of a bid in response to the bid solicitation. Costs associated with preparing and submitting a bid, as well as any costs incurred by the Bidder associated with the evaluation of the bid, are the sole responsibility of the Bidder.

GI13 Procurement Business Number

1. Bidders are required to have a Procurement Business Number (PBN) before contract award. Bidders may register for a PBN in the Supplier Registration Information system on the Contracts Canada Web site. For non-Internet registration, Bidders may contact the nearest Supplier Registration Agent.

GI14 Compliance with Applicable Laws

1. By submission of a bid, the Bidder certifies that the Bidder has the legal capacity to enter into a contract and is in possession of all valid licences, permits, registrations, certificates, declarations, filings, or other authorizations necessary to comply with all federal, provincial and municipal laws and regulations applicable to the submission of the bid and entry into any ensuing contract for the performance of the work.

2. For the purpose of validating the certification in paragraph 1) of GI14, a Bidder shall, if requested, provide a copy of every valid licence, permit, registration, certificate, declaration, filing or other authorization listed in the request, and shall provide such documentation within the time limit(s) set out in the request.

3. Failure to comply with the requirements of paragraph 2) of GI14 shall result in disqualification of the bid.

GI15 Approval of Alternative Materials

1. When materials are specified by trade names or trademarks, or by manufacturers' or suppliers' names, the bid shall be based on use of the named materials. During the solicitation period, alternative materials may be considered provided full technical data is received in writing by the Contracting Officer at least ten (10) calendar days prior to the solicitation closing date. If the alternative materials are approved for the purposes of the bid, an addendum to the bid documents shall be issued.

GI16 Performance Evaluation

1. Bidders shall take note that the performance of the Contractor during and upon completion of the work shall be evaluated by Canada. The evaluation shall be based on the quality of workmanship; timeliness of completion of the work; project management, contract management and management of health and safety. Should the Contractor's performance be considered unsatisfactory, the Contractor's bidding privileges on future work may be suspended indefinitely.

GI17 Conflict of Interest - Unfair Advantage

1. In order to protect the integrity of the procurement process, bidders are advised that Canada may reject a bid in the following circumstances:

    a. if the Bidder, any of its subcontractors, any of their respective employees or former employees was involved in any manner in the preparation of the bid solicitation or in any situation of conflict of interest or appearance of conflict of interest;

    b. if the Bidder, any of its subcontractors, any of their respective employees or former employees had access to information related to the bid solicitation that was not available to other bidders and that would, in Canada's opinion, give or appear to give the Bidder an unfair advantage.

2. The experience acquired by a bidder who is providing or has provided the goods and services described in the bid solicitation (or similar goods or services) will not, in itself, be considered by Canada as conferring an unfair advantage or creating a conflict of interest. This bidder remains however subject to the criteria established above.

3. Where Canada intends to reject a bid under this section, the Contracting Authority will inform the Bidder and provide the Bidder an opportunity to make representations before making a final decision. Bidders who are in doubt about a particular situation should contact the Contracting Authority before bid closing. By submitting a bid, the Bidder represents that it does not consider itself to be in conflict of interest nor to have an unfair advantage. The Bidder acknowledges that it is within Canada's sole discretion to determine whether a conflict of interest, unfair advantage or an appearance of conflict of interest or unfair advantage exists.

SUPPLEMENTARY CONDITIONS (SC)

SC01 SECURITY REQUIREMENTS

The Contractor/Offeror personnel working on the Central Experimental Farm (CEF) site must EACH hold a valid **"Reliability Status"**, granted or approved by CISD/PWGSC. They also must be part of the list of authorised personnel of the CEF, AAFC.

The Contractor/Offeror must comply with the provisions of the:

a) Security Requirements Check List, attached at Annex "B";
b) Departmental Security Requirements when on AAFC's property;
c) Industrial Security Manual (Latest Edition)

SC02 INSURANCE TERMS

1) Insurance Contracts

(a) The Contractor must, at the Contractor's expense, obtain and maintain insurance contracts in accordance with the requirements of the Certificate of Insurance. Coverage must be placed with an Insurer licensed to carry out business in Canada.

(b) Compliance with the insurance requirements does not release the Contractor from or reduce its liability under the Contract. The Contractor is responsible for deciding if additional insurance coverage is necessary to fulfill its obligation under the Contract and to ensure compliance with any applicable law. Any additional insurance coverage is at the Contractor's expense, and for its own benefit and protection.

2) Period of Insurance

(a) The policies required in the Certificate of Insurance must be in force from the date of contract award and be maintained throughout the duration of the Contract.

(b) The Contractor must be responsible to provide and maintain coverage for Products/Completed Operations hazards on its Commercial General Liability insurance policy, for a period of six (6) years beyond the date of the Certificate of Substantial Performance.

3) Proof of Insurance

(a) Before commencement of the Work, and no later than thirty (30) days after acceptance of its bid, the Contractor must deposit with Canada a Certificate of Insurance on the form attached herein.

(b) Upon request by Canada, the Contractor must provide originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the Certificate of Insurance.

4) Insurance Proceeds

In the event of a claim, the Contractor must, without delay, do such things and execute such documents as are necessary to effect payment of the proceeds.

5) Deductible

The payment of monies up to the deductible amount made in satisfaction of a claim must be borne by the Contractor.

CONTRACT DOCUMENTS (CD)

1) The following are the contract documents:

   a) Contract Page(s) when signed by Canada;
   b) Duly completed Bid and Acceptance Form and any Appendices attached thereto;
   c) Drawings and Specifications;
   d) General Conditions and clauses
      GC1 General Provisions R2810D (2013-04-25);
      GC2 Administration of the Contract R2820D (2012-07-16);
      GC3 Execution and Control of the Work R2830D (2010-01-11);
      GC4 Protective Measures R2840D (2008-05-12);
      GC5 Terms of Payment R2850D (2010-01-11);
      GC6 Delays and Changes in the Work R2865D (2013-04-25);
      GC7 Default, Suspension or Termination of Contract R2870D (2008-05-12);
      GC8 Dispute Resolution R2880D (2012-07-16);
      GC9 Contract Security R2890D (2012-07-16);
      GC10 Insurance R2900D (2008-05-12);
      Supplementary Conditions (SC)
      Fair Wages and Hours of Labour - Labour Conditions R2940D (2012-07-16);
      Allowable Costs for Contract Changes under GC6.4.1 R2950D (2007-05-25);
      Schedules of Wage Rates for Federal Construction Contracts;
   e) Any amendment issued or any allowable bid revision received before the date and time set or solicitation closing;
   f) Any amendment incorporated by mutual agreement between Canada and the Contractor before acceptance of the bid; and
   g) Any amendment or variation of the contract documents that is made in accordance with the General Conditions.

2) The documents identified by title, number and date above are incorporated by reference and are set out in the Standard Acquisition Clauses and Conditions (SACC) Manual, issued by Public Works and Government Services Canada (PWGSC). The SACC Manual is available on the PWGSC Web site: https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual

3) Schedules of Wage Rates for Federal Construction Contracts are included by reference and may be accessed from the Web site: http://www.rhdcc-hrsdc.gc.ca/eng/labour/employment_standards/contracts/schedule/index.shtml

4) The language of the contract documents is the language of the Bid and Acceptance Form submitted.

BID AND ACCEPTANCE FORM (BA)

BA01 IDENTIFICATION

EMERGENCY GENERATOR INSTALLATION
Building 56, CEF Ottawa
Project: CEF13 0013
Solicitation # 13-1427

BA02 BUSINESS NAME AND ADDRESS OF BIDDER

Name: _____

Address: _____
_____

Telephone: _____
Fax: _____
Email: _____
PBN: _____

BA03 THE OFFER

The Bidder offers to Her Majesty the Queen in right of Canada to perform and complete the Work for the above named project in accordance with the Bid Documents for the Total Bid Amount of
$ _____ excluding Applicable Taxes.
(amount in numbers)

BA04 BID VALIDITY PERIOD
The bid shall not be withdrawn for a period of 30 days following the date of solicitation closing.

BA05 ACCEPTANCE AND CONTRACT
Upon acceptance of the Contractor's offer by Canada, a binding Contract shall be formed between Canada and the Contractor. The documents forming the Contract shall be the contract documents identified in Contract Documents (CD).

BA06 CONSTRUCTION TIME
The Contractor shall perform and complete the Work within 12 weeks from the date of notification of acceptance of the offer.

BA07 BID SECURITY
The Bidder is enclosing bid security with its bid in accordance with GI08 - Bid Security Requirements of the General Instructions to Bidders (GI).

BA08 SIGNATURE

_____
Name and title of person authorized to sign on behalf of Bidder (Type or print)

_____ _____
Signature Date

Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

ANNEX A - CERTIFICATE OF INSURANCE

Description and Location of Work	Contract No.
Emergency Generator Installation, Building 56, CEF Ottawa	13-1427
	Project No. CEF13 0013

Name of Insurer, Broker or Agent	Address (No., Street)	City	Province	Postal Code
Name of Insured (Contractor)	**Address (No., Street)**	**City**	**Province**	**Postal Code**
Additional Insured ; **Her Majesty the Queen in Right of Canada as represented by the Minister of Agriculture and Agri-Food**				

Type of Insurance (Required when Checked)	Insurer Name and Policy Number	Inception Date D / M / Y	Expiry Date D / M / Y	Limits of Liability		
				Per Occurrence	Annual General Aggregate	Completed Operations Aggregate
☑ **Commercial General Liability**				**$**	**$**	**$**
☑ **Umbrella/Excess Liability**				**$**	**$**	**$**
☑ **Builder's Risk / Installation Floater**				**$**		
☐ **Pollution Liability**				**$**	☐ Per Incident ☐ Per Occurence	Aggregate **$**
☐ **Marine Liability**				**$**		
☐ **Aviation Liability**				**$**	☐ Per Incident ☐ Per Occurence	Aggregate **$**
☐				**$**		

I certify that the above policies were issued by insurers in the course of their Insurance business in Canada, are currently in force and include the applicable insurance coverages stated on page 2 of this Certificate of Insurance, including advance notice of cancellation / reduction in coverage.

_____ _____
Name of person authorized to sign on behalf of Insurer(s) (Officer, Agent, Broker)

_____
Telephone Number

_____
Signature

_____
Date D / M / Y

General The insurance policies required on page 1 of the Certificate of Insurance must be in force and must include the insurance coverage listed under the corresponding type of insurance on this page. The policies must insure the Contractor and must include Her Majesty the Queen in Right of Canada as represented by the Minister of Agriculture and Agri-Food as an additional Insured. The insurance policies must be endorsed to provide Canada with not less than thirty (30) days notice in writing in advance of a cancellation of insurance or any reduction in coverage. Without increasing the limit of liability, the policies must protect all insured parties to the full extent of coverage provided. Further, the policies must apply to each Insured in the same manner and to the same extent as if a separate policy had been issued to each.	Commercial General Liability The insurance coverage provided must not be substantially less than that provided by the latest edition of IBC Form 2100. The policy must either include or be endorsed to include coverage for the following exposures or hazards if the Work is subject thereto: (a) Blasting. (b) Pile driving and caisson work. (c) Underpinning. (d) Removal or weakening of support of any structure or land whether such support be natural or otherwise if the work is performed by the insured contractor. The policy must have the following minimum limits: (a) **$5,000,000** Each Occurrence Limit; (b) **$10,000,000** General Aggregate Limit per policy year if the policy contains a General Aggregate; and (c) **$5,000,000** Products/Completed Operations Aggregate Limit. Umbrella or excess liability insurance may be used to achieve the required limits.	Builder's Risk / Installation Floater The insurance coverage provided must not be less than that provided by the latest edition of IBC Forms 4042 and 4047. The policy must permit use and occupancy of any of the projects, or any part thereof, where such use and occupancy is for the purposes for which a project is intended upon completion. The policy may exclude or be endorsed to exclude coverage for loss or damage caused by asbestos, fungi or spores, cyber and terrorism. The policy must have a limit that is **not less than the sum of the contract value** plus the declared value (if any) set forth in the contract documents of all material and equipment supplied by Canada at the site of the project to be incorporated into and form part of the finished Work. If the value of the Work is changed, the policy must be changed to reflect the revised contract value. The policy must provide that the proceeds thereof are payable to Canada or as Canada may direct in accordance with GC10.2, "Insurance Proceeds" (https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R/R2900D/2).
Contractors Pollution Liability The policy must have a limit usual for a contract of this nature, but not less than **$1,000,000** per incident or occurrence and in the aggregate.	**Marine Liability** The insurance coverage must be provided by a Protection & Indemnity (P&I) insurance policy and must include excess collision liability and pollution liability. The insurance must be placed with a member of the International Group of Protection & Indemnity Associations or with a fixed market in an amount of not less than the limits determined by the *Marine Liability Act*, S.C. 2001, c. 6. Coverage must include crew liability, if it is not covered by the statutory requirements of the Territory or Province having jurisdiction over such employees. The policy must waive all rights of subrogation against Canada as represented by Public Works and Government Services Canada for any and all loss of or damage to the watercraft however caused.	**Aviation Liability** The insurance coverage shall Include Bodily Injury (including passenger Bodily Injury) and Property Damage, in an amount of not less than **$5,000,000** per incident or occurrence and in the aggregate.

Annex B: Security Requirements Check List
Annexe B: Liste de vérification des exigences relatives à la sécurité

Government of Canada / Gouvernement du Canada

Contract Number / Numéro du contrat
13-1427
Security Classification / Classification de sécurité
Unclassified

SECURITY REQUIREMENTS CHECK LIST (SRCL)
LISTE DE VÉRIFICATION DES EXIGENCES RELATIVES À LA SÉCURITÉ (LVERS)

PART A - CONTRACT INFORMATION / PARTIE A - INFORMATION CONTRACTUELLE

1. Originating Government Department or Organization / Ministère ou organisme gouvernemental d'origine	2. Branch or Directorate / Direction générale ou Direction
AAFC	CBM

3. a) Subcontract Number / Numéro du contrat de sous-traitance	3. b) Name and Address of Subcontractor / Nom et adresse du sous-traitant
N/A	N/A

4. Brief Description of Work / Brève description du travail
Emergency Generator Installation, Buidling 56.
Installation d'une génératrice d'urgence, édifice 56.

5. a) Will the supplier require access to Controlled Goods? Le fournisseur aura-t-il accès à des marchandises contrôlées?	☒ No / Non	☐ Yes / Oui
5. b) Will the supplier require access to unclassified military technical data subject to the provisions of the Technical Data Control Regulations? Le fournisseur aura-t-il accès à des données techniques militaires non classifiées qui sont assujetties aux dispositions du Règlement sur le contrôle des données techniques?	☒ No / Non	☐ Yes / Oui
6. Indicate the type of access required / Indiquer le type d'accès requis		
6. a) Will the supplier and its employees require access to PROTECTED and/or CLASSIFIED information or assets? Le fournisseur ainsi que les employés auront-ils accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS? (Specify the level of access using the chart in Question 7. c) (Préciser le niveau d'accès en utilisant le tableau qui se trouve à la question 7. c)	☒ No / Non	☐ Yes / Oui
6. b) Will the supplier and its employees (e.g. cleaners, maintenance personnel) require access to restricted access areas? No access to PROTECTED and/or CLASSIFIED information or assets is permitted. Le fournisseur et ses employés (p. ex. nettoyeurs, personnel d'entretien) auront-ils accès à des zones d'accès restreintes? L'accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS n'est pas autorisé.	☐ No / Non	☒ Yes / Oui
6. c) Is this a commercial courier or delivery requirement with **no** overnight storage? S'agit-il d'un contrat de messagerie ou de livraison commerciale **sans** entreposage de nuit?	☒ No / Non	☐ Yes / Oui

7. a) Indicate the type of information that the supplier will be required to access / Indiquer le type d'information auquel le fournisseur devra avoir accès

Canada ☐	**NATO / OTAN** ☐	**Foreign / Étranger** ☐
7. b) Release restrictions / Restrictions relatives à la diffusion		
No release restrictions / Aucune restriction relative à la diffusion ☐	All NATO countries / Tous les pays de l'OTAN ☐	No release restrictions / Aucune restriction relative à la diffusion ☐
Not releasable / À ne pas diffuser ☐		
Restricted to: / Limité à : Specify country(ies): / Préciser le(s) pays : ☐	Restricted to: / Limité à : Specify country(ies): / Préciser le(s) pays : ☐	Restricted to: / Limité à : Specify country(ies): / Préciser le(s) pays : ☐

7. c) Level of information / Niveau d'information

PROTECTED A / PROTÉGÉ A ☐	NATO UNCLASSIFIED / NATO NON CLASSIFIÉ ☐	PROTECTED A / PROTÉGÉ A ☐
PROTECTED B / PROTÉGÉ B ☐	NATO RESTRICTED / NATO DIFFUSION RESTREINTE ☐	PROTECTED B / PROTÉGÉ B ☐
PROTECTED C / PROTÉGÉ C ☐	NATO CONFIDENTIAL / NATO CONFIDENTIEL ☐	PROTECTED C / PROTÉGÉ C ☐
CONFIDENTIAL / CONFIDENTIEL ☐	NATO SECRET / NATO SECRET ☐	CONFIDENTIAL / CONFIDENTIEL ☐
SECRET / SECRET ☐	COSMIC TOP SECRET / COSMIC TRÈS SECRET ☐	SECRET / SECRET ☐
TOP SECRET / TRÈS SECRET ☐		TOP SECRET / TRÈS SECRET ☐
TOP SECRET (SIGINT) / TRÈS SECRET (SIGINT) ☐		TOP SECRET (SIGINT) / TRÈS SECRET (SIGINT) ☐

PART A *(continued)* / PARTIE A *(suite)*

8. Will the supplier require access to PROTECTED and/or CLASSIFIED COMSEC information or assets? ☒ No / Non ☐ Yes / Oui
Le fournisseur aura-t-il accès à des renseignements ou à des biens COMSEC désignés PROTÉGÉS et/ou CLASSIFIÉS?
If Yes, indicate the level of sensitivity:
Dans l'affirmative, indiquer le niveau de sensibilité :

9. Will the supplier require access to extremely sensitive INFOSEC information or assets? ☒ No / Non ☐ Yes / Oui
Le fournisseur aura-t-il accès à des renseignements ou à des biens INFOSEC de nature extrêmement délicate?

Short Title(s) of material / Titre(s) abrégé(s) du matériel :
Document Number / Numéro du document :

PART B - PERSONNEL (SUPPLIER) / PARTIE B - PERSONNEL (FOURNISSEUR)

10. a) Personnel security screening level required / Niveau de contrôle de la sécurité du personnel requis

☒ RELIABILITY STATUS COTE DE FIABILITÉ	☐ CONFIDENTIAL CONFIDENTIEL	☐ SECRET SECRET	☐ TOP SECRET TRÈS SECRET
☐ TOP SECRET– SIGINT TRÈS SECRET – SIGINT	☐ NATO CONFIDENTIAL NATO CONFIDENTIEL	☐ NATO SECRET NATO SECRET	☐ COSMIC TOP SECRET COSMIC TRÈS SECRET
☐ SITE ACCESS ACCÈS AUX EMPLACEMENTS			

Special comments:
Commentaires spéciaux : _____

NOTE: If multiple levels of screening are identified, a Security Classification Guide must be provided.
REMARQUE : Si plusieurs niveaux de contrôle de sécurité sont requis, un guide de classification de la sécurité doit être fourni.

10. b) May unscreened personnel be used for portions of the work? ☒ No / Non ☐ Yes / Oui
Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail?
If Yes, will unscreened personnel be escorted? ☐ No / Non ☐ Yes / Oui
Dans l'affirmative, le personnel en question sera-t-il escorté?

PART C - SAFEGUARDS (SUPPLIER) / PARTIE C - MESURES DE PROTECTION (FOURNISSEUR)

INFORMATION / ASSETS / RENSEIGNEMENTS / BIENS

11. a) Will the supplier be required to receive and store PROTECTED and/or CLASSIFIED information or assets on its site or premises? ☒ No / Non ☐ Yes / Oui
Le fournisseur sera-t-il tenu de recevoir et d'entreposer sur place des renseignements ou des biens PROTÉGÉS et/ou CLASSIFIÉS?

11. b) Will the supplier be required to safeguard COMSEC information or assets? ☒ No / Non ☐ Yes / Oui
Le fournisseur sera-t-il tenu de protéger des renseignements ou des biens COMSEC?

PRODUCTION

11. c) Will the production (manufacture, and/or repair and/or modification) of PROTECTED and/or CLASSIFIED material or equipment occur at the supplier's site or premises? ☒ No / Non ☐ Yes / Oui
Les installations du fournisseur serviront-elles à la production (fabrication et/ou réparation et/ou modification) de matériel PROTÉGÉ et/ou CLASSIFIÉ?

INFORMATION TECHNOLOGY (IT) MEDIA / SUPPORT RELATIF À LA TECHNOLOGIE DE L'INFORMATION (TI)

11. d) Will the supplier be required to use its IT systems to electronically process, produce or store PROTECTED and/or CLASSIFIED information or data? ☒ No / Non ☐ Yes / Oui
Le fournisseur sera-t-il tenu d'utiliser ses propres systèmes informatiques pour traiter, produire ou stocker électroniquement des renseignements ou des données PROTÉGÉS et/ou CLASSIFIÉS?

11. e) Will there be an electronic link between the supplier's IT systems and the government department or agency? ☒ No / Non ☐ Yes / Oui
Disposera-t-on d'un lien électronique entre le système informatique du fournisseur et celui du ministère ou de l'agence gouvernementale?

PART C - *(continued)* / PARTIE C - *(suite)*

For users completing the form **manually** use the summary chart below to indicate the category(ies) and level(s) of safeguarding required at the supplier's site(s) or premises.
Les utilisateurs qui remplissent le formulaire **manuellement** doivent utiliser le tableau récapitulatif ci-dessous pour indiquer, pour chaque catégorie, les niveaux de sauvegarde requis aux installations du fournisseur.

For users completing the form **online** (via the Internet), the summary chart is automatically populated by your responses to previous questions.
Dans le cas des utilisateurs qui remplissent le formulaire **en ligne** (par Internet), les réponses aux questions précédentes sont automatiquement saisies dans le tableau récapitulatif.

SUMMARY CHART / TABLEAU RÉCAPITULATIF

Category Catégorie	PROTECTED PROTÉGÉ			CLASSIFIED CLASSIFIÉ			NATO				COMSEC					
	A	B	C	CONFIDENTIAL CONFIDENTIEL	SECRET	TOP SECRET TRÈS SECRET	NATO RESTRICTED NATO DIFFUSION RESTREINTE	NATO CONFIDENTIAL NATO CONFIDENTIEL	NATO SECRET	COSMIC TOP SECRET COSMIC TRÈS SECRET	PROTECTED PROTÉGÉ A	PROTECTED PROTÉGÉ B	PROTECTED PROTÉGÉ C	CONFIDENTIAL CONFIDENTIEL	SECRET	TOP SECRET TRES SECRET
Information / Assets Renseignements / Biens	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Production	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
IT Media / Support TI	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
IT Link / Lien électronique	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

12. a) Is the description of the work contained within this SRCL PROTECTED and/or CLASSIFIED?
La description du travail visé par la présente LVERS est-elle de nature PROTÉGÉE et/ou CLASSIFIÉE?

☒ No / Non ☐ Yes / Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification".
Dans l'affirmative, classifier le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire.

12. b) Will the documentation attached to this SRCL be PROTECTED and/or CLASSIFIED?
La documentation associée à la présente LVERS sera-t-elle PROTÉGÉE et/ou CLASSIFIÉE?

☒ No / Non ☐ Yes / Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification" and indicate with attachments (e.g. SECRET with Attachments).
Dans l'affirmative, classifier le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire et indiquer qu'il y a des pièces jointes (p. ex. SECRET avec des pièces jointes).

Government of Canada / Gouvernement du Canada

Contract Number / Numéro du contrat
13-1427
Security Classification / Classification de sécurité
Unclassified

PART D - AUTHORIZATION / PARTIE D - AUTORISATION

13. Organization Project Authority / Chargé de projet de l'organisme

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature	
Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date

14. Organization Security Authority / Responsable de la sécurité de l'organisme

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature	
Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date

15. Are there additional instructions (e.g. Security Guide, Security Classification Guide) attached?
Des instructions supplémentaires (p. ex. Guide de sécurité, Guide de classification de la sécurité) sont-elles jointes?
☐ No / Non ☐ Yes / Oui

16. Procurement Officer / Agent d'approvisionnement

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature	
	r		
Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date

17. Contracting Security Authority / Autorité contractante en matière de sécurité

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature	
Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date

Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

DRAWINGS AND SPECIFICATIONS

#13-1427

FOR

EMERGENCY GENERATOR INSTALLATION
Building 56
Project: CEF13 0013

CENTRAL EXPERIMENTAL FARM (CEF)
Agriculture and Agri-Food Canada (AAFC)
960 Carling Avenue
Ottawa, Ontario K1A 0C6

TABLE OF CONTENTS

SPECIFICATIONS

DRAWINGS

PART 1 - GENERAL

1.1 Minimum Standards

.1 Materials shall be new and work shall conform to the minimum applicable standards of the Canadian General Standards Board, the Canadian Standards Association, the National Building Code of Canada 2010 and all applicable Provincial and Municipal codes. In the case of conflict or discrepancy the most stringent requirement shall apply.

1.2 Taxes

.1 Pay all taxes properly levied by law (including Federal, Provincial and Municipal).

1.3 Fees, Permits, and Certificates

.1 Pay all fees and obtain all permits. Provide authorities with plans and information for acceptance certificates. Provide inspection certificates as evidence that work conforms to requirements of the authority having jurisdiction.

1.4 Fire Safety Requirements

.1 Comply with the National Building Code of Canada 2010 for fire safety in construction and the National Fire Code of Canada 2013 for fire prevention, fire fighting and life safety in building in use.

.2 Comply with Human Resources Skills and Development Canada (HRSDC), Fire Commissioner of Canada (FCC) standards:
.1 No. 301: Standard for Construction Operations.
.2 No. 302: Standard for Welding and Cutting, available from Fire Protection Engineering Services, Labour Program, HRSDC.
.3 Retain all fire safety documents and standards on site.

.3 Welding and cutting:
.1 At least 48 hours prior to commencing cutting, welding or soldering procedure, provide to the Departmental Representative:

1.4 Fire Safety Requirements (Cont'd)

.3 (Cont'd)

.1 (Cont'd)

.1 Notice of intent, indicating devices affected, time and duration of isolation or bypass.

.2 Completed welding permit as defined in FC 302.

.3 Return welding permit to the Departmental Representative immediately upon completion of procedures for which permit was issued.

.2 A fire watcher as described in FC 302 shall be assigned when welding or cutting operations are carried out in areas where combustible materials within 10m may be ignited by conduction or radiation.

.4 Where work requires interruption of fire alarms or fire suppression, extinguishing or protection systems:

.1 Provide watchman service as described in FC 301. In general, watchman service is defined as an individual conversant with Fire Emergency Procedures, performing fire picket duty within an unprotected and unoccupied (no workers) area once per hour.

.2 Retain services of manufacturer for fire protection systems on daily basis or as approved by FCC, to isolate and protect all devices relating to:

.1 modification of fire alarms, fire suppression, extinguishing or protection systems; and/or

.2 cutting, welding, soldering or other construction activities which might activate fire protection systems.

.5 Immediately upon completion of work, restore fire protection systems to normal operation and verify that all devices are fully operational.

.6 Inform fire alarm system monitoring agency and local Fire Department immediately prior to isolation and immediately upon restoration of normal operation.

.7 Contractor to follow all protocols of PWGSC for work carried out in Building. Protocol regulation and instruction document will be explained and given to Contractors at the Job Showing.

1.5 Field Quality Control

.1 Carry out work using qualified licenced workers or apprentices in accordance with Provincial Act respecting manpower vocational training and qualification.

.2 Permit employees registered in Provincial apprenticeship program to perform specific tasks only if under direct supervision of qualified licenced workers.

.3 Determine permitted activities and tasks by apprentices, based on level of training attended and demonstration of ability to perform specific duties.

1.6 Hazardous Materials

.1 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal hazardous materials; and regarding labelling and provision of Material Safety Data Sheet and acceptable to Human Resources Development Canada, Labour Program.

.2 For work in or affecting occupied buildings give the Departmental Representative 48 hours notice for work involving designated substances (Ontario Bill 208), hazardous substances, and before painting, caulking, installing carpet or using adhesives.

1.7 Temporary Utilities

.1 Existing services required for the work, may be used by the Contractor without charge. Ensure capacity is adequate prior to imposing additional loads. Connect and disconnect at own expense and responsibility.

.2 Notify the Departmental Representative and utility companies of intended interruption of services, obtain requisite permission.

1.7 Temporary Utilities (Cont'd)

.3 Give the Departmental Representative 5 days notice related to each necessary interruption of any mechanical or electrical service throughout the course of the work. Keep duration of these interruptions to a minimum. Carry out all interruptions after normal working hours of the occupants, preferably on weekends.

1.8 Removed materials

.1 Unless otherwise specified, materials for removal becomes the Contractor's property and shall be taken from site.

1.9 Protection

.1 Protect finished work against damage until take-over.

.2 Protect adjacent work against the spread of dust and dirt beyond the work areas.

.3 Protect operatives and other users of site from all hazards.

1.10 Powder Actuated Fastening Devices

.1 Do not use powder actuated tools using explosives, unless permitted expressly by the Departmental Representative.

1.11 Use of Site and Facilities

.1 Execute work with the least possible interference or disturbance to the normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated. Refer to Article 25 Scheduling below, for work that must be done during "off hours".

.2 Be aware of restricted access to various plant areas during construction. Access to electrical rooms and sanitary facilities through the building will be available to all contractor security cleared personnel.

.3 Maintain existing services to building and provide for personnel and vehicle access.

.4 Where security is reduced by work provide temporary means to maintain security.

1.11 Use of Site and Facilities (Cont'd)

.5 Sanitary facilities will be provided by the Contractor for Contractor's personnel. Others shall not be used. Keep facilities clean.Locations to be co-ordinated on site with Departmental Representative.

.6 Contractor Trailer location to be asigned by the Departmental Representative if required.

1.12 Site Storage

.1 The Departmental Representative will assign storage space which shall be equipped and maintained by the Contractor.

.2 Move stored products or equipment, which interferes with the operations of the Departmental Representative or other Contractors.

.3 Obtain and pay for use of additional storage or work areas needed for operations.

1.13 Cut, Patch and Make Good

.1 Cut existing surfaces as required to accommodate new work.

.2 Remove all items so shown of specified.

.3 Patch and make good surfaces cut, damaged or disturbed, to the Departmental Representative's approval. Match existing material, colour, finish and texture.

.4 Execute cutting, fitting and patching to complete the work.

.5 Provide openings in non-structural elements of the work for penetrations of mechanical and electrical work.

.6 Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.

.7 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.8 Fit work to pipes, sleeves, conduit and other penetrations through surfaces.

1.13 Cut, Patch and Make Good (Cont'd)

.9 Install firestops and smoke seals in accordance with ULC-S-115-2011 around pipe, cables, cabletrays and other objects penetrating fire separations to provide fire resistance not less than the fire resistance rating of surrounding wall assembly.

.10 Fill voids around pipes:
.1 Where cored holes pass through walls, provide space for firestopping. Where pipes pass through fire rated walls and maintain fire rating integrity.

.11 Refinish surfaces to match adjacent finishes; for continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

.12 Submit written request 48 hours in advance of cutting or alteration which affects structural integrity of any element of project.

.13 Structural and non-structural cutting and coring:
.1 Do not cut or core steel beams or columns, or floor joists except with written permission of the Departmental Representative.
.2 Individual cores up to 150 mm dia. may be cut through floor slabs after checking that no structural steel members will be intersected.
.3 Verify beam and joist locations before coring. Offset cores to clear beam flanges and joists.
.4 Cored Holes: at points where pipes pass through masonry and concrete. Minimum 6 mm clearance all around, between cored hole and uninsulated pipe or between cored hole and insulation.

1.14 Sleeves, Hangers and Inserts

.1 Co-ordinate setting and packing of sleeves and supply and installation of hangers and

1.15 Examination

.1 Examine site and conditioins likely to affect work and be familiar and conversant with existing conditions.

1.16 Signs

.1 Provide common-use signs related to traffic control, information, instruction, use of equipment, public safety devices, etcetera, in both official languages or by the use of commonly-understood graphic symbols to the Departmental Representative's approval.

.2 No advertising will be permitted on this project.

1.17 Access and Egress

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant Municipal, Provincial and other regulations.

1.18 Scaffolds, Work Platforms and Hoisting

.1 Design, install, and inspect scaffolds platforms and hoisting platforms required for work in accordance with relevant municipal, provincial and other regulations.

1.19 Public Way Protection

.1 Design, erect and maintain hoarding and covered pedestrian walkways to support all including windloads and provide protection, complete with signs and electrical lighting

1.20 Guarantees and Warranties

.1 Before completion of work collect all manufacturer's guarantees and warranties and deposit with Departmental Representative.

1.21 Clean Up

.1 Clean up work area as work progresses. At the end of each work period, and more often if ordered by the Departmental Representative, remove debris from site, neatly stack material for use, and clean up generally.

.2 Upon completion remove scaffolding, temporary protection and surplus materials. Make good defects noted at this stage.

1.21 Clean Up (Cont'd)

.3 Clean areas under contract to a condition at least equal to that previously existing and to approval of Departmental Representative.

.4 Loose debris on site will not be tolerated, adhere to engineer's restraint and disposal requirements.

1.22 Building Smoking Environment

.1 Smoking is not permitted in the building. Obey smoking restrictions on building and property.

1.23 Dust Control

.1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of work and the public.

.2 Maintain and relocate protection until such work is complete.

.3 Protect all furnishings and sensitive equipment within work area with 0.102 mm thick polyethylene film during construction. Remove film during non-construction hours and leave premises in clean, unencumbered and safe manner for normal daytime function.

1.24 Scheduling

.1 On award of contract submit bar (GANTT) chart construction schedule for work, indicating anticipated progress stages within time of completion. When schedule has been reviewed by the Departmental Representative, take necessary measures to complete work within scheduled time. Do not change schedule without notifying Departmental Representative.

.2 Carry out work during "regular hour" Monday to Friday from 07:00 to 18:00 hours and on Saturdays, Sundays and statutory holidays.

.3 Carry out all shut down work during "off hours" Evenings, Saturdays and Sundays from 18:00 to 07:00 hours.

1.24 Scheduling (Cont'd)

.4 Give the Departmental Representative 72 hours notice for work to be carried out during "off hours". This work has to be coordinated with Departmental Representative.

1.25 Cost Breakdown

.1 Before submitting first progress claim, submit breakdown of Contract Amount in detail as directed by Departmental Representative and aggregating the Contract Amount. After approval by Departmental Representative cost breakdown will be used as the basis of progress payments.

1.26 Project Meetings

.1 Organize weekley project meetings to discuss progress, schedules, and issues. Departmental Representative will take and distribute minutes.

.2 Arrange for sub-contractors to attend as required.

1.27 Precedence

.1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this project manual.

1.28 Acceptance

.1 All modifications to the existing buildings exterior ie. siding replacement, supports etc. must be approved by the Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 78 00 - Closeout Submittals.

1.2 Administrative

.1 Submit to Departmental Representative submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Work affected by submittal shall not proceed until review is complete.

.3 Present shop drawings, product data, in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.

.6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are coordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.10 Keep one reviewed copy of each submission on site.

1.3 Shop Drawings and Product Data

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit ten (10) copies of shop drawings for each piece of equipment being provided by the contractors for this project. Shop drawings for each discipline to be submitted to all other disciplines for review and co-ordination with their scope of work.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow 10 days for Departmental Representative's review of each submission.

.5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of any revisions other than those requested.

.7 Accompany submissions with transmittal letter, in duplicate, containing:
- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.8 Submissions shall include:
- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.

.9 After Departmental Representative's review, distribute copies.

.10 Delete information not applicable to project.

.11 Supplement standard information to provide details applicable to project.

.12 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.13 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept. This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.4 Samples

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative's business address or site office, as directed.

.3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 Certificates and Transcripts

.1 Immediately after award of contract, submit Workers' Compensation Board status.

PART 2 - PRODUCTS

2.1 Not Used

.1 Not used.

PART 3 - EXECUTION

3.1 Not Used

.1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

1.2 References

.1 Canadian Standards Association (CSA).
.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

.2 Province of Ontario:
.1 Occupational Health and Safety Act and Regulation for Construction Projects, R.S.O. 1990 June 2002.

1.3 Submittals

.1 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
.1 Site specific safety hazard assessment.
.2 Safety and health risk or hazard analysis for site tasks and operation.
.3 Complying with the Occupational Health and Safety Act and regulations for construction projects.

.2 Submit Construction Safety Checklists after completion.

.3 Submit copies of reports or directions issued by Federal and Provincial health and safety inspector.

.4 Submit copies of incident and accident reports.

.5 Submit to Departmental Representative with Material Safety Data Sheets (MSDS).

.6 Personnel training requirements including as follows:
.1 Names of personnel and alternates responsible for site safety and health, hazards present on site, and use of personal protective equipment.

.7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 7 days after receipt of comments from Departmental Representative.

.8 On-site Contingency and Emergency Response Plan: Address standard operating procedures to be implemented during emergency situations.

1.4 Filing of Notice

.1 File Notice with Provincial authorities prior to commencement of Work.

1.5 Safety Assessment

.1 Perform site specific safety hazard assessment related to project.

1.6 Meetings

.1 Pre-construction meetings: attend health and safety pre-construction meeting.

1.7 Regulatory Requirements

.1 Comply with specified standards and regulations to ensure safe operations at site containing hazardous or toxic materials.

1.8 General Requirements

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Relief from or substitution for any portion or provision of minimum Health and Safety Guidelines specified herein or reviewed site-specific Health and Safety Plan must be submitted to the Departmental Representative in writing. The Departmental Representative will respond in writing, either accepting or requesting improvements.

1.9 Responsibility

.1 Be responsible for safety of persons and property on site and for protection of persons off site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

.3 The Contractor shall assume the role of a constructor in compliance with Occupational Health and Safety Act and Regulations for Construction Projects as related to the execution of this contract, providing site supervision and maintaining overall control and authority for health and safety on the site throughout the project.

1.10 Communication Requirements

.1 Comply with Ontario Health and Safety Act.

.2 Provide the Departmental Representative with Material Safety Data Sheets (MSDS).

1.11 Unforeseen Hazards

.1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Departmental Representative verbally and in writing.

1.12 Posted Documents

.1 Provide or obtain from the Departmental Representative documents as follow and post on site:
.1 Safety Policy.
.2 Health and Safety Representative.
.3 General Requirements - Constructor's name.
.4 Worker's Compensation Board for Province of Ontario - Form 82.
.5 Worker's Compensation Board for Province of Ontario - Regulation 1101.
.6 Ministry of Labour Orders for Province of Ontario.
.7 Occupational Health and Safety Act for Province of Ontario.
.8 Material Safety Data Sheets.
.9 Floor Plan.
.10 Notice of Project.
.11 Joint Health and Safety Committee Members.

.2 Comply with Provincial general posting requirements.

1.13 Correction of Non-Compliance

.1 Immediately address health and safety non-compliance issues identified by Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.14 Blasting

.1 Blasting or other use of explosives is not permitted.

1.15 Powder Actuated Devices

.1 Use of powder actuated devices is not permitted.

1.16 Work Stoppage

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

.2 Assign responsibility and obligation to Health and Safety Officer to stop or start Work when, at Health and Safety Officer's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 Definitions

.1 Waste Audit (WA): Relates to projected waste generation. Involves measuring and estimating quantity and composition of waste, reasons for waste generation, and operational factors which contribute to waste.

.2 Waste Reduction Workplan (WRW): Written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.

.3 Materials Source Separation Program (MSSP): Consists of a series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

.4 Cost/Revenue Analysis Workplan (CRAW): Based on information from WRW, and intended as financial tracking tool for determining economic status of waste management practices.

.5 Waste Management Coordinator (WMC): Designate individual who is in attendance on-site, full-time. Designate, or have designated, individuals from each Subcontractor to be responsible for waste management related to their trade and for coordinating activities with WMC.

.6 Separate Condition: Refers to waste sorted into individual types.

1.2 Documents

.1 Maintain at job site, one copy of following documents:
- .1 Waste Audit.
- .2 Waste Reduction Workplan.
- .3 Material Source Separation Plan.

1.3 Waste Audit

.1 Conduct WA prior to project start-up.

.2 Record, on Waste Audit, extent to which materials or products used consist of recycled or reused materials or products.

1.4 Waste Reduction Workplan

.1 Prepare WRW prior to project start-up.

.2 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

.3 Describes management of waste.

.4 Identify opportunities for reduction, reuse, and/or recycling (3Rs) of materials. Based on information acquired from WA.

.5 Post workplan or summary where workers at site are able to review its content.

1.5 Materials Source Separation Program

.1 Prepare MSSP and have ready for use prior to project start-up.

.2 Implement MSSP for waste generated on project in compliance with approved methods and as approved by Departmental Representative.

.3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and/or recyclable materials.

.4 Provide containers to deposit reusable and/or recyclable materials.

.5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.

.6 Locate separated material in area which minimize material damage.

.7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition. Transport to approved and authorized recycling facility.

.8 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition. Materials must be immediately separated into required categories for reuse of recycling.

1.6 Disposal of Wastes

.1 Burying of rubbish and waste materials is prohibited.

.2 Disposal of waste, volatile materials, mineral spirits, oil and paint thinner into waterways, storm, or sanitary sewers is prohibited.

1.7 Storage, Handling and Protection

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.

.2 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

.3 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.

.4 Protect surface drainage, mechanical and electrical from damage and blockage.

1.8 Removed Materials

.1 Dispose of existing material and equipment removed from work but not identified for reuse on site or identified as required by the Departmental Representative.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 Application

.1 Do work in compliance with WRW.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and Codes.

3.2 Cleaning

.1 Remove tools and waste materials on completion of work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

3.3 Diversion of Materials

.1 Separate materials from general waste stream and stockpile in separate piles or containers, to approval of Departmental Representative, and consistent with applicable fire regulations. Mark containers or stockpile areas. Provide instruction on disposal practices.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

1.2 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.3 Copy will be returned after final inspection, with Departmental Representative's comments.

.4 Revise content of documents as required prior to final submittal.

.5 Two weeks prior to Interim Certificate of Completion of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English and French.

.6 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.7 Furnish evidence, if requested, for type, source and quality of products provided.

.8 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.9 Pay costs of transportation.

1.3 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by systems, under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.4 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project;
- .1 Date of submission; names.
- .2 Addresses, and telephone numbers of Contractor with name of responsible parties.
- .3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:
- .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

1.5 AS-BUILTS AND SAMPLES

.1 Maintain,in addition to requirements in General Conditions, at site for Departmental Representative one record copy of:
.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Change Orders and other modifications to Contract.
.5 Reviewed shop drawings, product data, and samples.
.6 Field test records.
.7 Inspection certificates.
.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Departmental Representative.

1.6 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on set of black line opaque drawings, provided by Departmental Representative.

.2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
.1 Measured depths of elements of foundation in relation to finish first floor datum.
.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
.4 Field changes of dimension and detail.
.5 Changes made by change orders.
.6 Details not on original Contract Drawings.
.7 References to related shop drawings and modifications.

.5 Specifications: mark each item to record actual construction, including:
.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications,inspection certifications, field test records, required by individual specifications sections.

1.7 EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports as specified in Section 01 91 13 - General Commissioning (Cx) Requirements.

.15 Additional requirements: as specified in individual specification sections.

1.8 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-Protection and Weather-Exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional Requirements: as specified in individual specifications sections.

1.9 MAINTENANCE MATERIALS

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to site; place and store.

.4 Receive and catalogue items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 91 13 - General Commissioning (Cx) Requirements.

1.2 Description

.1 Demonstrate operation and maintenance of equipment and systems to Departmental Representative prior to date of interim completion.

.2 Departmental Representative will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon times.

1.3 Quality Control

.1 When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Departmental Representative and provide written report that demonstration and instructions have been completed.

1.4 Submittals

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Departmental Representative's approval.

.3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

.4 Give time and date of each demonstration, with list of persons present.

1.5 Conditions for Demonstrations

.1 Equipment has been inspected and put into operation in accordance with related Sections.

.2 Testing, adjusting, and balancing has been performed in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements and equipment and systems are fully operational.

.3 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.6 Preparation

.1 Verify that conditions for demonstration and instructions comply with requirements.

.2 Verify that designated personnel are present.

1.7 Demonstration and Instructions

.1 Demonstrate start-up, operation, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times, at the equipment location.

.2 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.

.3 Review contents of manual in detail to explain all aspects of operation and maintenance.

.4 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.

.5 Allow for two(2) only, four(4) hour long training session for all trades.Time and place to be assigned by Departmental Representative.

1.8 Seminar and Demonstration Questions

.1 Be prepared to answer all questions raised by the Departmental Representative at demonstrations and seminars. If satisfactory answers to questions are not immediately available, provide a written response to the Departmental Representative within three working days.

PART 2 - PRODUCTS

2.1 Not Used

.1 Not used.

PART 3 - EXECUTION

3.1 Not Used

.1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.3 Section 01 78 00 - Closeout Submittals.

.4 Division 26 - Electrical.

.5 Division 23 and 33 - Mechanical.

1.2 Acronyms

.1 AFD - Alternate Forms of Delivery, service provider.

.2 Cx - Commissioning.

.3 O&M - Operation and Maintenance.

.4 PI - Product Information.

.5 PV - Performance Verification.

.5 TAB - Testing, Adjusting and Balancing.

1.3 General

.1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:

- .1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.
- .2 Ensure appropriate documentation is compiled into the BMM.
- .3 Effectively train O&M staff.

.2 Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.

.3 Commissioning of project components and systems is of the utmost importance to ensure the successful operation of this project. The project will not be considered complete until all systems have been demonstrated to work precisely in accordance with the contract requirements.

.4 Partial commissioning of generators may be required in advance of overall system commissioning to ensure emergency power is provided to CHCP prior to actual testing of system.

1.4 Commissioning Overview

.1 Cx is conducted in concert with activities performed during stage of project delivery. The responsibility for the satisfactory completion of the project and demonstration that the requirements of commissioning are satisfied rests with the Contractor, who will employ and pay for the specialist supervision, inspection and testing as required to complete the work described.

.2 Departmental Representative will issue Interim Acceptance Certificate when:
- .1 Completed Cx documentation has been received, reviewed for suitability and approved by Departmental Representative.
- .2 Equipment, components and systems have been commissioned.
- .3 O&M training has been completed.

.3 Start-up and commissioning of the generators and the emergency power systems will be by Division 26. The following commissioning activities shall be carried out by the Contractor:
- .1 Carry out commissioning under direction of the Departmental Representative and in presence of Departmental Representative.
- .2 Test each emergency power system independently and then in unison with other related systems.
- .3 Inform, and obtain approval from the Departmental Representative in writing at least 14 days prior to commissioning or each test. Indicate:
  - .1 Location and part of system to be tested or commissioned.

.2 Testing/commissioning procedures, anticipated results.
.3 Names of testing/commissioning personnel.
.4 Perform tests as required.

.4 Correct deficiencies, re-test in presence of the Departmental Representative until satisfactory performance is obtained.

.5 Acceptance of tests will not relieve Contractor from responsibility for ensuring that complete systems meet every requirement of Contract.

.6 Load emergency power system with building loads for CX.

.7 Commission each emergency system using procedures prescribed by the Departmental Representative.

.8 Commission integrated systems using procedures prescribed by the Departmental Representative.

.9 Commissioning to be considered as satisfactorily completed when objectives of commissioning have been achieved and reviewed by the Departmental Representative.

1.5 Commissioning Process

.1 The Commissioning Process consists of:
.1 Testing of "New" components installed as defined in the Tender Documents.
.2 Testing of systems including existing systems which have been modified or extended as part of the work as defined in the Tender Documents.
.3 Integrated Systems performance testing and fine-tuning as defined within the Tender Documents.

1.6 Roles and Responsibilities

.1 The roles and responsibilities of the Departmental Representative and the Contractor for the Commissioning Process are as follows:
.1 The Departmental Representative is responsible for the coordination of the overall commissioning process.

.2 The Departmental Representative may participate in some or all of the testing and verification of project components, systems, and integrated systems to meet the client and project objectives.
.3 The Contractor shall participate in all of the performance testing and verification of building components, systems, and integrated systems to ensure that project components, systems, and integrated systems work correctly as per the project requirements and design intent.
.4 The Contractor shall be responsible for organizing and implementing all aspects of the commissioning process outlined herein.

1.7 Pre-Cx Review

.1 Before Construction:
.1 Review contract documents, confirm by writing to Departmental Representative.
.1 Adequacy of provisions for Cx.
.2 Aspects of design and installation pertinent to success of Cx.

.2 During Construction:
.1 Co-ordinate provision, location and installation of provisions for Cx.

.3 Before start of Cx:
.1 Have completed Cx Plan up-to-date.
.2 Ensure installation of related components, equipment, sub-systems, systems is complete.
.3 Fully understand Cx requirements and procedures.
.4 Have Cx documentation shelf-ready.
.5 Understand completely design criteria and intent and special features.
.6 Submit complete start-up documentation to Departmental Representative.
.7 Have Cx schedules up-to-date.
.8 Ensure systems have been cleaned thoroughly.
.9 Complete TAB procedures on systems, submit TAB reports to Departmental Representative for review and approval.
.10 Ensure "As-Built" system schematics are available.

.4 Inform Departmental Representative in writing of discrepancies and deficiencies on finished works.

1.8 Submittals

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
.1 Submit no later than 4 weeks after award of Contract:
.1 Name of Contractor's Cx agent.
.2 Draft Cx documentation.
.3 Preliminary Cx schedule.
.2 Request in writing to Departmental Representative for changes to submittals and obtain written approval at least 8 weeks prior to start of Cx.
.3 Submit proposed Cx procedures to Departmental Representative where not specified and obtain written approval at least 8 weeks prior to start of Cx.
.4 Provide additional documentation relating to Cx process required by Departmental Representative.

1.9 Commissioning Schedule

.1 Within 1 week of contract award, prepare a detailed schedule for implementing and conducting the Commissioning process. Update the schedule routinely and more often as directed by the Departmental Representative so that the schedule is always current and relevant to the components, systems, and integrated systems being commissioned.

.2 Unless otherwise specified in writing by the Departmental Representative, all testing and related requirements specified herein will be successfully performed prior to the issuance of the Interim Certificate of Completion.

1.10 Coordination

.1 Coordinate all sub-trades, other Divisions, manufacturers, suppliers, and other specialists as required to ensure all phases of work shall be properly organized prior to commencement of each particular testing procedure. Establish all necessary manpower requirements.

.2 Coordinate the activities of this Section with the starting and testing of:
.1 Mechanical components and systems specified in Division 21 and 23.
.2 Electrical components and systems specified in Division 26.
.3 EMCS components and systems specified in Division 25.

.3 Where any components or systems require testing prior to starting, ensure that such work has been completed and approved prior to starting of these components and systems.

1.11 Verification Forms

.1 The Departmental Representative will develop project specific verification forms if necessary for verification of components and systems which will be provided to the Contractor. Fully completed forms are to be completed and submitted to the Departmental Representative upon completion of the Contractor's start-up activities and prior to Acceptance Testing of the components /systems.
.1 PI/PV forms shall be completed as follows:
.1 The specified requirements shall be completed by Contractor and verified by the Departmental Representative.
.2 The shop drawing information shall be completed by hand and shall reflect APPROVED shop drawings.
.3 The installed information shall be completed the Contractor from nameplates on installed equipment.
.4 The systems verification cannot take place before all related componants have been verified as correct.
.5 Integrated systems verification cannot take place before all related systems have been verified as correct.
.6 PI/PV forms will be provided for information and convenience to the Contractor and will not relieve the Contractor of responsability for verification of components, systems, or integrated systems not included on the verification forms.

.7 A verification form is to be completed for each integrated system in a category requiring verification.

1.12 Witnessing of Starting and Testing

.1 Prior to starting and testing of components or systems, prepare a schedule for the required testing. Review schedule and revise as required to obtain acceptance of the Departmental Representative. Also refer to the scheduling section of this commissioning specification.

.2 Provide sufficient notice of a minimum of ten working days prior to commencing tests.

.3 The Departmental Representative may witness all or any portion of testing and starting procedures performed by the Contractor.

.4 Contractor to be present for all tests.

1.13 Authorities Having Jurisdiction

.1 Initial equipment start-up shall be successfully completed by the Contractor prior to performance verification and certification by presiding authorities having jurisdiction.

.2 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.

.3 Any costs associated with the presiding authorities attending testing during the daytime or during off-hours shall be the responsibility of the Contractor. Include all such costs in the tender.

.4 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.

.5 Provide copies to Departmental Representative within 5 days of test and with Cx report.

1.14 Correction of Deficiencies

.1 Correct all contract deficiencies found during commissioning.

PART 2 - PRODUCTS

2.1 Not Used

.1 Not used.

PART 3 - EXECUTION

3.1 Testing Overview

.1 Ensure integrated system operations conform with the design documents, providing the required performance with proper interaction between related systems.

.2 Verify performance of components and systems operating in conjunction with one another under all conditions and modes of operation.

.3 Each system is to be operated for as long as required to complete commissioning.

.4 The Departmental Representative to verify that reported results of testing and procedures are checked and verified to be correct. If inconsistencies appear between reported results and demonstrated values, the relevant testing procedures are repeated and adjustments made until satisfactory results are obtained.

3.2 Coordination

.1 Integrated system testing shall take place only after the mechanical, electrical, and electronic control systems testing and commissioning have been completed and accepted by the Departmental Representative.

.2 System testing shall not take place until the operation and maintenance manuals have been reviewed and accepted by the Departmental Representative.

.3 Arrange for and confirm to Departmental Representative that the presiding authorities having jurisdiction will be present for each test, as required.

3.3 Responsibilities

.1 The Departmental Representative will do the following during Systems and Integrated System Testing and Fine tuning:
- .1 Witness and provide instruction in a series of pre-planned integrated system performance tests under conditions simulating, to the extent possible, full and partial operating loads.
- .2 Review and verify the Contractor recorded test results.
- .3 Diagnose problems and determine whether they are a result of Contract Deficiencies.
- .4 Request repeat tests as required following correction of Contract Deficiencies.
- .5 Provide direction and instruction in the fine tuning of the systems under test to satisfy the operating requirements.

.2 The Contractor will perform the following during the Systems and Integrated Systems testing and fine tuning:
- .1 Employ all coordination, resources, services, measures and responsibilities to execute the entire testing and commissioning program (process) without damage to project systems or components, at no additional cost to the Departmental Representative.
- .2 Modify operating parameters of the systems to satisfy the fine tuning requirements outlined by the Departmental Representative so as to ensure proper system operation. For example:
  - .1 Make adjustments which may become apparent as testing proceeds.
  - .2 Undertake modifications to suit changes as equipment settles down during the running period.
  - .3 Document results.
  - .4 Diagnoses of problems.
  - .5 Correct contract deficiencies previously outstanding as well as any identified during the Systems and Integrated Systems Testing and fine tuning.
  - .6 Fine tuning will provide for the adjustment of the system where the integrated systems testing have shown a need.

END OF SECTION

PART 1 - GENERAL

1.1 References

.1 CAN/ULC-S115-11, Standard Method of Fire Tests of Firestop Systems.

1.2 Submittals

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit duplicate 300 x 300 mm samples showing actual firestop material proposed for project.

.3 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

.4 Submit shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.

.5 Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation.

PART 2 - PRODUCTS

2.1 Materials

.1 Fire stopping and smoke seal systems: in accordance with ULC-S115.

.1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of ULC-S115 and not to exceed opening sizes for which they are intended and conforming to special requirements specified in 3.5.

.2 Firestop system rating: 1 hour.

.2 Service penetration assemblies: certified by ULC in accordance with ULC-S115 and listed in ULC Guide No. 40 U19.

.3 Service penetration firestop components: certified by ULC in accordance with ULC-S115 and listed in ULC Guide No. 40 U19.13 and ULC Guide No. 40 U19.15 under the Label Service of ULC.

.4 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.

.5 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

.6 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

.7 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.8 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.9 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.10 Sealants for vertical joints: non-sagging.

PART 3 - EXECUTION

3.1 Preparation

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.

.2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.2 Installation

.1 Install fire stopping and smoke seal material and components in accordance with ULC certification and manufacturer's instructions.

.2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.4 Tool or trowel exposed surfaces to a neat finish.

.5 Remove excess compound promptly as work progresses and upon completion.

3.3 Inspection

.1 Notify Departmental Representative when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.

3.4 Schedule

.1 Firestop and smoke seal at:
.1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.

.2 Edge of floor slabs at wall panels.

.3 Top of fire-resistance rated masonry and gypsum board partitions.

.4 Intersection of fire-resistance rated masonry and gypsum board partitions.

.5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.

.6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.

.7 Openings and sleeves installed for future use through fire separations.

.8 Around mechanical and electrical assemblies penetrating fire separations.

.9 Rigid ducts: greater than 129 cm2: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

3.5 Clean Up

.1 Remove excess materials and debris and clean adjacent surfaces immediately after application.

.2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END OF SECTION

PART 1 - GENERAL

1.1 General

.1 This Section covers items common to Sections of Division 26. This section supplements requirements of Division 1.

.2 New work shall be as per accessibility and barrier requirements.

1.2 Codes and Standards

.1 Do complete installation in accordance with the Canadian electrical code CSA C22.1-2012 and the Ontario Electrical Safety Code ESA OESC 2012 except where specified otherwise.

.2 The Departmental representative will submit the plans to the inspection department for their review in accordance with CSA C22.1-2009 paragraph 2-010. The Departmental representative will pay all fees associated with this submission.

1.3 Care, Operation and Start-up

.1 Instruct Departmental representative in the operation, care and maintenance of systems, system equipment and components.

.2 Arrange and pay for services of manufacturer's factory service departmental representative to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.

.3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

1.4 Voltage Ratings

.1 Operating voltages: to CAN3-C235-83(R2006).

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.5 Permits, Fees and Inspection

.1 The contractor is responsible for obtaining inspection permits from ESA as required by CSA C22.1-02 item 2-004 and shall pay all associated fees. Proof of compliance to be posted on site prior to commencement of work.

.2 Departmental representative will provide additional drawings and specifications if required by Electrical Safety Authority (site inspection) at no cost.

.3 Notify Departmental representative of additional changes required by Electrical Safety Authority prior to making changes.

.4 Furnish Certificates of Acceptance from Electrical Safety Authority to the Departmental representative on completion of work. Copies of certificates to be included in the maintenance manuals under warranties.

1.6 Materials and Equipment

.1 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Safety Authority.

.2 Factory assemble control panels and component assemblies.

1.7 Electric Motors, Equipment and Controls

.1 Control wiring and conduit is specified in Division 26 except for conduit, wiring and connections below 50 V which are related to control systems specified in Division 23.

1.8 Finishes

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
.1 Paint indoor switchgear and enclosures distribution light grey to EEMAC 2Y-1-1958.

.2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.3 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

1.9 Equipment Identification

.1 Identify electrical equipment with nameplates and labels as follows:

.2 Nameplates:
.1 Lamicoid 3 mm thick plastic engraving sheet, white face, black core for Normal Power equipment, Red face, white core for Emergency power equipment, 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

.3 Labels:
.1 Embossed plastic labels with 6 mm high letters unless specified otherwise.

.4 Wording on nameplates and labels to be approved by Departmental representative prior to manufacture.

.5 Allow for average of twenty-five (25) letters per nameplate and label.

.6 Identification to be English and French.

.7 Use one nameplate or label for both languages.

.8 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

.9 Identify equipment with Size 3 labels engraved "ASSET INVENTORY No. ". Number as and if directed by Departmental representative.

.10 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

.11 Terminal cabinets and pull boxes: indicate system and voltage.

.12 Provide P-Touch Labels with appropriate circuit numbers for receptacle and light switches. Attach the numeric labels to the front of the device's cover plate. Labels to be Black lettering on White background.

1.10 Wiring Identification

.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.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour code: to CSA C22.1.

.4 Use colour coded wires in communication cables, matched throughout system.

1.11 Conduit and Cable Identification

.1 Colour code conduits, boxes and metallic sheathed cables.

.2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

.3 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 15 kV	Yellow	Red
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

1.12 Wiring Terminations

.1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

1.13 Manufacturers and CSA Labels

.1 Visible and legible, after equipment is installed.

1.14 Warning Signs

.1 As specified and to meet requirements of Electrical Safety Authority and Departmental Representative.

.2 Decal signs, minimum size 175 x 250 mm.

1.15 Single Line Electrical Diagrams

.1 Provide updated single line electrical diagrams in glazed frames as follows:
- .1 Electrical distribution system: locate in main electrical rooms.
- .2 Electrical power generation and distribution systems: locate in power plant rooms.

.2 Drawings: 600 x 600 mm minimum size.

1.16 Location of Outlets

.1 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.

.2 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.

.3 Locate light switches on latch side of doors. Locate disconnect devices in mechanical and elevator machine rooms on latch side of door.

1.17 Mounting Heights

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

.3 Install electrical equipment at following heights unless indicated otherwise.
- .1 Local switches: 1400 mm.
- .2 Wall receptacles:
  - .1 General: 400 mm.
- .3 Panelboards: as required by Code or as indicated.
- .4 Fire alarm stations: 1200 mm.
- .5 Fire alarm bells: 2100 mm.

1.18 Load Balance

.1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

.3 Submit, at completion of work, report listing phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

1.19 Conduit and Cable Installation

.1 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm.

.2 Install cables, conduits and fittings to be embedded, neatly and close to building structure so furring can be kept to minimum.

1.20 Field Quality Control

.1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks - the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.

.2 The work of this division to be carried out by a contractor who holds a valid Master Electrical contractor license as issued by the Province that the work is being constructed.

.3 Conduct and pay for following tests:
- .1 Power distribution system including phasing, voltage, grounding and load balancing.
- .2 Circuits originating from branch distribution panels.
- .3 Lighting and its control.
- .4 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
- .5 Emergency generator and transfer switch commissioning.

.4 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.

.5 Insulation resistance testing.
- .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.

.2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
.3 Check resistance to ground before energizing.

.6 Carry out tests in presence of Departmental representative.

.7 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.8 Submit test results for Departmental representative's review.

1.21 Co-ordination Study

.1 Supplier of the emergency switchgear will prepare a co-ordination for emergency power side of the new distribution system.

.2 Fault current capacities of distribution panels and branch circuit panels and breaker trip settings to be provided conforming to the submitted calculations.

PART 2 - PRODUCTS

2.1 Not Used

.1 Not Used.

PART 3 - EXECUTION

3.1 Not Used

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 References

.1 CSA C22.2. No.65, 2013 ,Wire Connectors.

PART 2 - PRODUCTS

2.1 Materials

.1 Pressure type wire connectors: with current carrying parts of copper alloy aluminum sized to fit copper conductors as required.

.2 Fixture type splicing connectors: with current carrying parts of copper alloy sized to fit copper conductors 10 AWG or less.

PART 3 - EXECUTION

3.1 Installation

.1 Remove insulation carefully from ends of conductors and:
.1 Apply coat of zinc joint compound on aluminum prior to conductors installation of connectors.
.2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No. 65.
.3 Install fixture type connectors and tighten. Replace insulating cap.
.4 Install bushing stud connectors in accordance with EEMAC 1Y-2.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Specialty wiring and installation methods are specified in the related sections.

1.2 References

.1 CAN/CSA C22.2 No.2556-13, Wire and Cable Test Methods. (Tri-National standard, with NMX-J-556-ANCE-2013 and UL 2556).

1.3 Product Data

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

PART 2 - PRODUCTS

2.1 Building Wires

.1 Conductors: stranded for 10AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, with 600 V insulation of chemically cross-linked thermosetting polyethylene material rated R90 XLink.

2.2 Armoured Cables

.1 Conductors: insulated, copper size as indicated.

.2 Type: AC90.

.3 Armour: interlocking type fabricated from galvanized steel strip.

.4 Connectors: as recommended by the manufacturer.

2.3 TECK Cable

.1 Cable: to CAN/CSA-C22.2 No. 131.

.2 Conductors:
.1 Grounding conductor: copper.
.2 Circuit conductors: copper, size as indicated.

.3 Insulation:
.1 Type: ethylene propylene rubber.
.2 Chemically cross-linked thermosetting polyethylene rated type 1000 V.

.4 Inner jacket: polyvinyl chloride material.

.5 Armour: flat interlocking galvanized steel.

.6 Overall covering:polyvinyl chloride material.

.7 Fastenings:
.1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.
.2 Channel type supports for two or more cables at 1500 mm centers.
.3 Threaded rods: 6 mm dia. to support suspended channels.

.8 Connectors:
.1 Watertight, approved for TECK cable.

PART 3 - EXECUTION

3.1 Installation of Building Wires

.1 Install wiring as follows:
.1 In conduit systems in accordance with Section - 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings.

.2 Visual and Mechanical Inspection
.1 Inspect exposed sections of cables for physical damage.
.2 Check tightness of bolted connections.
.3 Inspect compression-applied connectors for proper cable match and indention.

.3 Electrical Tests
.1 Perform insulation-resistance test on each conductor with respect to ground and adjacent conductors. Applied potential to be 1000 Volts DC for 1 minute. Cables: Medium-Voltage.

3.2 Installation of Armoured Cables

.1 Group cables wherever possible.

3.3 Installation of TECK Cable 0 -1000V

.1 Install cables in cable trays in accordance with Division 26.

.2 .1 Group cables wherever possible on channels.

.3 Install cable in trenches in accordance with Division 26.

.4 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 26 05 00 - Common Work Results - Electrical.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

.1 ANSI/IEEE 837-2002, Qualifying Permanent Connections Used in Substation Grounding.

.2 Canadian Standards Association, (CSA International).

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 00 10 - General Instructions and with Section 01 74 21 Waste Management and Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused metal materials from landfill to metal recycling facility as approved by. Departmental Representative.

.5 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 EQUIPMENT

.1 Grounding conductors: bare stranded copper, soft annealed, size as indicated.

.2 Insulated copper grounding conductors: green, type to be run in all conduit runs.

.3 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
.1 Grounding and bonding bushings.
.2 Protective type clamps.
.3 Bolted type conductor connectors.
.4 Bonding jumpers, straps.
.5 Pressure wire connectors.

PART 3 - EXECUTION

3.1 INSTALLATION GENERAL

.1 Install complete permanent, continuous grounding system including, conductors, connectors, accessories. Where EMT is used, run ground wire in conduit.

.2 Install connectors in accordance with manufacturer's instructions.

.3 Protect exposed grounding conductors from mechanical injury.

.4 Use mechanical connectors for grounding connections to equipment provided with lugs.

.5 Soldered joints not permitted.

.6 Install bonding wire for flexible conduit, connected at one end to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

3.2 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, switchgear, frames of motors, starters, transfer switches, distribution panels.

3.3 GROUNDING BUS

.1 Install copper grounding bus mounted on insulated supports on wall of generator walk in enclosure.

.2 Ground items of electrical equipment in electrical room and generator walk in enclosure to ground bus with individual bare stranded copper connections.

3.4 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 Common Work Results - Electrical.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

.4 Provide report on grounding test to the Departmental Representative.

.5 Visual and Mechanical Inspection:
.1 Inspect ground system for compliance with drawings.

.6 Electrical Tests:
.1 Perform fall-of-potential test or alternative per IEEE Standard No. 81-2012 on the main grounding electrode or system.
.2 Perform point-to point test to determine the resistance between the main grounding system and all major electrical equipment frames, system neutral, and/or derived neutral points.

END OF SECTION

PART 1 - GENERAL

1.1 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 00 10 - General Instructions and with Section 01 74 21 Waste Management and Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

.5 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 SUPPORT CHANNELS

.1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted and suspended from concrete ceilings.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Secure equipment to solid masonry, with lead anchors.

.2 Secure equipment to poured concrete with expandable inserts.

.3 Secure equipment to hollow masonry walls with toggle bolts.

.4 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.5 Fasten exposed conduit or cables to building construction or support system using straps.
.1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
.2 Two-hole steel straps for conduits and cables larger than 50 mm.
.3 Beam clamps to secure conduit to exposed steel work.

.6 Suspended support systems.
.1 Support individual cable or conduit runs with 10 mm diameter threaded rods and spring clips.
.2 Support 2 or more cables or conduits on channels supported by 10 mm diameter threaded rod hangers where direct fastening to building construction is impractical.

.7 For surface mounting of two or more conduits use channels at 1500 mm on centre spacing.

.8 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.9 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.10 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Departmental Representative.

.11 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

END OF SECTION

PART 1 - GENERAL

1.1 References

.1 CSA C22.1-2012, Canadian Electrical Code, Part 1.

1.2 Waste Management and Disposal

.1 Separate and recycle waste materials in accordance with Section 01 00 10 - General Instructions and with Section 01 74 21 Waste Management and Disposal.

.2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

PART 2 - PRODUCTS

2.1 Outlet and Conduit Boxes General

.1 Size boxes in accordance with CSA C22.1.

.2 102 mm square or larger outlet boxes as required for special devices.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 Sheet Steel Outlet Boxes

.1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

2.3 Masonry Boxes

.1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.

2.4 Conduit Boxes

.1 Cast FS aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.

2.5 Fittings - General

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

PART 3 - EXECUTION

3.1 Installation

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

.4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

1.2 SECTION INCLUDES

.1 Materials and installation for cable splice and junction boxes.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA C22.2 No. 40-M1989(R2009), Cutout, Junction and Pull Boxes.

1.4 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 00 10 - General Instructions and with Section 01 74 21 Waste Management and Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Departmental Representative.

.5 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 JUNCTION BOXES DISTRIBUTION LEVEL

.1 Welded steel rectangular boxes 6 mm thick painted with chromate primer and gray enamel with removable plate on front side.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install distribution level steel boxes on walls. Splice main cable in box and connect branch feeder. Fasten cover.

END OF SECTION

PART 1 - GENERAL

1.1 References

.1 Canadian Standards Association (CSA)
- .1 CAN/CSA C22.2 No. 18-1998(R2003), Outlet Boxes, Conduit Boxes, and Fittings.
- .2 CSA C22.2 No.45-M1981 (R2003), Rigid Metal Conduit.
- .3 CSA C22.2 No.56-2013, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
- .4 CSA C22.2 No.83-M1985(R2013), Electrical Metallic Tubing.
- .5 CAN/CSA C22.2 No.227.3-2005(R2010), Non-metallic Mechanical Protection Tubing (NMPT) (Bi-National standard, with UL 1696)

1.2 Waste Management and Disposal

.1 Separate and recycle waste materials in accordance with Section 01 00 10 - General Instructions and with Section 01 74 21 Waste Management and Disposal.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

.4 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

PART 2 - PRODUCTS

2.1 Conduits

.1 Rigid metal conduit: to CSA C22.2 No. 45, hot dipped galvanized steel threaded.

.2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.

.3 Flexible metal conduit: to CSA C22.2 No. 56, liquid-tight flexible metal.

2.2 Conduit Fastenings

.1 One hole steel straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 1500mm oc.

.4 Threaded rods, 10 mm dia., to support suspended channels.

2.3 Conduit Fittings

.1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.

.2 Factory "ells" where 90° bends are required for 25 mm and larger conduits.

.3 Steel compression (raintite) connectors and couplings for EMT.

2.4 Fish Cord

.1 Polypropylene.

PART 3 - EXECUTION

3.1 Installation

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Surface mount conduits.

.3 Use rigid hot dipped galvanized steel threaded conduit.

.4 Use electrical metallic tubing (EMT) except. where subject to mechanical injury.

.5 Use flexible metal conduit for connection to motors in dry areas, connection to surface or recessed fluorescent fixtures and work in partition walls.

.6 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.

.7 Minimum conduit size for lighting and power circuits: 19 mm.

.8 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.9 Mechanically bend steel conduit over 19 mm diameter.

.10 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.11 Install fish cord in empty conduits.

.12 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.

.13 Dry conduits out before installing wire.

3.2 Surface Conduits

.1 Run parallel or perpendicular to building lines.

.2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

.3 Run conduits in flanged portion of structural steel.

.4 Group conduits wherever possible on suspended channels.

.5 Do not pass conduits through structural members except as indicated.

.6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 26 05 00 - Common Work Results - Electrical.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
- .1 CSA G40.20/G40.21-2013, General for Requirements Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).

.3 National Building Code of Canada (NBC) - 2010.

1.3 DEFINITIONS

.1 Priority Two (P2) Buildings: buildings in which life safety is of paramount concern. It is not necessary that P2 buildings remain operative during or after earthquake activity.

.2 SRS: acronym for Seismic Restraint System.

1.4 SYSTEM DESCRIPTION

.1 This section covers design, supply and installation of complete SRS for all systems, equipment specified for installation on this project. This includes MCC's, diesel generators, conduit, electrical equipment and systems, both vibration isolated and statically supported.

.2 SRS fully integrated into, and compatible with:
- .1 Noise and vibration controls specified elsewhere.
- .2 Structural, mechanical, electrical design of project.

.3 During seismic event, SRS to prevent systems and equipment from causing personal injury and from moving from normal position.

.4 Designed by Professional Engineer specializing in design of SRS and registered in Province of Ontario. Division 26 to include all costs associated with this work as it relates to Division 26 installations. Submit design sketches complete with professional stamp prior to start of installations, complete with installation requirements.

1.5 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop drawings: submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario.

.3 Submit design data including:
.1 Full details of design criteria.

.4 Submit additional copy of shop drawings and product data to Structural Engineer for review of connection points to building structure.

.5 Closeout Submittals:
.1 Provide maintenance data including monitoring requirements for incorporation into manuals specified in Section 01 78 00 - Closeout Submittals.

1.6 QUALITY ASSURANCE

.1 Health and Safety:
.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:
.1 Construction/Demolition Waste Management and Disposal: separate waste materials for recycling in accordance with Section 01 00 10 - General Instructions and with Section 01 74 21 Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 SRS MANUFACTURER

.1 SRS from one manufacturer regularly engaged in SRS production.

2.2 GENERAL

.1 SRS to provide gentle and steady cushioning action and avoid high impact loads.

.2 SRS to restrain seismic forces in every direction.

.3 Fasteners and attachment points to resist same load as seismic restraints.

.4 SRS of Piping systems compatible with:
- .1 Expansion, anchoring and guiding requirements.
- .2 Equipment vibration isolation and equipment SRS.

.5 SRS utilizing cast iron, threaded pipe, other brittle materials not permitted.

.6 Attachments to RC structure:
- .1 Use high strength mechanical expansion anchors.
- .2 Drilled or power driven anchors not permitted.

.7 Seismic control measures not to interfere with integrity of firestopping.

2.3 SRS FOR STATIC EQUIPMENT, SYSTEMS

.1 Floor-mounted equipment, systems:
- .1 Anchor equipment to equipment supports.
- .2 Anchor equipment supports to structure.
- .3 Use size of bolts scheduled in approved shop drawings.

.2 Suspended equipment, systems:
- .1 Use one or combination of following methods:
  - .1 Install tight to structure.
  - .2 Cross-brace in every direction.
  - .3 Brace back to structure.
  - .4 Slack cable restraint system.

.2 SRS to prevent sway in horizontal plane, "rocking" in vertical plane, sliding and buckling in axial direction.
.3 Hanger rods to withstand compressive loading and buckling.

2.4 SRS FOR VIBRATION ISOLATED EQUIPMENT

.1 Floor mounted equipment, systems:
.1 Use one or combination of following methods:
.1 Vibration isolators with built-in snubbers.
.2 Vibration isolators and separate snubbers.
.3 Built-up snubber system approved by Departmental Representative, consisting of structural elements and elastomeric layer.
.2 SRS to resist complete isolator unloading.
.3 SRS not to jeopardize noise and vibration isolation systems. Provide 4-8 mm clearance between seismic restraint snubbers and equipment during normal operation of equipment and systems.
.4 Cushioning action: gentle and steady by utilizing elastomeric material or other means in order to avoid high impact loads.

.2 Suspended equipment, systems:
.1 Use one or combination of following methods:
.1 Slack cable restraint system.
.2 Brace back to structure via vibration isolators and snubbers.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Attachment points and fasteners:
.1 To withstand same maximum load that seismic restraint is to resist and in every direction.

.2 Install SRS at least 25 mm from equipment, systems, services.

.3 Miscellaneous equipment not vibration-isolated:
.1 Bolt through house-keeping pad to structure.

.4 Co-ordinate connections with other disciplines.

3.2 FIELD QUALITY CONTROL

.1 Inspection and Certification:
.1 SRS: inspected and certified by Manufacturer upon completion of installation.
.2 Provide written report to Departmental Representative with certificate of compliance.

.2 Commissioning Documentation:
.1 Upon completion and acceptance of certification, hand over to Departmental Representative complete set of construction documents, revised to show "as-built" conditions.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 LEED Canada-EB: O&M-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for Existing Buildings: Operations and Maintenance 2009.

.2 CSA International
.1 CAN/CSA-C22.2 No.47-2013, Air-Cooled Transformers (Dry Type).
.2 CSA C9-02(R2011), Dry-Type Transformers.
.3 CSA C802.2-12, Minimum Efficiency Values for Dry Type Transformers.

.3 National Electrical Manufacturers Association (NEMA)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for dry type transformers and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Sustainable Design Submittals:
.1 Construction Waste Management:
.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for dry type transformers for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.2 Storage and Handling Requirements:
.1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect dry type transformers from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 DESIGN DESCRIPTION

.1 Design 1.
.1 Type: ANN.
.2 3 phase, kVA, V input, V output, 60 Hz.
.3 Voltage taps: standard.
.4 Insulation: Class, degrees C temperature rise.
.5 Basic Impulse Level (BIL): standard.
.6 Hipot: standard.
.7 Average sound level: standard
.8 Impedance at 17 degrees C: standard
.9 Enclosure: CSA, removable metal front panel.
.10 Mounting: floor and/or wall.
.11 Finish: in accordance with Section 26 05 00 - Common Work Results for Electrical .
.12 Copper windings.
.13 Winding configuration to be as noted on drawings.
.14 KL-Rated Transformers as indicated on drawings.
.15 Voltage Regulation to be 4% or better.

2.2 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Label size: 7.

.3 Nameplate wording:.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for dry type transformers installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Departmental Representative
.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Mount dry type transformers up to 75 kVA as indicated.

.2 Mount dry type transformers above 75 kVA on floor.

.3 Ensure adequate clearance around transformer for ventilation.

.4 Install transformers in level upright position.

.5 Remove shipping supports only after transformer is installed and just before putting into service.

.6 Loosen isolation pad bolts until no compression is visible.

.7 Make primary and secondary connections in accordance with wiring diagram.

.8 Energize transformers after installation is complete.

.9 Make conduit entry into bottom 1/3 of transformer enclosure.

3.3 CLEANING

.1 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by dry type transformers installation.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for low voltage switchgear for controlling relatively large loads - 800 A or larger.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.3 Section 01 78 00 - Closeout Submittals.

.4 Section 26 05 00 - Common Work Results - Electrical.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International)
- .1 CAN/CSA-C22.2 No.31-2010, Switchgear Assemblies.

.2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
- .1 EEMAC G8-3.3, Metal-Enclosed Switchgear Interrupter Assemblies.

1.4 SHOP DRAWINGS PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate on shop drawings:
- .1 Floor anchoring method and foundation template.
- .2 Dimensioned cable entry and exit locations.
- .3 Dimensioned position and size of bus.
- .4 Overall length, height and depth of complete switchgear.
- .5 Dimensioned layout of internal and front panel mounted components.

1.5 QUALITY ASSURANCE

.1 Submit copies of certified factory test results.

1.6 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for secondary switchgear for incorporation into manual in accordance with Section 01 78 00 - Closeout Submittals.

.2 Six copies maintenance data for complete switchgear assembly including components.

1.7 STORAGE AND PROTECTION

.1 Store switchgear on site in protected, dry location. Cover with plastic to keep off dust.

.2 Provide energized strip heater in each cell to maintain dry condition during storage.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 00 10 - General Instructions and with Section 01 74 21 Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused metal and wiring materials from landfill to metal recycling facility approved by Departmental Representative,.

.5 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Switchgear assembly: to EEMAC G8-3.3 CAN/CSA-C22.2 No.31.

2.2 RATING

.1 Secondary switchgear: indoor, 347/600V, 800 A, 3 phase, 4 wire, 60 Hz, minimum short circuit capacity 35kA (rms symmetrical) complete with breakers as noted on drawings.

2.3 ENCLOSURE

.1 Switchgear dimensions 965.2mm deep x 1168.4 mm wide x 2286 mm High c/w:
.1 800A main breaker and metering.
.2 digital metering.
.3 All breakers to be molded case.

.2 Mimic graphic representation showing bus work.

.3 Metal enclosed, free standing, floor mounted, dead front, indoor, CSA Enclosure 2R cubicle unit.

.4 Ventilating louvres: vermin, insect proof with easily replaceable fibre glass filters.

.5 Access from front and side.

.6 Steel channel sills for base mounting in single length common to multi-cubicle switchboard.

2.4 BUSBARS

.1 Three phase and full capacity neutral bare insulated busbars, continuous current rating 800 A self-cooled, extending full width of multi-cubicle switch board, suitably supported on insulators.

.2 Main connections between bus and major switching components to have continuous current rating to match major switching components.

.3 Busbars and main connections: 99.30% conductivity copper.

.4 Provision for extension of bus on both sides of unit without need for further drilling or preparation in field.

.5 Silver surfaced joints, secured with non-corrosive bolts and Belleville washers.

.6 Identify phases of busbars by suitable marking.

.7 Busbar connectors, when switchboard shipped in more than one section.

2.5 GROUNDING

.1 Copper ground bus not smaller than 50 x 6 mm extending full width of multi-cubicle switchboard and situated at bottom.

.2 Lugs at each end for size 4/0- 500mcm AWG grounding cable.

2.6 FINISHES

.1 Apply finishes in accordance with Section 26 05 00 - Common Work Results - Electrical
.1 Cubicle exteriors gray.
.2 Cubicle interiors white.

2.7 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results - Electrical.

.2 Nameplates:
.1 White plate, black letters, size 7.
.2 Complete switchgear labelled: "600 V".

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Locate switchgear assembly as indicated and bolt to floor.

.2 Connect incoming power supplies to breakers.

.3 Check factory made connections for mechanical security and electrical continuity.

.4 Run one grounding conductor 4/0AWG bare copper in 25 mm conduit from ground bus to ground.

.5 Check trip unit settings against co-ordination study to ensure proper working and protection of components.

.6 Visual and Mechanical Inspection - Insulated-Case Circuit Breakers:
- .1 Inspect circuit breaker for proper mounting.
- .2 Operate circuit breaker to insure smooth operation. Inspect case for cracks or other defects. Check tightness of bolted cable connections. Inspect mechanism contacts and arc chutes in unsealed units.
- .3 Visual and Mechanical Inspection - Power Breaker
- .4 Verify that all maintenance devices are available for servicing and operating the breaker.
- .5 Inspect for physical damage. Clean and lubricate as required.
- .6 Inspect anchorage, alignment, and grounding. Inspect arc chutes. Inspect moving and stationary contacts for condition, wear, and alignment.
- .7 Verify that primary and secondary contact wipe and other dimensions vital to satisfactory operation of the breaker are correct.
- .8 Perform all mechanical operator and contact alignment tests on both the breaker and its operating mechanism.
- .9 Check tightness of bolted cable connections.
- .10 Check cell fit and element alignment.
- .11 Check racking mechanism.
- .12 Lubricate all moving current carrying parts.

.7 Electrical Tests:
- .1 Perform a contact resistance test.
- .2 Perform an insulation-resistance test from pole-to-pole and from each pole-to-ground with breaker closed and across open contacts of each phase.
- .3 Perform adjustments for final settings in accordance with breaker setting sheet when applicable.

.4 Perform long-time delay time-current characteristic tests by passing three hundred percent (300%) rated current through each pole separately unless series testing is required to defeat ground fault functions. Record trip time. Make external adjustments as required to meet time-current curves.

.5 Verify correct operation of any auxiliary features such as trip and pickup indicators, zone interlocking, electrical close and trip operation.

END OF SECTION

PART 1 - GENERAL

1.1 Shop Drawings

.1 Submit shop drawings in accordance with Section 26 05 00 - Common Work Results - Electrical.

.2 Drawings to include electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

PART 2 - PRODUCTS

2.1 Panelboards

.1 Panelboards: product of one manufacturer.

- .1 Install circuit breakers in panelboards before shipment.
- .2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.
- .3 Panelboards up to 84 circuits to be vertical single tub construction. Side by side tub construction is not acceptable.

.2 250v panelboards: bus and breakers rated for 22,000 A (symmetrical) interrupting capacity or as indicated.

.3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.

.4 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated on panel schedules on drawings.

.5 Two keys for each panelboard and key panelboards alike.

.6 Copper bus with 100% ampere rated neutral.

.7 Mains: suitable for bolt-on breakers.

.8 Trim with concealed front bolts and hinges.

.9 Trim and door finish: baked grey enamel.

.10 Locking devices as requested.

2.2 Breakers

.1 Breakers: to Section 26 28 16.02 - Moulded Case Circuit Breakers.

.2 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.

2.3 Equipment Identification

.1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results - Electrical.

.2 Nameplate for each panelboard size 4 engraved as indicated.

.3 Nameplate for each circuit in distribution panelboards size 2 engraved as indicated.

.4 Complete circuit directory with typewritten legend showing location and load of each circuit.

PART 3 - EXECUTION

3.1 Installation

.1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.

.2 Install surface mounted panelboards on plywood backboards. Where practical, group panelboards on common backboard.

.3 Mount panelboards to height specified in Section 26 05 00 - Common Work Results - Electrical or as indicated.

.4 Connect loads to circuits.

.5 Connect neutral conductors to common neutral bus with respective neutral identified.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

1.2 References

.1 Canadian Standards Association (CSA)
- .1 CSA C22.2 No.248.12-2011, Low Voltage Fuses Part 12: Class R (Tri-National Standard with, UL 248-12 (2nd Edition).

1.3 Shop Drawings and Product Data

.1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit fuse performance data characteristics for each fuse type and size above 400 A. Performance data to include: average melting time-current characteristics.

1.4 Waste Management and Disposal

.1 Separate and recycle waste materials in accordance with Section 01 00 10 - General Instructions and with Section 01 74 21 Waste Management and Disposal.
- .1 Place materials defined as hazardous or toxic waste in designated containers.
- .2 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .3 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

1.5 Delivery and Storage

.1 Ship fuses in original containers.

.2 Store fuses in original containers.

PART 2 - PRODUCTS

2.1 Fuses General

.1 Fuse type references, J1, have been adopted for use in this specification.

.2 Fuses: product of one manufacturer for entire project.

2.2 Fuse Types

.1 Class J fuses (formerly HRCI- J).
.1 Type J1, time delay, capable of carrying 500% of its rated current for 10 seconds minimum.
.2 Type J2, fast acting.

PART 3 - EXECUTION

3.1 Installation

.1 Install fuses in mounting devices immediately before energizing circuit.

.2 Ensure correct fuses fitted to physically matched mounting devices.

.3 Ensure correct fuses fitted to assigned electrical circuit.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International).

.1 CSA-C22.2 No. 5-2013, Moulded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, tenth edition, and the second edition of NMX-J-266-ANCE).

1.3 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Include time-current characteristic curves for breakers with ampacity of 400 A and over at system voltage of 600volts.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 00 10 - General Instructions and with Section 01 74 21 Waste Management and Disposal.

.2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.3 Separate for reuse and recycling and place in designated containers Metal and Plastic waste in accordance with Waste Management Plan.

PART 2 - PRODUCTS

2.1 BREAKERS GENERAL

.1 Moulded-case circuit breakers: to CSA C22.2 No. 5.

.2 Bolt-on moulded case circuit breaker: quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40 degrees C ambient.

.3 Common-trip breakers: with single handle for multi-pole applications.

.4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
.1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.

.5 Circuit breakers with interchangeable trips as indicated.

.6 Circuit breakers to have minimum 50 kA symmetrical rms interrupting capacity rating.

2.2 THERMAL MAGNETIC BREAKERS DESIGN A

.1 Moulded case circuit breakers in panelboards to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

2.3 SOLID STATE TRIP BREAKERS DESIGN B

.1 Moulded case circuit breakers in switchgear to operate by means of solid-state trip unit with associated current monitors and self-powered shunt trip to provide inverse time current trip under overload condition, and long time, short time, instantaneous tripping for phase fault short circuit protection.

2.4 OPTIONAL FEATURES

.1 Include:
.1 Handle mechanism.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install circuit breakers in panel boards and main switchgear as indicated.

END OF SECTION

PART 1 - GENERAL

1.1 References

.1 NEMA MG 1-2011, Motors and Generators.

.2 CAN/CGSB-3.517-2013, Automotive Diesel Fuel.

.3 ISO 3046/1-2002, Specification for Reciprocating Internal Combustion Engines: Performance.

.4 API 650-2013, Welded Steel Tanks for Oil Storage.

.5 CSA-C282-2009, Emergency Electrical Power Supply for Buildings.

.6 ULC-S601-2007, Standard for Shop Fabricated Steel Above Ground Horizontal Tank for Flammable and Combustible Liquids.

.7 ASTM D 3359-09e2, Standard Test Methods for Measuring Adhesion.

.8 ASTM D2794-93(2010), Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

.9 ASTM B117-2011, Standard Practice for operating Salt Spray (Fog).

.10 ASTM D 2247-2011, Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.

1.2 Related Sections

.1 Section 01 00 10 - General Instruction.

.2 Section 01 33 00 - Submittal Procedures.

1.3 Description of System

.1 System to be provided as follows:
- .1 500 kW, 347/600 volt unit.
- .2 Generating unit to meet the following specifications.

.2 Emergency power generating system shall comprise all components required for complete working system. Components to include but not necessarily be limited to:

1.3 Description of System (Cont'd)

.2 (Cont'd)
- .1 Diesel engine.
- .2 Set mounted radiator.
- .3 Generator.
- .4 Generator control panel.
- .5 Battery charger and battery.
- .6 Fuel supply system and tank.
- .7 Exhaust system and flex connection silencer.
- .8 Structural steel mounting base and spring isolators with snubbers for seismic duty.
- .9 Walk-in sound attenuated weatherproof enclosure for gen-set c/w remote 5000 liter fuel day tank.

.3 System designed to operate as a tenant process emergency standby system completely automated to run in an unattended mode.

1.4 Shop Drawings

.1 Submit shop drawings in accordance with Section 01 33 00 Submittal Procedures.

.2 Include:
- .1 Engine: make and model, with curves. performance
- .2 Generator: make and model.
- .3 Voltage regulator: make, model and type.
- .4 Battery: make, type and capacity.
- .5 Battery charger: make, type and model.
- .6 Generator control panel: make and type of meters and controls.
- .7 Governor type and model.
- .8 Cooling air requirements in m^3/s.
- .9 British standard or DIN rating of engine.
- .10 Flow diagrams for:
  - .1 Diesel fuel.
  - .2 Cooling air.
- .11 Dimensioned drawing showing complete generating set mounted on steel base in Sound attenuated enclosure including vibration isolators, exhaust system, drip trays, and total weight.
- .12 Continuous full load output of set at 0.8 PF lagging.
- .13 Description of set operation including:

1.4 Shop Drawings (Cont'd)

.2 (Cont'd)

.13 (Cont'd)

.1 Automatic starting and transfer to load and back to normal power, including time in seconds from start of cranking until unit reaches rated voltage and frequency.

.2 Manual starting.

.3 Automatic shut down and alarm.

.4 Manual remote emergency stop.

1.5 Operation and Maintenance Data

.1 Provide five(5) copies of operation and maintenance data for diesel generator for incorporation into manuals specified below.

.2 Include in Operation and Maintenance Manual instructions for particular unit supplied and not general description of units manufactured by supplier and:

.1 Operation and maintenance instructions for engine, alternator, control panel, battery charger, battery, fuel system, weatherproof enclosure ventilation system, exhaust system and accessories, to permit effective operation, maintenance and repair.

.2 Technical data:

.1 Illustrated parts lists with parts catalogue numbers.

.2 Schematic diagram of electrical controls.

.3 Flow diagrams for:

.1 Fuel system.

.2 Lubricating oil.

.3 Cooling system.

.4 Certified copy of factory test results.

.5 Maintenance and overhaul instructions and schedules.

.6 Precise details for adjustment and setting of time delay relays or sensing controls which require on site adjustment.

1.6 Extra Materials

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals. and as follows:

1.6 Extra Materials (Cont'd)

.2 Include:
- .1 Six (6) fuel filter replacement elements.
- .2 Six (6) lube oil filter replacement elements.
- .3 Six (6) air cleaner filter elements.
- .4 Two (2) sets of fuses for control panel.
- .5 Special tools for unit servicing.

1.7 Source Quality Control

.1 Factory test generator set including engine, alternator, control panels, and accessories in presence of Departmental Representative in conformance to CAN/CSA C282-2009 Emergency Electrical Power Supply for Buildings.

.2 Notify Departmental Representative fifteen (15) working days in advance of date of factory test.

.3 Test procedure:

.1 Prepare blank forms and check sheet with spaces to record data. At top of first sheet record:
- .1 Date.
- .2 Generator set serial no.
- .3 Engine, make, model, serial no.
- .4 Alternator, make, model, serial no.
- .5 Voltage regulator, make and model.
- .6 Rating of generator set, kW, kVA, V, A, r/min, Hz.

.2 Mark check sheet and record data on forms in duplicate as test proceeds.

.3 Manufacture's, contractor's and Departmental Representative's signature on completed forms to indicate concurrence in results of test.

.4 Tests:

.1 With 100% rated load, operate set for 8 h, taking readings at 30 min intervals, and record following:
- .1 Time of reading.
- .2 Running time.
- .3 Ambient temp in °C.
- .4 Lube oil pressure in kPa.
- .5 Lube oil temp in °C.
- .6 Engine coolant temp in °C.
- .7 Exhaust stack temp in °C.

1.7 Source Quality Control (Cont'd)

.4 (Cont'd)

.1 (Cont'd)

.8 Generator voltage: phase 1, 2, 3.
.9 Generator current: phase 1, 2, 3.
.10 Power in kW.
.11 Frequency in Hz.
.12 Power Factor.
.13 Battery charger current in A.
.14 Battery voltage.
.15 Generator cooling air outlet temp.

.2 At the end of eight (8) hour run, increase load to 110% rated value, and record reading every fifteen minutes for one hour.

.3 After completion of test run, demonstrate following shut down devices and alarms:

.1 Overcranking.
.2 Overspeed.
.3 High engine temp.
.4 Low lube oil pressure.
.5 Short circuit.
.6 Alternator overvoltage.
.7 Low battery voltage, or no battery charge.
.8 Manual remote emergency stop.
.9 High alternator temperature.

.4 Next install continuous strip chart recorders to record frequency and voltage variations during load switching procedures. Each load change delayed until steady state conditions exist. Switching increments to include:

.1 No load to full load to no load.
.2 No load to 70% load to no load.
.3 No load to 20% load to no load.
.4 20% load to 40% load to no load.
.5 40% load to 60% load to no load.
.6 60% load to 80% load to no load.

.5 Demonstrate:

.1 That battery charger reverts to high rate charge after cranking.

.6 Demonstrate low oil pressure and high engine temperature shutdown devices operation without subjecting engine to these excesses.

PART 2 - PRODUCTS

2.1 Diesel Engine

.1 Diesel engine: to ISO 3046/1 and CAN/CSA-C282-2009 Emergency Electrical Power Supply for Buildings.

.1 Engine: standard product of current manufacture, from company regularly engaged in production of such equipment.

.2 NITROGEN OXIDES (NOX) AS FOLLOWS:

.1 1/4 CAPACITY LOAD = 5.81 ppm

.2 1/2 CAPACITY LOAD = 4.50 ppm

.3 3/4 CAPACITY LOAD = 3.83 ppm

.4 fULL CAPACITY LOAD = 3.97 ppm

.2 Capacity:

.1 Rated continuous power in kW at rated speed, after adjustment for system losses in auxiliary equipment necessary for engine operation; to be calculated as follows:

Rated continuous output = Generator kW
Generator Eff @ FL

.1 Under following site conditions:

.1 Altitude:152 m.

.2 Ambient temperature: 25°C.

.3 Relative humidity:40%.

.2 Engine overload capability 100% of continuous output for 1 h within 12 h period of continuous operation.

.3 Locked rotor Amps (LRA): 3192 Amps.

.3 Cooling System:

.1 Liquid cooled: heavy duty industrial radiator mounted on generating set base with engine driven pusher type fan to direct air through radiator from engine side, with ethylene glycol anti-freeze non-sludging above minus 46°C.

.2 To maintain manufacturer's recommended engine temperature range at 100% continuous load in ambient temperature of 40°C.

.3 Block heater: thermostatically controlled lube oil or liquid coolant heater connected to line side of automatic transfer switch to allow engine to start in room ambient 0°C.

2.1 Diesel Engine (Cont'd)

.3 (Cont'd)

.3 (Cont'd)

.1 Switch and fuse in heater circuit, mounted in engine-alternator control cubicle and fed from line side of automatic transfer switch.

.4 Governor:

.1 Electronic load sharing type, electric actuator, speed droop externally adjustable from isochronous to 5%, temperature compensated with steady state speed maintenance capability of plus or minus 0.25%.

.5 Lubrication system:

.1 Pressure lubricated by engine driven pump.

.2 Lube oil filter: replaceable, full flow type, removable without disconnecting piping.

.3 Lube oil cooler.

.4 Engine sump drain valve.

.5 Oil level dip-stick.

.6 Starting system:

.1 Positive shift, gear engaging starter 12 or 24 V dc.

.2 Remote control.

.3 Cranking limiter to provide 3 cranking periods of 10 s duration, each separated by 5 s rest.

.4 Lead acid, 24 V storage battery with sufficient capacity to crank engine for 1 min at 0°C without using more than 25% of ampere hour capacity.

.5 Battery charger: constant voltage, solid state, two stage from trickle charge at standby to boost charge after use. Regulation: plus or minus 1% output for plus or minus 10% input variation. Automatic boost for 6 h every 30 days. Equipped with dc voltmeter, dc ammeter and on-off switch. Minimum charger capacity: 10 A.

.7 Vibration isolated engine instrument panel with:

.1 Lube oil pressure gauge.

.2 Lube oil temperature gauge.

.3 Lube oil level gauge.

.4 Coolant temperature gauge.

.5 Coolant level gauge.

2.1 Diesel Engine (Cont'd)

.7 (Cont'd)
.6 Running time meter: non-tamper type.
.7 Alarms:
.1 Low oil pressure.
.2 Low coolant level, first stage.
.3 High crankcase pressure.
.4 low engine temperature.
.5 These alarms shall be annunciated visually and audibly.
.6 Low battery.
.7 Low fuel.
.8 High Engine temp.
.8 Shutdown alarms:
.1 High water temperature.
.2 Low oil pressure.
.3 Over speed.
.4 Over crank.
.5 Alternator over and under voltage.
.6 Very low coolant level, second stage.
.7 Short circuit.
.8 Oil high temperature.
.9 These alarms shall be annunciated visually and audibly at local locations andBuiolding Automation System.

.8 Guards to protect personnel from hot and moving parts. Locate guards so that normal daily maintenance inspections can be undertaken without their removal.

.9 Provision to prevent or reduce crank case fumes entering the room.

2.2 Alternator

.1 Alternator: to NEMA MG 1-1993.

.2 Rating: 3 phase, 347/600 V, 4 wire, 500 kw, 625 kva standby rating, 60 Hz, at 0.8 PF.

.3 Output at 40°C ambient:
.1 100% full load continuously.

.4 Revolving field, brushless, single bearing.

.5 Drip proof.

.6 Amortisseur windings.

.7 Synchronous type.

2.2 Alternator (Cont'd)

.8 Dynamically balanced rotor permanently aligned to engine by flexible disc coupling.

.9 Exciter: permanent magnet.

.10 EEMAC class F insulation on windings. Winding temperature rise shall not to exceed 80deg.C as measured by resistance at ambient temperature of 40Deg.C.

.11 Thermistors embedded in stator winding and connected to alternator control circuitry will programmed to alarm and shutdown genset. RTD's will provide temperature output.

.12 Voltage regulator: thyristor controlled rectifiers with phase controlled sensing circuit:

.1 Stability: 1% maximum voltage variation at any constant load from no load to full load.

.2 Regulation: 10% maximum voltage deviation between no-load steady state and full-load steady state.

.3 Transient: 20% maximum voltage dip on one-step application of 0.8 PF full load.

.4 Transient: 10% maximum voltage rise on one-step removal of 0.8 PF full load.

.5 Transient: 4 s maximum voltage recovery time with application or removal of 0.8 PF full load.

.6 Generator supplier to provide factory test sheet at the time of tender verifying voltage dip performance.

.13 Frequency Stability: 1/4 percent maximum deviation from rated generator frequency at any constant load from no load to full load.

.14 Frequency transient: 7 percent maximum deviation from rated generator terminal voltage on one step application or removal of full load.

.15 Alternator: capable of sustaining 300% rated current for period not less than 10 s permitting selective tripping of down line protective devices when short circuit occurs.

2.2 Alternator (Cont'd)

.16 Design generator set to minimize Radio Frequency Interference (RFI) under all operating conditions. Balance Telephone Influence Factor (TIF) to meet or better requirement of EEMAC Standard M1-6.

2.3 Motor Starting

.1 Motor starting capability shall have integrated system requirement including:
.1 engine and governor
.2 alternator and voltage regulator

.2 Motor starting capability shall require parallel and independent mode of operation.

.3 Maximum horsepower: 100 hp. or maximum motor starting kVa: 625.

.4 Maximum voltage and frequency transient and recovery to be as indicated under item 2.2 for full load step.

2.4 Control Panel

.1 Totally enclosed,mounting base isolated from diesel generator skid.

.2 All alarms and controls to comply CAN/CSA-C282-2009.

.3 Instruments:
.1 Digital 100% solid state circuitry LCD screen indicating type 2% accuracy, rectangular face, flush panel mounting:
.1 Touch Pad Button for Voltmeter: ac, scale 0 to 750 V.
.2 Touch Pad Button for Ammeter: ac, scale 0 to 1200 A.
.3 Touch Pad Button for Frequency meter: scale 55 to 65 Hz.
.4 Touch Pad Button for Kilowatt meter: Scale 0-1000 kW.
.5 Touch Pad Button for Power factor meter.
.2 Instrument Transformers
.1 Potential-dry type for indoor use:
.1 Ratio: 600 to 120.
.2 Rating: 600 V, 60 Hz.
.2 Current-dry type for indoor use:
.1 Ratio: 1200 to 5.
.2 Rating: 600 V, 60 Hz.

2.4 Control Panel (Cont'd)

.3 (Cont'd)
.2 (Cont'd)
.3 Positive action automatic short-circuiting device in secondary terminals.

.4 Controls:
.1 Engine start button.
.2 Touch Pad Button: Off-Auto-Manual - Test full load test no load.
.3 Engine emergency Touch Pad Button and provision for remote emergency stop button.
.4 Alternator output breaker:
.1 Circuit breaker: bolt-on, moulded case, temperature compensated for 40°C ambient, dual thermal-magnetic trip.
.2 Circuit breaker, solid state sensing rated 50 KA with:
.1 Frame containing breaker contacts, arc quenchers, manual mechanism, quick-make, quick-break, spring-loaded overcenter switching mechanism, mechanically trip free from handle, fixed type.
.2 Static sensor: current monitors detect overload, short-circuit and ground-fault currents, and send these signals through solid-state circuits to static sensor which acts to trip breaker. Adjustable for current values and time of tripping.
.3 Flux-transfer shunt trip-magnetic tripping device actuated by signal from static sensor to open breaker contacts. Requires no external source of power.
.5 Voltage control rheostat: mounted on the inside of the control panel.
.6 Operating lights, panel mounted:
.1 "Normal power" pilot light.
.2 "Emergency power" pilot light.
.3 Green pilot lights for breaker on and red pilot lights for breaker off.

2.4 Control Panel (Cont'd)

.4 (Cont'd)

.6 (Cont'd)

.7 Solid state indicator lights for alarm with 1 set manually reset NO/NC contacts wired to terminal block for remote annunciation on:

.1 Low fuel level.

.2 Low battery voltage.

.3 Ventilation failure.

.4 Low coolant temperature.

.8 Solid state controller for automatic shutdown and alarms with 1 set manually reset NO/NC contacts wired to terminal block for remote annunciation on:

.1 Engine overcrank.

.2 Engine overspeed.

.3 Engine high temperature.

.4 Engine low lube oil pressure.

.5 Short circuit.

.6 AC over voltage.

.9 Lamp test button.

.10 Provision for remote monitoring.

.11 Provide auxiliary contacts to control external mechanical dampers when generator unit is running.

.12 Provide remote alarm as indicated on the plan.

.13 Provide remote monitor and control the generator from a personal computer using area network, remotely through an Ethernet connection. Provide software and associated equipment. Generator controller shall have the capability of starting and stopping from remote location within the institution via an Ethernet connection.

2.5 Outdoor Weather-Protective Sound-Attenuated Housing

.1 The generator set shall be provided with a factory-installed sound-attenuated housing which allows the generator set to operate at full rated load in the ambient conditions previously specified. The enclosure shall reduce the sound level of the generator set while operating at full rated load to a maximum of 72 dba at any location 7 meters from the generator set in a free field environment. Housing configuration and materials used may be of any suitable design which meets application needs, except that acoustical materials used shall be oil and water resistant. No foam materials shall be used unless they can be demonstrated to have the same durability and life as fiberglass.

.2 The enclosures shall include hinged doors for access to the engine and alternator, and the control equipment. Key-locking and padlockable door latches shall be provided for all doors. Door hinges shall be stainless steel.

.3 All ventillation dampers and louvers to be wired in a fail safe mode to open upon loss of contrpl power. Monitoring through end switches is manditory.

.4 Provide equipment door and man door into genset enclosure.

.5 The enclosures shall be provided with a 600 V - 120/208 V transformer Capacity as shown on single line diagram and twenty-four (24) circuit panelboard feeding the following:

.1 15 amp single pole breaker: (2) duplex receptacles.

.2 2-20 amp single pole breakers: 2-1500 watt baseboard heaters c/w thermostats, rated 120 volt.

.3 20 amp single pole breaker: battery charger.

.4 20 amp double pole breaker: engine block heater.

.5 15 amp single pole breaker: control panel and damper motors.

.6 15 amp single pole breaker: two duplex receptacles.

.7 15 amp single pole breaker: Emergency battery unit c/w two integral heads.

2.5 Outdoor Weather-Protective Sound-Attenuated Housing (Cont'd)

.5 (Cont'd)
.8 15 amp single pole breaker: five (5) two lamp industrial fluorescent light fixtures c/w exterior rated ballasts and control switch.
.9 15 amp single pole breaker:70 watt HPS wallpacks above access doors c/w intgral photocell.
.10 Refer to drawing details for additional information for power conections..

.6 The enclosure shall be provided with an exhaust silencer which is mounted inside of the enclosure, and allows the generator set package to meet specified sound level requirements. Silencer and exhaust shall terminate in an ANSI flange exhaust outlet 300 mm above enclosure. The supplier to include for field installation a self supporting, free standing heavy duty exhaust pipe terminating in a rain cap and rain shield 1000 mm above flange. Exhaust piping and flange to be non-corroding and insulated.

.7 All sheet metal shall be primed for corrosion protection and finish painted with the manufacturers specified colors using a two step electrocoating paint process, or equal meeting the performance requirements specified below. All surfaces of all metal parts shall be primed and painted. The painting process shall result in a coating which meets the following requirements:
.1 Primer thickness, 0.5-2.0 mils. Top coat thickness, 0.8-1.2 mils.
.2 Gloss, per ASTM D523, 80% plus or minus 5%. Gloss retention after one year shall exceed 50%.
.3 Crosshatch adhesion, per ASTM D3359, 4B-5B.
.4 Impact resistance, per ASTM D2794, 120-160 inch-pounds.
.5 Salt Spray, per ASTM B117, 1000+ hours.
.6 Humidity, per ASTM D2247, 1000+ hours.
.7 Water Soak, per ASTM D2247, 1000+ hours.

2.5 Outdoor Weather-Protective Sound-Attenuated Housing (Cont'd)

.7 (Cont'd)

.8 Painting of hoses, clamps, wiring harnesses, and other non-metallic service parts shall not be acceptable. Fasteners used shall be corrosion resistant, and designed to minimize marring of the painted surface when removed for normal installation of service work.

.9 Provide weatherproof rubber flaps over all padlock hasps to prevent icing of padlocking devices.

.10 Emergency Power Off (EPO) push button station to be weatherproof and located outside the Weatherproof walkin enclosure adjacent to the exit door and paralled with the EPO switch on the generator control panel. Provide weatherproof enclosure for EPO pushbutton.

2.6 Structural Steel Mounting Base

.1 The generator set in the weatherproof enclosure shall be mounted on a structural steel base of sufficient strength and rigidity to protect the assembly from stress of strain during transportation, installation and under operating condition on suitable level surface. The enclosure structural steel base to be co-ordinated with the roof mounted structural sub-base and ensure that the support points are acceptable to the enclosure manufacturer as well as the Structural Engineer.

.2 Assembly shall be fitted with vibration isolators and snubbers for siesmic duty engine control console resiliency.

.1 Spring type isolators with adjustable side snubbers for levelling.

.2 Sound insulation pads for installation between isolators and structural steel base.

.3 Lifting lugs.

2.7 Exhaust System

.1 Heavy duty, critical grade, horizontally mounted exhaust silencer with condensate drain, plug and flanged couplings supplied under this contract. Modifications to silensor drains and piping to the floor drain.

.2 Modifications to heavy duty flexible exhaust pipe with flanged couplings as required. Provide modifications to exhaust piping from the silencer to outside.

.3 Fittings and accessories as required.

.4 Expansion joints: stainless steel, corrugated, of suitable length, to absorb both vertical and horizontal expansion.

2.8 Fuel System

.1 Provide a dual wall fuel storage tank with 24 hour fuel capacity to file inividual enclosure base. The tank and piping shall be constructed of corrosion resistant steel and shall be UL listed. The equipment, as installed, shall meet all local, regional and federal requirements for above ground tanks.

.1 High level and low level fuel Level float switches.
.2 Leak detection switch.
.3 Fuel System trouble alarm.
.4 Electrical control module(s) to integrate above switches and alarm into the fuel oil transfer pump set control panel to stop /start the pump set automatically.
.5 Provide fuel for testing and leave tanks full on acceptance.
.6 Welded Black steel feed and return lines, with flexible terminations at engine.
.7 Shut-off cock.
.8 Renewable cartridge filter.
.9 Fire valve.
.10 Generator supplier shall complete a TSSA application process for any variances as required and obtain the installation certificate on behalf of the client for fuel services.

2.9 Finishes

.1 Shop finish metal surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
  .1 Paint indoor enclosures light grey to EEMAC 2Y-1-1958.

.2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.3 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

.4 Alternator control cubicle: paint inside, exterior to match engine and alternator.

.5 Other ducts and racks grey.

.6 Supply 0.25 L of grey touch-up enamel.

2.10 Equipment Identification

.1 Provide equipment identification of all electrical components located inside the generator room.

.2 Control panel:
  .1 20 x 90mm nameplates for controls such as alternator breakers and program selector switch.
  .2 12mm x 70mm nameplates for meters, alarms, indicating lights and minor controls.
  .3 Nameplates to be Lamicoid 3 mm thick plastic engraving sheet, black face, white core, mechanically attached with self tapping screws.

2.11 Fabrication

.1 Shop assemble generating unit including:
  .1 Base.
  .2 Engine and radiator.
  .3 Alternator.
  .4 Control panel.
  .5 Battery and charger.
  .6 Fuel system and day tank.
  .7 Weatherproof sound attenuated enclosure.

PART 3 - EXECUTION

3.1 Sequence of installation

.1 Emergency generator is to be installed on and fastened to a structural base. This work must be completed by the manufacturers technicians including anchoring and levelling of the enclosure.

.2 A complete sequence of installation and testing schedule to be provided by the supplier to the Departmental Representative for approval prior to commencement of installation.

3.2 Installation

.1 Locate generating unit as indicated, re-assemble all components and reinstate all fluids removed during shipment.

.2 Complete wiring and interconnections as indicated.

.3 Start generating set and re-test to ensure correct alignment, balance and performance of components.

.4 Installation shall be in conformance with CAN/CSA-C282-2009 Emergency Electrical Power Supply for Buildings.

3.3 Testing and Commissioning

.1 Emergency Power System (EPS)
  .1 Visual and Mechanical Inspection: For each of the EPS components as applicable and as listed below carry out Visual and Mechanical Inspection:
    .1 Generator: Carry out all the applicable work for the generator to establish completeness and correct installation of all individual components of the generator, engine and the engine-generator assembly.
  .2 EPS - Field Testing:
    .1 Provide manufacturer's factory trained technician to test and commission power generation equipment as a system.

3.3 Testing and Commissioning (Cont'd)

.1 (Cont'd)

.2 (Cont'd)

.2 Prior to energizing the power generation set on site:

.1 Ensure generating system is disconnected from normal power supply.

.2 Ensure all auxiliary support devices are operational, including ventilation and exhaust systems.

.3 Ensure all testing on emergency distribution components has been completed

.3 Prior to the official field test the following related items must be completed and operational:

.1 The ventilation system and related damper controls for the generator room.

.2 The fuel tank, float sensors and related pumps.

.3 The insulation on the exhaust system.

.4 Sealing of the generator room from the other rooms in the building.

.4 Provide fuel for testing and leave full tanks on acceptance. Provide 500 kW temporary loadbank to be used for site load test.

.5 Load test:

.1 The diesel generator shall be initially, started on no load and checked out for operational comopliance by factory trained representatives from the manufacturer of the generator set.

.2 Upon completion of the above coordinate the timing of the field test and inform the Departmental Representative 10 working days in advance of the test.

.3 Before proceeding with the field test, demonstrate system operation as follows:

.1 Unit start, transfer to load, retransfer to normal power, unit shut down, on "Automatic" control.

3.3 Testing and Commissioning (Cont'd)

.1 (Cont'd)

.2 (Cont'd)

.2 Unit start and shut down on "Manual" control.

.3 Unit start and transfer on "Test" control.

.4 Unit start on "Engine Start" control.

.5 Operation of manual bypass switch.

.6 Operation of automatic alarms and shutdown devices.

.7 Time delay on start and transfer of power.

.8 Engine crank time until engine starts.

.9 Time to achieve operating speed.

.10 Time to achieve steady state speed.

.11 Voltage, frequency and amperes at start and at load application.

.12 Time delay on re-transfer to normal power.

.13 Time delay on engine cool down and shutdown.

.6 Test Procedure:

.1 Conduct field testing in conjunction with the manufacturer and in the presence of the Departmental Representative.

.2 Provide fuel for testing and leave full tanks after the test.

.3 Record component and test data on approved component verification forms. Included as a minimum will be the following:

.1 Date

.2 Generator set serial no.

.3 Engine make, model, serial no.

.4 Alternator make, model, serial no.

.5 Rating of generator set kW, kVA, V, A, RPM, Hz.

.4 Record data on approved forms as test proceeds.

3.3 Testing and Commissioning (Cont'd)

.1 (Cont'd)

.2 (Cont'd)

.5 Submit test results for Departmental Representative's approval. Approved test results to be submitted with maintenance manuals.

.6 Utilize the portable load bank for 100 percent load test in accordance with yearly CSA test requirement. Load the unit in 25% load steps to 100% full load, noting engine recovery time. Operate on full load for minimum period of 4h to show load carrying ability, stability of voltage and frequency and satisfactory performance of dampers in ventilating system to provide adequate engine cooling. Record the following by taking readings at 15 minute intervals:

.1 Time of reading
.2 Running time
.3 Ambient temp. in °C.
.4 Lube oil pressure in kPa
.5 Lube oil temp. in °C.
.6 Exhaust stack temp. in °C.
.7 Alternator voltage, phase A, B, C, AN, BN, CN
.8 Alternator current, phase A, B and C
.9 Power in kW
.10 Frequency in Hz
.11 Power Factor
.12 Battery charger current in A.
.13 Battery voltage
.14 Alternator stator temp. in °C.

.7 Disconnect load bank and reconnect EPS to the building distribution.

3.3 Testing and Commissioning (Cont'd)

.1 (Cont'd)

.2 (Cont'd)

.8 Re-demonstrate automatic starting of the EPS and all automatic and manual modes of operation. Simulate loss of normal power and other conditins as applicable. Record transfer time.

.9 Demonstrate that battery charger reverts to high rate charge after cranking. Demonstrate two minute total cranking capacity and recharge cycle.

.10 Demonstrate operation of all automatic alarms and shut down devices.

.11 Demonstrate low oil pressure and high temperature shutdowns.

.12 Test all alarm and shut-down circuits by simulating conditions. Closing or opening of appropriate sensor contacts mechanically is not acceptable.

.13 Record noise level measurements in dB at various locations in generator room and area surrounding exhaust port.

.14 Demonstrate that on-site test results are consistent with results of factory tests with variances only as to location.

.15 Perform a second four (4) hour load testing utilizing building loads. Record following at 15 minute intervals during entire test:

.1 KiloWatts
.2 Amperes
.3 Voltage
.4 Frequency
.5 Current and Voltage harmonics
.6 Oil pressure
.7 Room temperature

3.3 Testing and Commissioning (Cont'd)	.1	(Cont'd)		
	.2	(Cont'd)		
			.16	At the end of the test transfer the system back to Normal power. Record transfer time.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for automatic load transfer equipment which can monitor voltage on all phases of normal power supply, initiate cranking of standby generator unit, transfer loads and shut down standby unit.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

.3 Section 01 78 00 - Closeout Submittals.

.4 Section 26 05 00 - Common Work Results - Electrical.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CAN3-C13-M83(R2003), Instrument Transformers.
.2 CSA C22.2 No.5-13, Moulded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489 and NMX-J-266-ANCE-2013).
.3 CSA C22.2 No.178-1978(R2006), Automatic Transfer Switches.

.2 American National Standards Institute (ANSI)/National Electrical Manufacturers Association (NEMA)
.1 NEMA ICS 2-[1996 Part 8(R2009)], Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC, Part 8: Disconnect Devices for Use in Industrial Control Equipment.

1.4 SYSTEM DESCRIPTION

.1 Automatic load transfer equipment to:
.1 Transfer switches to be complete with BYPASS function to allow building system power operation while transfer switch is out of service for maintenance.

1.4 SYSTEM DESCRIPTION (Cont'd)

.1 (Cont'd)

.2 Monitor voltage on phases of normal power supply.

.3 Initiate cranking of standby generator unit on normal power failure or abnormal voltage on any one phase below preset adjustable limits for adjustable period of time.

.4 Transfer load from normal supply to standby unit when standby unit reaches rated frequency and voltage pre-set adjustable limits.

.5 Transfer load from standby unit to normal power supply when normal power restored, confirmed by sensing of voltage on phases above adjustable pre-set limit for adjustable time period.

.6 Shut down standby unit after running unloaded to cool down using adjustable time delay relay.

1.5 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Include:

.1 Make, model and type.

.2 Load classification:

.1 Restricted use: resistance and general loads, 0.8pf or higher.

.3 Single line diagram showing controls and relays.

.4 Description of equipment operation including:

.1 Automatic starting and transfer to standby unit and back to normal power.

.2 Test control.

.3 Manual control.

.4 Automatic shutdown.

1.6 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for automatic load transfer equipment for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.2 Detailed instructions to permit effective operation, maintenance and repair.

.3 Technical data:

1.6 CLOSEOUT SUBMITTALS (Cont'd)

.3 (Cont'd)
- .1 Schematic diagram of components, controls and relays.
- .2 Illustrated parts lists with parts catalogue numbers.
- .3 Certified copy of factory test results.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal and Section 01 00 10 General Instructions.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard,and packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Instrument transformers: to CAN3-C13.

.2 Contactors: to ANSI/NEMA ICS 2.

2.2 CONTACTOR TYPE TRANSFER EQUIPMENT

.1 Contact Type Transfer Equipment: to CSA C22.2 No.178.

.2 Two(2) 3-phase contactors mounted on common frame, in double throw arrangement, mechanically and electrically interlocked, solenoid operated,with CSA enclosure.

.3 Rated: 600 V, 60Hz, 800 A. 4 wire.

.4 Main contacts: silver surfaced, protected by arc disruption means.

2.2 CONTACTOR TYPE TRANSFER EQUIPMENT (Cont'd)

.5 Switch and relay contacts, coils, spring and control elements accessible for inspection and maintenance from front of panel without removal of switch panel or disconnection of drive linkages and power conductors.

.6 Auxiliary contact: silver plated, to initiate emergency generator start-up on failure of normal power.

.7 Fault withstand rating: 42 kA symmetrical peak value.

.8 Lever to operate switch manually when switch is isolated.

.9 Solid neutral bar, rated: 800 A.

.10 Overlapping neutral contacts on contactor type transfer equipment.

2.3 CONTROLS

.1 Selector switch - four position "Test", "Auto", "Manual", "Engine start".
.1 Test position - Normal power failure simulated. Engine starts and transfer takes place. Return switch to "Auto" to stop engine.
.2 Auto position - Normal operation of transfer switch on failure of normal power; retransfers on return of normal voltage and shuts down engine.
.3 Manual position - Transfer switch may be operated by manual handle but transfer switch will not operate automatically and engine will not start.
.4 Engine start position - Engine starts but unit will not transfer unless normal power supply fails. Switch must be returned to "Auto" to stop engine.

.2 Control transformers: dry type with 120V secondary to isolate control circuits from:
.1 Normal power supply.
.2 Emergency power supply.

.3 Relays: continuous duty, industrial control type, with wiping action contacts rated 10 A minimum:

2.3 CONTROLS (Cont'd)

.3 (Cont'd)

.1 Voltage sensing: 3 phase for normal power and on one phase only for emergency, solid state type, adjustable drop out and pick up, close differential, 2V minimum undervoltage and over voltage protection.

.2 Time delay: normal power to standby, adjustable solid state, 5 to 180s.

.3 Time delay on engine starting to override momentary power outages or dips, adjustable solid state, 0 to 60s delay.

.4 Time delay on retransfer from standby to normal power, adjustable 5 to 180s 20s to 10 min.

.5 Time delay for engine cool-off to permit standby set to run unloaded after retransfer to normal power, adjustable solid state, 20s intervals to 10 min.

.4 Solid state electronic in-phase monitor.

2.4 ACCESSORIES

.1 Pilot lights to indicate power availability normal and standby, switch position, green for normal, red for standby, mounted in panel.

.2 Plant exerciser: 168h timer to start standby unit once each week for selected interval but does not transfer load from normal supply. Timer adjustable 0-168h in 15 min intervals.

.3 Auxiliary relay to provide 2 N.O. and 2 N.C. contacts for remote alarms.

.4 Pre-transfer module c/w 2 N.O. and 2 N.C. contacts to be wired to elevator control panel in elevator machine room.

.5 Instruments:

.1 Digital true rms, indicating type 2% accuracy, flush panel mounting:

.1 Voltmeter: ac, scale 0 to 750 V.

.2 Ammeter: ac, scale 0 to 1500 A.

.3 Frequency meter: scale 55 to 65 Hz.

2.4 ACCESSORIES (Cont'd)

.5 (Cont'd)
.1 (Cont'd)

.6 Voltmeter selector switch: maintained contacts, panel mounting type, round notched handle, four position, labelled "OFF-Phase A-Phase B-Phase C".

.7 Potential transformers - dry type for indoor use:
.1 Ratio: 600 to 120.
.2 Rating: 600 V, 60Hz, BIL.
.3 standard Accuracy rating:2%.

.8 Ammeter selector switch: rotary, maintained contacts, panel mounting type, designed to prevent opening of current circuits, round notched handle, four position labelled "OFF - Phase A - Phase B - Phase C".

.9 Current transformers - dry type for indoor use:
.1 Ratio: 800 to 5 and
.2 Rating: 600 V, 60Hz, BIL standard.
.3 Accuracy rating:2%.
.4 Positive action automatic short-circuiting device in secondary terminals.

.10 Manual bypass:For normal and emergency sources.

2.5 EQUIPMENT IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results - Electrical.

.2 Control panel:
.1 For selector switch and manual switch: size 4 nameplates.
.2 For meters, indicating lights, minor controls: size 2 nameplates.
.3 Nameplates wording to be prepared by the Departmental Representative.

2.6 SOURCE QUALITY CONTROL

.1 Complete equipment, including transfer mechanism, controls, relays and accessories factory assembled and tested in presence of Departmental Representative.

.2 Notify Engineer 7 days in advance of date of factory test.

2.6 SOURCE QUALITY CONTROL (Cont'd)

.3 Tests:
- .1 Operate equipment both mechanically and electrically to ensure proper performance.
- .2 Check selector switch, in modes of operation Test, Auto, Manual, Engine Start and record results.
- .3 Check voltage sensing and time delay relay settings.
- .4 Check:
  - .1 Automatic starting and transfer of load on failure of normal power.
  - .2 Retransfer of load when normal power supply resumed.
  - .3 Automatic shutdown.
  - .4 In-phase monitor operation.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Locate, install and connect transfer equipment.

.2 Check relays solid state monitors and adjust as required.

3.2 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.

.2 Energize transfer equipment from normal power supply.

.3 Set selector switch in "Test" position to ensure proper standby start, running, transfer, retransfer. Return selector switch to "Auto" position to ensure standby shuts down.

.4 Set selector switch in "Manual" position and check to ensure proper performance.

.5 Set selector switch in "Engine start" position and check to ensure proper performance. Return switch to "Auto" to stop engine.

3.2 FIELD QUALITY CONTROL (Cont'd)

.6 Set selector switch in "Auto" position and open normal power supply disconnect. Standby should start, come up to rated voltage and frequency, and then load should transfer to standby. Allow to operate for 10 min, then close main power supply disconnect. Load should transfer back to normal power supply and standby should shutdown.

.7 Repeat, at 1h intervals, times, complete test with selector switch in each position, for each test.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

1.2 References

.1 American National Standards Institute (ANSI)
- .1 ANSI C82.1-2004, Electric Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.
- .2 ANSI C82.4-2002, Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type).

.2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
- .1 ANSI/IEEE C62.41-2002, Surge Voltages in Low-Voltage AC Power Circuits.

.3 American Society for Testing and Materials (ASTM)
- .1 ASTM F 1137-2011, Standard for Specification Phosphate/Oil and Phosphate/OrganicCorrosion Protective Coatings for Fasteners.

.4 United States of America, Federal Communications Commission (FCC)
- .1 FCC (CFR47) EM and RF Interference Suppression.

1.3 Shop Drawings and Product Data

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Departmental Representative.

1.4 Waste Management and Disposal

.1 Separate and recycle waste materials in accordance with Section 01 00 10 - General Instructions and with Section 01 74 21 Waste Management and Disposal.

1.4 Waste Management and Disposal (Cont'd)

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

PART 2 - PRODUCTS

2.1 Lamps

.1 Fluorescent lamps.

Lamp Design	Bulb shape Wattage	Base	Type	Initial Lumens	Life hour	Descrip.	Colour °k
A	T5-28	md.bip	RS	3100	30000	cool white	4000

2.2 Ballasts

.1 Fluorescent ballast: CBM and CSA certified, energy efficient type, IC electronic design.
- .1 Rating: 120 V, 60 Hz, for use with T-5, 2-28W Rapid start lamps.
- .2 RFI/EMI suppression circuit to: FCC (CFR47) Part 18, sub-part C, Class A and Part 15, sub-part B, Class B.
- .3 Totally encased and designed for 40 °C ambient temperature.
- .4 Power factor: minimum 95 % with 95% of rated lamp lumens.
- .5 Crest factor: 1.5 maximum current, maximum voltage.
- .6 Capacitor: thermally protected.
- .7 Thermal protection: non-resettable on coil.
- .8 Harmonics: <10 % maximum THD,
- .9 Operating frequency of electronic ballast: 21 khz minimum.
- .10 Total Circuit Power: 58 Watts.
- .11 Ballast Factor: greater than 0.90.
- .12 Sound rated: Class A.
- .13 Mounting: integral with luminaire.

2.3 Finishes

.1 Baked enamel finish:
- .1 Conditioning of metal before painting:
  - .1 For corrosion resistance coating conversion to ASTM F 1137.

2.3 Finishes (Cont'd)

.1 (Cont'd)
.1 (Cont'd)
.2 For paint base, conversion coating to ASTM F 1137.
.2 Metal surfaces of luminaire housing and reflectors finished with high gloss baked enamel to give smooth, uniform appearance, free from pinholes or defects.
.3 Reflector and other inside surfaces finished as follows:
.1 White, minimum reflection factor 85%.
.2 Colour fastness: yellowness factor not above 0.02 and after 250 hours exposure in Atlas fade-ometer not to exceed 0.05.
.3 Film thickness, not less than 0.03 mm average and in no areas less than 0.025 mm.
.4 Gloss not less than 80 units as measured with Gardner 60° gloss meter.

2.4 Luminaires

.1 Fluorescent luminaire design: Type 'A'.
.1 No. of lamps: 2.
.2 Industrial open reflector fluorescent luminaire with wire guard. Mounting: indoor pendant.

PART 3 - EXECUTION

3.1 Installation

.1 Locate and install luminaires as indicated.

3.2 Wiring

.1 Connect luminaires to lighting circuits:
.1 Directly for luminaire designs 'A'.

3.3 Luminaire Supports

.1 Light fixtures to be suspended on 6mm threaded rods, 2 rods per fixture.

3.4 Luminaire Alignment

.1 Align luminaires mounted in continuous rows to form straight uninterrupted line.

.2 Align luminaires mounted individually parallel or perpendicular to building grid lines.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.2 No.141-2010,Emergency Lighting equipment, includes update No.1.

1.3 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Data to indicate system components, mounting method, source of power and special attachments.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 00 10 - General Instructions and Section 01 74 21 Construction/Demolition Waste Management & Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused metal and wiring materials from landfill to metal recycling facility approved by Departmental Representative.

.5 Dispose of unused batteries at official hazardous material collections site approved by Departmental Representative.

.6 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 EQUIPMENT

.1 Emergency lighting equipment: to CSA C22.2 No.141.

.2 Supply voltage: 120 V, ac.

.3 Output voltage: 12 V dc.

.4 Operating time: 120 min.

.5 Battery: sealed, maintenance free.

.6 Charger: solid state, multi-rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01V for plus or minus 10% input variations.

.7 Solid state transfer circuit.

.8 Low voltage disconnect: solid state, modular, operates at 80% battery output voltage.

.9 Signal lights: solid state, for 'AC Power ON' and 'High Charge'.

.10 Lamp heads: integral on unit, 345 degrees horizontal and 180 degrees vertical adjustment. Lamp type: MR16 halogen, 20 W, minimum.

.11 Cabinet: suitable for direct or shelf mounting to wall and c/w knockouts for conduit. Removable or hinged front panel for easy access to batteries.

.12 Finish:Standard.

.13 Auxiliary equipment:
- .1 Test switch.
- .2 Time delay relay.
- .3 Battery disconnect device.
- .4 Bracket.
- .5 Cord and plug connection for AC.
- .6 RFI suppressors.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install unit equipment and remote mounted fixtures.

.2 Direct heads.

.3 Connect exit lights to unit equipment.

END OF SECTION

PART 1 - GENERAL

1.1 Waste Management and Disposal

.1 Seperate and recycle waste materials in accordance with Section 01 00 10 General Instructions and Section 01 74 21 Construction/Demolition Waste Management and Disposal

.2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Ensure emptied containers are sealed and stored safely.

1.2 Protection of Existing Features

.1 Protect existing features in accordance with local regulations.

.2 Existing buried utilities and structures:

.1 Size, depth and location of existing utilities and structures arenot available.

.2 Prior to commencing excavation Work, notify Departmental Representative, establish location and state of use of buried utilities and structures. Contractor is responsible to clearly mark such locations to prevent disturbance during Work.

.3 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.

.4 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative. Costs for such Work to be paid by Contractor.

.5 Record location of maintained, re-routed and abandoned underground lines.

.6 Confirm locations of recent excavations adjacent to area of excavation.

.3 Existing buildings and surface features:

1.2 Protection of Existing Features (Cont'd)

.3 (Cont'd)

.1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair to approval of Departmental Representative.

.3 Where required for excavation, cut roots or branches as approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 Site Preparation

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.2 Stripping of Topsoil

.1 Commence topsoil stripping of areas approved by Departmental Representative, after area has been cleared of brush and removed from site.

.2 Strip topsoil to depths as directed by Departmental Representative. Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.

.3 Stockpile in locations as directed by Departmental Representative. Stockpile height not to exceed 2m.

3.2 Stripping of Topsoil (Cont'd)

.4 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill.

.5 Protect stockpiles from contamination and compaction.

3.3 Stockpiling

.1 Stockpile fill materials in areas designated by Departmental Representative.

.2 Protect fill materials from contamination.

3.4 Excavation

.1 Excavate to lines, grades, elevations and dimensions as directed by Departmental Representative.

.2 Excavation must not interfere with bearing capacity of adjacent foundations.

.3 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.4 Keep excavated and stockpilled materials a safe distance away from edge of trench as directed by Departmental Representative.

.5 Restrict vehicle operations directly adjacent to open trenches.

.6 Dispose of surplus and unsuitable excavated material off site.

.7 Do not obstruct flow of surface drainage or natural watercourses.

.8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.9 Notify Departmental Representative when bottom of excavation is reached.

.10 Obtain Departmental Representative's approval of completed excavation.

3.4 Excavation (Cont'd)

.11 Remove unsuitable material from trench bottom to extent and depth as directed by Departmental Representative.

3.5 Backfilling

.1 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding 150mm compacted thickness up to grades indicated. Compact each layer to 95% standard proctor density before placing succeeding layer.

.5 Backfilling around installations.

.1 Place bedding and surround material as specified elsewhere.

3.6 Restoration

.1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.

.2 Replace topsoil as directed by Departmental Representative.

.3 Reinstate lawns to elevation which existed before excavation.

.4 Reinstate pavements and concrete walkways disturbed by excavation to thickness, structure and elevation which existed before excavation.

.5 Clean and reinstate areas affected by Work as directed by Departmental Representative.

END OF SECTION