PWGSC

LAURENTIAN FORESTERY
RESEARCH CENTER
2 NATURAL RESOURCES CANADA
1055, RUE DU PEPS

REPLACEMENT DISTRIBUTION CENTER
ELECTRICAL DEVICE

PROJECT Nº Q152064A

Travaux publics et Services gouvernementaux Canada

Public Works and Government Services Canada

PWGSC
LAURENTIAN FORESTERY
RESEARCH CENTER
2 NATURAL RESOURCES CANADA
1055, RUE DU PEPS

REPLACEMENT DISTRIBUTION CENTER

N/Réf. : Q152064A

ISSUED FOR BID

Prepared by : Bernard Ouellet-Jean, tech.

Verified by :

Janik Leblond, Eng.

CIMA, Engineering services
1145, Lebourgneuf blvd, suite 300
Quebec (Quebec) G2K 2K8

Revision nº	Issued for	Date
0	Preliminary	2016-03-09
	Comments	2016-07-07
	Bid	2017-03-07

END OF SECTION

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 26.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises replacement, tests and commissioning of one new distribution center and transformers as per drawings.

1.03 CONTRACT METHOD

.1 The work performed must be part of a lump sum construction contract.

.2 Retain the services of designated suppliers and subcontractors prequalified by the Owner for the following work:
.1 See section 26 for electrical work.

.3 The relationship and responsibilities between the Contractor and the subcontractors, the supplier's designer, and the subcontractors designated by the Owner, shall be in accordance with the terms and conditions of the Contract. In addition, designated subcontractors must:
.1 Furnish to the Contractor the security for subcontracting work and the related payment guarantees where the Contractor is required to provide such security to the Departmental Representative;
.2 Subscribe and maintain liability insurance to protect the Contractor against potential claims, at least to the extent of the minimum liability insurance coverage that the Contractor is required to provide to the Departmental Representative.

1.04 WORK BY OTHERS

.1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from Consultant.

.2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Consultant, in writing, any defects which may interfere with proper execution of Work.

1.05 EXECUTION OF WORK

.1 Perform the work in steps, so that the Owner can use the site continuously during the work.

.2 Coordinate schedule of work according to occupancy by the Owner during construction.

.3 Carry out work in steps to allow continued use of the site by the public. Maintain site access to the public as long as work prevents alternatives.

.4 Maintain access for firefighting purposes; Provide fire-fighting equipment.

1.06 CONTRACTOR USE OF PREMISES

.1 The site may be used without restriction until substantial completion of the work.

.2 Limit use of premises for Work and for storage to allow:
- .1 Owner occupancy.
- .2 Partial owner occupancy.
- .3 Work by other contractors.
- .4 Public usage.

.3 Co-ordinate use of premises under direction of Consultant.

.4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Consultant.

.7 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.07 OWNER OCCUPANCY

.1 Owner will occupy premises during entire construction period for execution of normal operations.

.2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.08 PARTIAL OWNER OCCUPANCY

.1 Schedule and substantially complete designated portions of Work for Owner's occupancy prior to Substantial Performance of entire Work.

.2 Owner will occupy designated areas for purpose of storage of furnishings and equipment.

.3 Execute Certificate of Substantial Performance for each designated portion of Work prior to Owner occupancy. [Contractor] [Design-Builder] shall allow:
- .1 Access for Owner personnel.
- .2 Use of parking facilities.
- .3 Operation of HVAC and electrical systems.

.4 On occupancy, Owner will provide for occupied areas:
.1 Operation of HVAC and electrical systems.
.2 Maintenance.
.3 Security.

.5 Execute Partial Interim Certificate of Completion for each designated portion of Work prior to Owner occupancy. Contractor shall allow:
.1 Access for Owner personnel.
.2 Use of parking facilities.
.3 Operation of HVAC and electrical systems.

1.09 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building operations, public and normal use of premises. Arrange with Consultant to facilitate execution of work.

.2 Use only elevators or escalators existing in building for moving workers and material.
.1 Protect walls of passenger elevators, to approval of Consultant prior to use.
.2 Accept liability for damage, safety of equipment and overloading of existing equipment.

1.10 EXISTING SERVICES

.1 Notify, Consultant and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Consultant 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to vehicular traffic.

.3 Provide alternative routes for personnel and vehicular traffic.

.4 Establish location and extent of service lines in area of work before starting Work. Notify Consultant of findings.

.5 Submit schedule to and obtain approval from Consultant for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.6 Provide temporary services to maintain critical building and tenant systems.

.7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.8 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.

.9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.10 Record locations of maintained, re-routed and abandoned service lines.

1.11 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:
- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Reviewed Shop Drawings.
- .5 List of Outstanding Shop Drawings.
- .6 Change Orders.
- .7 Other Modifications to Contract.
- .8 Field Test Reports.
- .9 Copy of Approved Work Schedule.
- .10 Health and Safety Plan and Other Safety Related Documents.
- .11 Other documents as specified.

Part 2 - PRODUCTS

2.01 NOT USED

.1 Not used.

Part 3 - EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 26.

1.02 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of PWGSC Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting four days in advance of meeting date to PWGSC Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants and, PWGSC Representative.

.8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.03 PRECONSTRUCTION MEETING

.1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 PWGSC Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include:
- .1 Appointment of official representative of participants in the Work.
- .2 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Delivery schedule of specified equipment in accordance with Section

26.

.4 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

.5 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.6 Owner provided products.

.7 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

.8 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.

.9 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.

.10 Monthly progress claims, administrative procedures, photographs, hold backs.

.11 Appointment of inspection and testing agencies or firms.

.12 Insurances, transcript of policies.

1.04 PROGRESS MEETINGS

.1 During course of Work and 2 weeks prior to project completion, schedule progress meetings monthly.

.2 Contractor, major Subcontractors involved in Work and PWGSC Representative and Owner are to be in attendance.

.3 Notify parties minimum 5 days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within days after meeting.

.5 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

.11 Review proposed changes for affect on construction schedule and on completion date.

.12 Other business.

PART 2 - PRODUCTS

2.01 NOT USED

.1 Not Used.

PART 3- EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 26.

1.02 ADMINISTRATIVE

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

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

.3 Present shop drawings, product data, samples and mock-ups 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 PWGSC 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 considered rejected.

.6 Notify PWGSC 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 co-ordinated.

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

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

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

1.03 SHOP DRAWINGS AND PRODUCT DATA

.1 Refer to CCDC 2 GC 3.11.

.2 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.

.3 Submit drawings stamped and signed by professional engineer registered or licensed in Province Quebec, Territory of Canada.

.4 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 co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.5 Allow 12 days for PWGSC Representative's review of each submission.

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

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

.8 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.

.9 Submissions 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.

.10 After PWGSC Representative's review, distribute copies.

.11 Submit one (1) transparent reproducible, six (6) hard copies, one (1) electronic copy of shop drawings prescribed in the specification sections and according to the reasonable requirements of the PWGSC Representative.

.12 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by PWGSC Representative where shop drawings will not be prepared due to standardized manufacture of product.

.13 Submit 1 electronic copies of test reports for requirements requested in specification Sections and as requested by PWGSC Representative.
- .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
- .2 Testing must have been within 3 years of date of contract award for project.

.14 Submit 1 electronic copies of certificates for requirements requested in specification Sections and as requested by PWGSC Representative.
- .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
- .2 Certificates must be dated after award of project contract complete with project name.

.15 Submit 1 electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by PWGSC Representative.
- .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.16 Submit 1 electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by PWGSC Representative.

.17 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.18 Submit 1 electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by PWGSC Representative.

.19 Delete information not applicable to project.

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

.21 If upon review by PWGSC Representative, no errors or omissions are discovered or if only minor corrections are made, transparency 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.

.22 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.

.1 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 requirements of construction and Contract Documents.

.2 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 sub-trades.

1.04 SAMPLES

.1 Submit two (2) product samples for review, as specified by the specification sections. Label the samples indicating their origin and intended destination.

.2 Deliver samples prepaid to PWGSC Representative's business address site office.

.3 Notify PWGSC 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 PWGSC Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to PWGSC Representative prior to proceeding with Work.

.6 Make changes in samples which PWGSC 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.

1.05 MOCK-UPS

.1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

1.06 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic and hard copy of colour digital photography in jpg format, fine resolution monthly with progress statement and as directed by PWGSC Representative.

.2 Project identification: name and number of project and date of exposure indicated.

.3 Number of viewpoints: 2 locations.
.1 Viewpoints and their location as determined by PWGSC Representative.

.4 Frequency of photographic documentation: weekly as directed by PWGSC Representative.
.1 Upon completion of: of Work, and as directed by PWGSC Representative.

1.07 CERTIFICATES AND TRANSCRIPTS

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

.2 Submit transcription of insurance immediately after award of Contract.

PART 2 - PRODUCTS

2.01 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 26.

1.02 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.2 Province of Quebec
.1 An Act Respecting Occupational Health and Safety, R.S.Q., c.S-2.1 (current edition) - Updated 2005.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 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 Results of site specific safety hazard assessment.
.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.3 Submit 1 copies of Contractor's authorized representative's work site health and safety inspection reports to PW65C Representative weekly.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit copies of incident and accident reports.

.6 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 47 15 - Sustainable Requirements: Construction.

.7 PW65C 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 PW65C Representative within 7 days after receipt of comments from PW65C Representative.

.8 PW65C Representative review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to PW65C Representative.

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

1.04 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to beginning of Work.

.2 Contractor shall be responsible and assume the Principal Contractor role for each work zone location and not the entire complex. Contractor shall provide a written acknowledgement of this responsibility with 3 weeks of contract award. Contractor to submit written acknowledgement to CSST along with Ouverture de Chantier Notice.

.3 Work zone locations include:
.1 Electric room of Laurentian Forestery Research Centre.

.4 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project.

1.05 SAFETY ASSESSMENT

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

1.06 MEETINGS

.1 Schedule and administer Health and Safety meeting with PW65C Representative prior to commencement of Work.

1.07 PROJECT/SITE CONDITIONS

.1 Not used.

1.08 GENERAL REQUIREMENTS

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

.2 PWGSC Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.09 RESPONSIBILITY

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

.2 Contractor will be responsible and assume the role Constructor as described in the Québec Occupational Health and Safety Act and Regulations for

Construction Projects.

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

1.10 COMPLIANCE REQUIREMENTS

.1 Comply with R.S.Q., c. S-2.1, an Act respecting Health and Safety, and c. S-2.1, r.4 Safety Code for the Construction Industry.

.2 Comply with Occupational Health and Safety Regulations, 1996.

.3 Comply with Occupational Health and Safety Act, General Safety Regulations, O.I.C.

.4 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.11 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise PWGSC Representative verbally and in writing.

.2 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Safety Officer and follow procedures in accordance with Acts and Regulations of Province having jurisdiction and advise PWGSC Representative verbally and in writing.

1.12 HEALTH AND SAFETY CO-ORDINATOR

.1 The contractor shall always manage his activities so as to priories the Health and Safety of the Public and the work force to cost or schedule related motives.

1.13 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with PWGSC Representative.

1.14 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by PWGSC Representative.

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

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

1.15 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt of written permission from PWGSC Representative.

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.

PART 2 - PRODUCTS

2.01 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 26.

1.02 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)
.1 CCDC 2-[94], Stipulated Price Contract.

1.03 INSPECTION

.1 Refer to CCDC 2, GC 2.3.

.2 Allow PWGSC Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by PWGSC Representative instructions, or law of Place of Work.

.4 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.5 PWGSC Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, PWGSC Representative shall pay cost of examination and replacement.

1.04 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by PWGSC Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by PWGSC Representative.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by PWGSC

Representative at no cost to PWGSC Representative. Pay costs for retesting and reinspection.

1.05 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.06 PROCEDURES

.1 Notify appropriate agency and PWGSC Representative in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.07 REJECTED WORK

.1 Refer to CCDC, GC 2.4.

.2 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by PWGSC Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.3 Make good other Contractor's work damaged by such removals or replacements promptly.

.4 If in opinion of PWGSC Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by PWGSC Representative.

1.08 REPORTS

.1 Submit 4 copies of inspection and test reports to PWGSC Representative.

.2 Provide copies to subcontractor of work being inspected or tested or manufacturer or fabricator of material being inspected or tested.

1.09 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

.2 Cost of tests and mix designs beyond those called for in Contract Documents

or beyond those required by law of Place of Work will be appraised by PWGSC Representative and may be authorized as recoverable.

1.10 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.

.2 Construct in locations acceptable to PWGSC Representative as specified in specific Section.

.3 Prepare mock-ups for PWGSC Representative's review with reasonable promptness and in orderly sequence, to not cause delays in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 If requested, PWGSC Representative will assist in preparing schedule fixing dates for preparation.

.6 Remove mock-up at conclusion of Work or when acceptable to PWGSC Representative.

.7 Mock-ups may remain as part of Work.

.8 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.11 MILL TESTS

.1 Submit mill test certificates as requested required of specification Sections.

1.12 EQUIPMENT AND SYSTEMS

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

PART 2 - PRODUCTS

2.01 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 26.

1.02 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)
- .1 CCDC 2-[94], Stipulated Price Contract.
- .2 DOC 14-[2000], Design-Build Stipulated Price Contract.
- .3 DOC 15-[2000], Design-Builder/ Consultant Contract.

.2 Conform to these reference standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether products or systems are in conformance with applicable standards, PWGSC Representative reserves right to have such products or systems tested to prove or disprove conformance.

.4 Cost for such testing will be born by PWGSC Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.03 QUALITY

.1 Refer to CCDC 2.

.2 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.3 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

.4 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.5 Should disputes arise as to quality or fitness of products, decision rests strictly with PWGSC Representative based upon requirements of Contract Documents.

.6 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.7 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.04 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify PWGSC Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify PWGSC Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, PWGSC Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.05 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials, lumber and on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of PWGSC Representative.

.9 Touch-up damaged factory finished surfaces to PWGSC Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.06 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

.2 Transportation cost of products supplied by Owner will be paid for by PWGSC

Representative. Unload, handle and store such products.

1.07 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify PWGSC Representative in writing, of conflicts between specifications and manufacturer's instructions, so that PWGSC Representative will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes PWGSC Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.08 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify PWGSC Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. PWGSC Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with PWGSC Representative, whose decision is final.

1.09 CO-ORDINATION

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.10 CONCEALMENT

.1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation inform PWGSC Representative if there is interference. Install as directed by PWGSC Representative.

1.11 REMEDIAL WORK

.1 Refer to CCDC 2 DOC 14 and Section 01 73 00 - Execution Requirements.

.2 Refer to DOC 14.

.3 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.

.4 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.12 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform [Departmental Representative] [PWGSC Representative] [Consultant] of conflicting installation. Install as directed.

1.13 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.14 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.15 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of parts of building. Do not cut, drill or sleeve load

bearing structural member, unless specifically indicated without written approval of PWGSC Representative.

1.16 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

PART 2 - PRODUCTS

2.01 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 26.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit written request in advance of cutting or alteration which affects:
- .1 Structural integrity of elements of project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of operational elements.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.

.3 Include in request:
- .1 Identification of project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Owner or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.

1.03 MATERIALS

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.04 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.05 EXECUTION

.1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.

.2 Fit several parts together, to integrate with other Work.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Provide openings in non-structural elements of 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 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

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

.9 Restore work with new products in accordance with requirements of Contract Documents.

.10 Fit Work [airtight] to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material, full thickness of the construction element.

.12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

.13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.06 WASTE MANAGEMENT AND DISPOSAL

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

PART 2 - PRODUCTS

2.01 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 26.

1.02 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)
  .1 CCDC 2-[94], Stipulated Price Contract.

1.03 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including other than that caused by Owner or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by PWGSC Representative. Do not burn waste materials on site, unless approved by PWGSC Representative.

.3 Clear snow and ice from access to building, bank/pile snow in designated areas only remove from site.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Provide on-site containers for collection of waste materials and debris.

.6 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.7 Dispose of waste materials and debris at designated dumping areas on Crown property off site.

.8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

.9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.04 FINAL CLEANING

.1 Refer to CCDC 2, GC 3.14.

.2 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.3 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.4 Prior to final review remove surplus products, tools, construction machinery and equipment.

.5 Remove waste products and debris other than including that caused by Owner or other Contractors.

.6 Remove waste materials from site at regularly scheduled times or dispose of as directed by PWGSC Representative. Do not burn waste materials on site, unless approved by PWGSC Representative.

.7 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.8 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.9 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.

.10 Clean lighting reflectors, lenses, and other lighting surfaces.

.11 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

.12 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.

.13 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.14 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.15 Remove dirt and other disfiguration from exterior surfaces.

.16 Clean and sweep roofs, gutters, areaways, and sunken wells.

.17 Sweep and wash clean paved areas.

.18 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

.19 Clean roofs, downspouts, and drainage systems.

.20 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.21 Remove snow and ice from access to building.

1.05 WASTE MANAGEMENT AND DISPOSAL

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

PART 2 - PRODUCTS

2.01 NOT USED

.1 Not Used.

PARt 3 - EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 WASTE MANAGEMENT GOALS

.1 Prior to start of Work conduct meeting with PW65C Representative to review and discuss PWGSC's waste management goal and Contractor's proposed Waste Reduction Workplan for Construction, Renovation and /or Demolition (CRD) waste to be project generated.

.2 PWGSC's waste management goal: to divert a minimum 75 percent of total Project Waste from landfill sites. Prior to project completion provide PW65C Representative documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.

.3 Target percentage goals are achievable for waste diversion. Contractor to review and confirm PW65C Representative's Waste Audit acceptable values.

.4 Minimize amount of non-hazardous solid waste generated by project and accomplish maximum source reduction, reuse and recycling of solid waste produced by CRD activities.

.5 Protect environment and prevent environmental pollution damage.

1.02 RELATED REQUIREMENTS

.1 Section 26.

1.03 USE OF SITE AND FACILITIES

.1 Execute Work with minimal interference and disturbance to normal use of premises.

.2 Maintain security measures established by facility provide temporary security measures approved by PWGSC Representative.

1.04 STORAGE, HANDLING AND PROTECTION

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

.2 Unless specified otherwise, materials for removal do not become become Contractor's property.

.3 Protect, stockpile, store and catalogue salvaged items.

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

.5 Protect structural components not removed and salvaged materials from movement or damage.

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

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

.8 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials.

.9 Separate and store materials produced during project in designated areas.

.10 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.
- .1 On-site source separation is recommended.
- .2 Remove co-mingled materials to off site processing facility for separation.
- .3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.
- .4 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.

1.05 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste volatile materials into waterways, storm, or sanitary sewers.

.3 Remove materials on-site as Work progresses.

1.06 SCHEDULING

.1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

PART 2 - PRODUCTS

2.01 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.01 APPLICATION

.1 Do Work in compliance with WRW and WSSP.

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

3.02 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

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

END OF SECTION

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 26.

1.02 REFERENCES

.1 Canadian Environmental Protection Act (CEPA)
  .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.03 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:
  .1 Convene meeting one week prior to contract completion with contractor's representative and PWGSC Representative, in accordance with Section 01 31 19 - Project Meetings to:
    .1 Verify Project requirements.
    .2 Review manufacturer's installation instructions and warranty requirements.
  .2 PWGSC Representative to establish communication procedures for:
    .1 Notifying construction warranty defects.
    .2 Determine priorities for type of defects.
    .3 Determine reasonable response time.
  .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
  .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Two weeks prior to Substantial Performance of the Work, submit to the PWGSC Representative, four final copies of operating and maintenance manuals in English and French.

.3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

.4 Provide evidence, if requested, for type, source and quality of products supplied.

1.05 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.
.1 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, process flow, 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.
.1 Bind in with text; fold larger drawings to size of text pages.

.9 Provide 1:1 scaled CAD files in dwg format on CD.

1.06 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Table of Contents for Each Volume: provide title of project;
.1 Date of submission; names.
.2 Addresses, and telephone numbers of Consultant and [Contractor] [Design-Builder] 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.
.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.07 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for PWGSC 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.
- .1 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.
- .1 Label each document "PROJECT RECORD" in neat, large, printed letters.

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

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

1.08 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of blue line opaque drawings, and in copy of Project Manual, provided by PWGSC Representative.

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

.3 Record information concurrently with construction progress.
- .1 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.

.7 Provide digital photos, if requested, for site records.

1.09 EQUIPMENT AND SYSTEMS

.1 For each item of equipment and each system include description of unit or system, and component parts.
.1 Give function, normal operation characteristics and limiting conditions.
.2 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.
.1 Include regulation, control, stopping, shut-down, and emergency instructions.
.2 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 Design-Builder'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 45 00 - Quality

Control and 01 91 13 - General Commissioning (Cx) Requirements.

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

1.10 MATERIALS AND FINISHES

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
  .1 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.

1.11 MAINTENANCE MATERIALS

.1 Spare Parts:
  .1 Provide spare parts, in quantities specified in individual specification sections.

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

  .3 Deliver to site location as directed; place and store.

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

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

.2 Extra Stock 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 location as directed; place and store.
  .4 Receive and catalogue items.
    .1 Submit inventory listing to PWGSC Representative.
    .2 Include approved listings in Maintenance Manual.
  .5 Obtain receipt for delivered products and submit prior to final payment.

.3 Special Tools:
  .1 Provide special tools, in quantities specified in individual

specification section.
.2 Provide items with tags identifying their associated function and equipment.
.3 Deliver to site location as directed; place and store.
.4 Receive and catalogue items.
.1 Submit inventory listing to PWGSC Representative.
.2 Include approved listings in Maintenance Manual.

1.12 DELIVERY, STORAGE AND HANDLING

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and for review by PWGSC Representative.

1.13 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Submit warranty management plan, 30 days before planned pre-warranty conference, to PWGSC Representative approval.

.3 Warranty management plan to include required actions and documents to assure that PWGSC Representative receives warranties to which it is entitled.

.4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.5 Submit, warranty information made available during construction phase, to PWGSC Representative for approval prior to each monthly pay estimate.

.6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
.4 Verify that documents are in proper form, contain full information, and are notarized.
.5 Co-execute submittals when required.
.6 Retain warranties and bonds until time specified for submittal.

.7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.8 Conduct joint 9 month warranty inspection, measured from time of acceptance, by PWGSC Representative.

.9 Include information contained in warranty management plan as follows:
- .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
- .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include transformers, and distribution center distribution.
- .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
  - .1 Name of item.
  - .2 Model and serial numbers.
  - .3 Location where installed.
  - .4 Name and phone numbers of manufacturers or suppliers.
  - .5 Names, addresses and telephone numbers of sources of spare parts.
  - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
  - .7 Cross-reference to warranty certificates as applicable.
  - .8 Starting point and duration of warranty period.
  - .9 Summary of maintenance procedures required to continue warranty in force.
  - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
  - .11 Organization, names and phone numbers of persons to call for warranty service.
  - .12 Typical response time and repair time expected for various warranted equipment.
- .4 Contractor's plans for attendance at 9 month post-construction warranty inspections.
- .5 Procedure and status of tagging of equipment covered by extended warranties.
- .6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.10 Respond in timely manner to oral or written notification of required construction warranty repair work.

.11 Written verification to follow oral instructions.
- .1 Failure to respond will be cause for the RCC Representative to proceed with action against Contractor.

1.14 WARRANTY TAGS

.1 Tag, at time of installation, each warranted item. Provide durable, oil

and water resistant tag approved by PWGSC Representative.

.2 Attach tags with copper wire and spray with waterproof silicone coating.

.3 Leave date of acceptance until project is accepted for occupancy.

.4 Indicate following information on tag:
.1 Type of product/material.
.2 Model number.
.3 Serial number.
.4 Contract number.
.5 Warranty period.
.6 Inspector's signature.
.7 Construction Contractor.

PART 2 - PRODUCTS

2.01 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 REFERENCES

Reference Standards:

.1 CSA Group
- .1 CSA C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
- .2 CSA C22.2 No. .
- .3 CAN/CSA-C22.3 No.1-10, Overhead Systems.
- .4 CAN3-C235-83(R2010), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

.2 Electrical Equipment Manufacturers Association of Canada EEMAC)
- .1 EEMAC 2Y-1-1958, Light Gray Colour for Indoor Switch Gear.

.3 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
- .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.02 DEFINITION:

.1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

1.03 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235.

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

.3 Language operating requirements: provide identification nameplates and labels for control items in French.

1.04 SEISMIC REQUIREMENTS MEASURES

.1 All electrical equipment shall be secured with seismic systems approved in Quebec, in accordance with applicable codes and standards.

.2 Demonstrate the installation of these measures with the Engineer.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit for review single line electrical diagrams under plexiglass and locate electrical room.
- .1 Electrical distribution system in main electrical room.
- .2 Electrical power generation and distribution systems in power plant rooms.
- .3 Shop drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
  - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
  - .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
  - .4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
  - .5 Submit one number of copies of 600 x 600 mm minimum size drawings and product data to inspection authorities.
  - .6 If changes are required, notify Departmental Representative of these changes before they are made.
- .4 Certificates according to section 01 45 00 - :
  - .1 Provide CSA certified equipment and material.
  - .2 Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction and inspection authorities for special approval before delivery to site.
  - .3 Submit test results of installed electrical systems and instrumentation.
  - .4 Permits and fees: in accordance with General Conditions of contract.
  - .5 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
  - .6 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.

.5 Manufacturer's Field Reports: submit to Departmental Representative manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

1.06 FIELD QUALITY CONTROL

.1 Field quality control : according to section 01 45 00 - Control

quality.

.2 Qualification: electrical work must be performed by licensed electricians, trained by a master electrician or a contractor electrician holds a license issued by the province in which the work will be performed by apprentices or in accordance with the relevant authorities in accordance under the provincial law on vocational training and qualification of manpower.

.1 Employees enrolled in a provincial apprenticeship program will carry out specific tasks if they are under the direct supervision of a qualified licensed electrician.

.2 Permitted tasks: depending on the degree of training and the demonstrated ability to perform the specific tasks.

.3 Construction Site Meetings

.1 Hold Construction site meetings in accordance with Section 01 32 16.06 Construction Progress Schedule - Critical Path Method.

.2 Construction Site Meetings: Tests performed on site by the manufacturer and prescribed in section QUALITY CONTROL, FIELD PART 3 in the relevant section of the NMS should include site visits to the following steps:

.1 After the products delivered and stored on site and preparatory work completed, but before the start of the installation work of the work covered by this Section;

.2 Two (2) times during the progress of work, that is to say, once they have been completed at 25% and 60%;

.3 Upon completion of Work, after cleaning.

.4 Take professional measures necessary health and construction safety in accordance with Section 01 35 29.06 - Health and Safety.

1.07 DELIVERY, STORAGE AND HANDLING

.1 Calendar Delivery of equipment: deliver a delivery schedule to the Engineer within two (2) weeks after contract award.

.2 Management and disposal of construction / demolition waste: separate waste materials for reuse / reuse and recycling in accordance with Section 01 74 21 - Management and disposal of construction / demolition waste.

1.08 GETTING STARTED INSTALLATION

.1 Instruct the operating mode operating personnel and maintenance practices of the facility, its equipment and its components.

.2 Select and pay for the services of an engineer seconded from the manufacturing plant to monitor the commissioning of the installation, to check, adjust, calibrate and balance the various elements and to instruct the operating personnel.

.3 Provide these services for a sufficient time, forecasting the number of visits needed to put the equipment on and ensure that the operating

personnel are familiar with all aspects of maintenance and operation

1.09 OPERATING INSTRUCTIONS

.1 Provide operating instructions for each main system and for each main unit prescribed in the relevant sections of the specifications, for the operating and maintenance personnel.

.2 Operating instructions should include the following:

.1 Wiring diagrams, control diagrams, control sequence for each main system and for each device.

.2 Start-up procedures, adjustment, adjustment, lubrification operation and shutdown.

.3 Safety Precautions.

.4 Procedures to be followed in case of failure.

.5 Other settings, according to the manufacturer's recommendations for each system or device.

.3 Provide instructions printed or engraved, placed under glass frame or laminated so approved.

.4 Post instructions to approved locations.

.5 Operating instructions should be exposed to the weather resistant material or they must be placed in a sealed envelope to the weather.

.6 Ensure that the operating instructions do not discolor when exposed to sunlight.

PART 2 - PRODUCTS

2.01 SUSTAINABLE REQUIREMENTS

.1 Materials and equipement product: in accordance with section 01 47 15 – Sustainable requirements

2.02 MATERIALS AND EQUIPMENT

.1 Provide material and equipment in accordance with Section 01 61 00 - Common Product Requirements.

.2 Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

.3 Factory assemble control panels and component assemblies.

2.03 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

.1 Verify installation and co-ordination responsibilities related to motors, equipment and controls, as indicated.

.2 Control wiring and conduit except for conduit, wiring and connections below 50 V which are related to control systems specified in mechanical sections and as shown on mechanical drawings.

2.04 WARNING SIGNS

.1 Warning Signs: in accordance with requirements of authority having jurisdiction Consultant and Engineering consultant.

.2 Porcelain enamel decal signs, minimum size 175 x 250 mm.

2.05 WIRING TERMINATIONS

.1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.06 EQUIPMENT IDENTIFICATION

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

.1 Nameplates: lamicoid 3 mm thick plastic engraving sheet , black matt white finish face, black white core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.

.2 Sizes as follows:

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: embossed plastic labels with 6 mm high letters unless specified otherwise.

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

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

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

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

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

.9 Transformers: indicate capacity, primary and secondary voltages.

2.07 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, numbered 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 coding: to CSA C22.1.

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

2.08 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 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

2.09 FINISHES

.1 Paint indoor switchgear and distribution enclosures light gray to accordance with EEMAC 2Y-1.

PART 3 - EXECUTION

3.01 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise

.2 Do overhead and underground systems in accordance with CAN/CSA-C22.3 No.1

except where specified otherwise.

3.02 NAMEPLATES AND LABELS

.1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.03 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: 300 mm.
  - .2 Above top of continuous baseboard heater: 200 mm.
  - .3 Above top of counters or counter splash backs: 175 mm.
  - .4 In mechanical rooms: 1400 mm.
- .3 Panelboards: as required by Code or as indicated.
- .4 Telephone and interphone outlets: 300 mm.
- .5 Wall mounted telephone and interphone outlets: 1500 mm.
- .6 Fire alarm stations: 1500 mm.
- .7 Fire alarm bells: 2100 mm.
- .8 Television outlets: 300 mm.
- .9 Wall mounted speakers: 2100 mm.
- .10 Clocks: 2100 mm.
- .11 Door bell pushbuttons: 1500 mm.

3.04 CO-ORDINATION OF PROTECTIVE DEVICES

.1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.05 FIELD QUALITY CONTROL

.1 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 Provide upon completion of work, load balance report as directed in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS, phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.

2 Conduct following tests in accordance with Section 01 45 00 - Quality Control.
- .1 Power generation and distribution system including phasing, voltage, grounding and load balancing.
- .2 Circuits originating from branch distribution panels.
- .3 Lighting and its control.
- .4 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.

.3 Carry out tests in presence of Engineer.

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

.5 Manufacturer's Field Services:
- .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
- .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .3 Foresee site visits in accordance with QUALITY ASSURANCE, PART 1.

3.06 CLEANING

.1 Clean and touch up painted surfaces in workshops that were scratched or damaged during transport and installation; use a paint type and color identical to the original painting.

.2 Clean hooks, brackets, fasteners and other visible fasteners,non-galvanized, and apply a primer to protect against rust.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 01 and 26.

1.02 REFERENCES

.1 CSA C22.2 n° 0.3. Test methods for electrical wires and cables.

.2 CAN/CSA C22.2 n° 38, Thermoset-insulated wires and cables (Tri-national standard, with UL 44 and ANCE NMX-J-451-2014.

.3 CAN/CSA-C22.2 n° 131, Type TECK 90 cable.

.4 The gauge wiring is based on Table 2 of the Electrical Code of Quebec.

1.03 PERFORMANCE REQUIREMENTS

.1 Unless otherwise indicated, all drivers will be copper.

.2 General use piped: Type RW-90, insulated for 600 volts.

.3 Temporary supply, type of cable Teck 90.

1.04 ALUMINIUM CONDUCTOR

.1 Aluminum conductors will not be accepted on this project.

1.05 PRODUCT DATA

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

1.06 DELIVERY, STORAGE AND HANDLING

.1 Packaging Waste Management: remove for reuse and return by manufacturer of pallets crates padding and packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.07 REELS CABLE

.1 Cables should be supplied on reels.

.1 Each and every cable drum or cable winding shall be marked or labeled with the length of the cable, its rated voltage, the conductor size, the batch number and reel number.

.2 Each reel or winding should understand that continuous cable without fitting.

.3 Identify cables exclusively used for DC applications.

.4 Shielded cables with a rated voltage is above 2001 volts must be wrapped and labeled.

PART 2 - PRODUCTS

2.01 BUILDING WIRES

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

.2 Copper conductors: size as indicated, with 1000 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE Jacketted.

2.02 TECK 90 CABLE

.1 Cable: in accordance with Section 26 05 00 - Common Work Results for Electrical.

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

.3 Insulation:
- .1 Cross-linked polyethylene XLPE.
- .2 Rating: , 1000 V.

.4 Inner jacket: polyvinyl chloride material.

.5 Armour: interlocking.

.6 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 1000 mm centers.
- .3 Threaded rods: 6 mm diameter to support suspended channels.

.7 Connectors:
- .1 Watertight approved for TECK cable.

2.03 CONTROL CABLES

.1 Type: LVT: 2 soft annealed copper conductors, sized as indicated:
- .1 Insulation: thermoplastic.
- .2 Sheath : thermoplastic jacket, and armour of closely wound aluminum wire.

.2 Type: 600 V : 2 stranded annealed copper conductors, sizes as indicated:
- .1 Insulation: PVC type TW, Type R90.
- .2 Overall covering: thermoplastic jacket thermosetting jackets PVC thermosetting compound.

PART 3 - EXECUTION

3.01 FIELD QUALITY CONTROL

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

.2 Perform tests using method appropriate to site conditions and to approval of Consultant and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

3.02 GENERAL CABLE INSTALLATION

.1 Lay cable in cable trays in accordance with Section 26 05 36 - Cable Trays for Electrical Systems.

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

.3 Conductor length for parallel feeders to be identical.

.4 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.

.5 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.

.6 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.

.7 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

3.03 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 Son sizes are selected to a voltage drop of 3% maximum through the probable path. Ensure that the rule of 3% maximum voltage drop is observed between the electrical input and any system device in normal operation. The voltage drop in the last branch must be less than 2%.
- .3 Splice will be accepted between the conductive connection points.
- .4 Son and cables are lubricated for the draw, as recommended by the manufacturer, with a lubricant specifically designed for this purpose.
- .5 Provide additional green insulated conductor of appropriate size to

ensure the continuity of the masses in each conduit thin wall (LMA type).

.6 For single-phase circuits 120 V install and route the neutral of each of the circuits with the live conductor.

3.04 INSTALLATION OF TECK90 CABLE (0 -1000 V)

.1 Group cables wherever possible on channels.

.2 Install cable exposed , securely supported by straps.

.3 Finish the ends of cables with connectors for cables and boxes 0-1000 V.

3.05 INSTALLATION OF ARMOURED CABLES

.1 Group cables wherever possible on channels.

3.06 INSTALLATION OF ALUMINUM SHEATHED CABLE

.1 Group cables wherever possible on channels.

3.07 INSTALLATION OF CONTROL CABLES

.1 Install control cables in conduit.

.2 Ground control cable shield.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 01 and 26.

1.02 REFERENCES

.1 CSA Group
  .1 C22.2 NO. 65-13 - Wire connectors (Tri-national standard, with UL 486A-486B and NMX-J-543- ANCE)
  .2 C22.2 NO. 41-13 - Grounding and bonding equipment (Tri-national standard, with NMX-J-590-ANCE and UL 467)

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

1.04 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: submit operation and maintenance data for connectors and terminations for incorporation into manual.

1.05 DELIVERY, STORAGE AND HANDLING

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Management and disposal of construction / demolition waste.

.2 Remove from site all packaging materials and transport them to the appropriate recycling facilities.

.3 All packaging materials from paper, plastic, polystyrene, corrugated in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused metal and wiring to metal recycling facility.

PART 2 - PRODUCTS

2.01 CONNECTORS AND TERMINATIONS

.1 Long sleeve pressure connectors, copper, according to CSA C22.2 65 size appropriate drivers used.**PART 3 - EXECUTION**

3.01 INSTALLATION

.1 Install stress cones, terminations, and splices in accordance with

manufacturer's instructions.

.2 Bond and ground as required to CSA C22.2 No.41.

END OF SECTION

PART 1 - GENERAL

1.01 REFERENCES

.1 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
  .1 ANSI/IEEE 837-02, Qualifying Permanent Connections Used in Substation Grounding.

1.02 PERFORMANCE REQUIREMENT

.1 The ground fault detection system should limit the current to 5A during a phase to ground fault. In a first fault, a sound and light signal should be heard locally. A dry contact must change state in order to transmit information remotely. From zero sequence transformers installed on the main circuit breakers, tie breakers and arteries, the artery fault must be identified. Subsequently, a modulation current to ground at a frequency of 1 Hz to 3 Hz must allow the location of the fault through the power grid.

1.03 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

PART 2 - PRODUCTS

2.01 MATERIALS

.1 Conductors: bare, stranded, un tinned soft annealed copper wire, size No. 2/0 AWG for ground bus, electrode interconnections, metal structures, gradient control mats, transformers, switchgear, motors, ground connections.

.2 Conductors: , pvc insulated coloured green, stranded un tinned soft annealed copper wire, size indicated for grounding cable sheaths, raceways, pipe work, screen guards, switchboards, potential transformers.

.3 Conductors: pvc insulated coloured green, stranded un tinned soft annealed copper wire No. 10 AWG for grounding meter and relay cases.

PART 3 - EXECUTION

3.01 INSTALLATION

.1 Install continuous grounding system including, electrodes, conductors, connectors and accessories as indicated and to requirements of local authority having jurisdiction.

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

.3 Protect exposed grounding conductors during and after construction.

.4 Make buried connections, and connections to electrodes, structural steel work, using copper welding by thermit process permanent mechanical connectors to ANSI/IEEE 837.

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

3.02 NEUTRAL GROUNDING

.1 Connect transformer neutral and distribution neutral together using 1000 V insulated conductor to one side of ground test link, the other side of the test link being connected directly to main station ground. Ensure distribution neutral and neutrals of potential transformers and service banks are bonded directly to transformer neutral and not to main station ground.

.2 Interconnect electrodes and neutrals at each grounding installation.

.3 Connect neutral of station service transformer to main neutral bus with tap of same size as secondary neutral.

.4 Ground transformer tank with continuous conductor from tank ground lug through connector on ground bus to primary neutral. Connect neutral bushing at transformer to primary neutral in same manner.

3.03 CABLE SHEATH GROUNDING

.1 Bond single conductor, metallic sheathed cables together at one end only. Break sheath continuity by inserting insulating sleeves in cables.

.2 Use No. 6 AWG flexible copper wire soldered, not clamped, to cable sheath.

.3 Connect bonded cables to ground with No. 2/0 AWG copper conductor.

3.04 FIELD QUALITY CONTROL

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

.2 Engage an independent testing agent to inspect grounding and perform ground resistance test before backfill.

.3 Perform earth loop test and resistance tests using method appropriate to site conditions and to approval of [Departmental Representative] [PWGSC Representative] [Consultant] and local authority having jurisdiction.

.4 Perform test before energizing electrical system.

.5 Provide step-and-touch potential calculations using measured station ground resistance measurements. Submit test result and inspection certificate before energizing electrical system.

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

.1 Section
.1 A system of secondary grounding of the electrical and the entire electrical distribution system as required by the Electrical Code.

1.02 REFERENCES

.1 American National Standards Institute /Institute of Electrical and Electronics Engineers (ANSI/IEEE)
.1 ANSI/IEEE 837-02, IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.

.2 C22.2 NO. 41-13 - Grounding and bonding equipment (Tri-national standard, with NMX-J-590-ANCE and UL 467)

.3 Copper conductors to ground: according to the ASA G7.1, latest edition.

1.03 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

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

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

PART 2 - PRODUCTS

2.01 EQUIPMENT

.1 Clamps for grounding of conductor: size as required to electrically conductive underground water pipe.

.2 Plate grounding for connecting the equipment to put at the main earthing conductor.

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

.4 Insulated grounding conductors: green, copper conductors, size as indicated.

2.02 GROUNDING ÉLECTRICAL NETWORK

.1 Make connections of grounding the neutral network to the primary network of 600 V.

2.03 GROUNDING OF THE EQUIPEMENT

.1 Make the grounding connections prescribed for all equipment.

PART 3 - EXECUTION

3.01 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for grounding equipment installation in accordance with manufacturer's written instructions.
  .1 Visually inspect substrate in presence of Consultant.
  .2 Inform Consultant 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 Consultant.

3.02 INSTALLATION GENERAL

.1 Install complete permanent, continuous grounding system including, electrodes, 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.

3.03 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, transformers, switchgear, duct systems, frames of motors, motor control centres, starters, control panels, building steel work, generators, elevators and escalators, distribution panels, outdoor lighting, cable trays.

3.04 FIELD QUALITY CONTROL

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

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

.3 Perform tests before energizing electrical system.

.4 Disconnect ground fault indicator during tests.

3.05 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

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

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

.1 Section contents
.1 Supply and install fasteners and brackets to secure the equipment and wiring to adjacent surfaces.

1.02 DELIVERY, STORAGE AND HANDLING

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Management and disposal of construction / demolition waste.

.2 Remove from site all packaging materials and transport them to the appropriate recycling facilities.

.3 All packaging materials from paper, plastic, polystyrene, corrugated in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused metal and wiring to metal recycling facility.

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

PART 2 - PRODUCTS

2.01 SUPPORT CHANNELS

.1 U shape, size 41 x 41 mm, 2.5 mm thick, suspended.

.2 Twist staples to attach the equipment to the surface sleepers inverted "T" of suspended ceilings.

PART 3 - EXECUTION

3.01 INSTALLATION

.1 Check the type of ceiling and wall at the places..2 Secure equipment to hollow masonry, tile and plaster surfaces with lead anchors.

.3 Secure equipment to poured concrete with expandable inserts.

.4 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.

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

.6 Fasten exposed conduit or cables to building construction or support system using straps.
- .1 One-hole steel straps to secure surface conduits and cables 53 mm and smaller.
- .2 Two-hole steel straps for conduits and cables larger than 53 mm.
- .3 Beam clamps to secure conduit to exposed steel work.

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

.8 For surface mounting of two or more conduits use channels at 1 m on centre spacing.

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

.10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

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

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

.13 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

1.01 SUMMARY

.1 Section contents
.1 Provide, install and connect cabinets, junction boxes, distribution boxes and draw where indicated and as specified in the plans.

1.02 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 C22.2 NO. 40-M1989 (R2014) - Cutout, Junction and Pull Boxes
.2 C22.2 NO. 76-14 - Splitters

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

1.03 DELIVERY, STORAGE AND HANDLING

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

PART 2 - PRODUCTS

2.01 SPLITTERS

.1 Construction: sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.

.2 Boxes provided with distribution terminal blocks corresponding to the size and number of input and output conductor connected thereto, as indicated.

.3 Unless otherwise indicated, the distribution boxes have the necessary length to accommodate the available pieces of equipment connected to it.

.4 Spare Terminals: minimum three spare terminals or lugs on each connection or lug block sized less than 400 A.

.5 The distribution boxes of 600 Amps and will come with bus bars with lugs.

.6 The distribution boxes for use by the electrical input will include common no voltage check and comply with Hydro-Quebec requirements.

2.02 JUNCTION AND PULL BOXES

.1 Construction: welded steel enclosure.

.2 Covers Flush Mounted: 25 mm minimum extension all around.

.3 Covers Surface Mounted: screw-on turned edge covers.

2.03 CABINETS

.1 Construction: welded sheet steel as indicated hinged door, handle, latch lock 2 keys and catch

.2 Type T Terminal: surface return flange mounting as indicated containing 20 mm sheet steel backboard.

PART 3 - EXECUTION

3.01 SPLITTER INSTALLATION

.1 Mount plumb, true and square to building lines.

.2 Extend splitters full length of equipment arrangement except where indicated otherwise.

3.02 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Mount cabinets with top not higher than 2 m above finished floor except where indicated otherwise.

.3 Install terminal block as indicated in Type T cabinets.

.4 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1.

3.03 IDENTIFICATION

.1 Equipment Identification: to Section 26 05 00- Common Work Results for Electrical.

.2 Identification Labels: size 2 indicating system name voltage and phase or as indicated.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

.1 Section contents
  .1 Conduits serving mainly the passage of the power wiring equipment shown in the drawings and as indicated.

1.02 REFERENCES

.1 Canadian Standards Association (CSA International)
  .1 CSA C22.2 No. 45-M1981(R2003), Rigid Metal Conduit.
  .2 CSA C22.2 No. 83-M1985(R2003), Electrical Metallic Tubing.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product data: submit manufacturer's printed product literature, specifications and datasheets.
  .1 Submit cable manufacturing data.

1.04 PERFORMANCE REQUIREMENTS

.1 Conduits
  .1 The conduits have a minimum diameter of 21 mm unless otherwise indicated.
  .2 Aluminum pipes will not be accepted unless otherwise indicated.
  .3 Conduits fiberglass will not be accepted.
  .4 Flexible polyethylene pipes will not be accepted.
  .5 Conduits used in telecommunications cabling passage will be like "electrical metallic tubing" "TME" blue.
  .6 Conduits conducting the wiring of the fire alarm system will be like "electrical metallic tube" (TME), red.

PART 2 - PRODUCTS

2.01 CONDUITS

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

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

2.02 CONDUIT FASTENINGS

.1 One hole malleable iron straps to secure surface conduits 53 mm and smaller.
.1 Two hole steel straps for conduits larger than 53 mm].

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

.3 Channel type supports for two or more conduits at 1 m on centre.

.4 Threaded rods, 6 mm diameter, to support suspended channels.

2.03 CONDUIT FITTINGS

.1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.

.2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.

.3 Watertight connectors and couplings for EMT.
.1 Set-screws are not acceptable.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.02 INSTALLATION

.1 Installation of conduit rigid steel
.1 Nets rigid conduits, executed on site must have sufficient length to make seals.
.2 Place a protective cover to each of the open ends.

.2 Installing electrical metallic tubing "EMT"
.1 Place a protective cover to each of the open ends.
.2 Use conduits fitings with one or two clamping screws depending on the diameter of the conduits.

3.03 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Run conduits in flanged portion of structural steel.

.3 Group conduits wherever possible on surface channels.

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

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

.6 The apparent conduits will be installed so as to not reduce the clearance of the room, using the least possible space. The beams will be bypassed by type connectors "LB".

.7 The final disposition of apparent conduits must be approved by the engineer.

3.04 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Do not install horizontal runs in masonry walls.

.3 Do not install conduits in terrazzo or concrete toppings.

3.05 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

.1 Section contents
.1 Provide, install and connect one or distribution transformers for lowering the primary voltage to a secondary voltage required to supply the prescribed equipment.

1.2 REFERENCES

.1 CSA International
.1 CAN/CSA-C22.2 No.47-M90(R2007), Air-Cooled Transformers (Dry Type).
.2 CSA C9-02(R2007), Dry-Type Transformers.
.3 CAN/CSA-C802.2-06, Minimum Efficiency Values for Dry Type Transformers.

.2 National Electrical Manufacturers Association (NEMA)

1.2 PERFORMANCE REQUIREMENTS

.1 Three phase transformers by indicated.

.2 All prescribed transformers must come from a single manufacturer.

.3 Copper winding.

.4 Windings "T" are not allowed.

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 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

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

.3 Storage and Handling Requirements:
.1 Store materials off ground indoors 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 Dry transformers Power indicated, the following characteristics:
.1 Type: ANN.

.2 Insulation, 115 °C degrees C temperature rise.
.3 Dielectric insulation can withstand a voltage of 1.2 kV.
.4 Four (4) made 2.5%, two (2) taken at full flow and high voltage (2-FCAN) and two (2) taken at full flow and lowered voltage (2-FCBN).
.5 Protected by a ventilated enclosure, CSA, Type 3R, protected against spills and sprinklers fitted with lifting lugs and metal and removable side panels at the front and sides.
.6 High and low voltage terminals of bands identified continuously and solderless connectors.
.7 Korfund cushions or equivalent type of vibration.
.8 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 Use a size label 7, according to the requirements of Section 26 05 01 and bearing the inscription similar to the following:
.1 225 kVA 600-120-208 volt, three phase.
.2 Power supply: the CDP-4.
.3 Approve the registration before manufacture.

2.3 MANUFACTURERS

.1 Transformers must come directly from the manufacturer and not bear any identification as his own.

.2 Acceptable Products:
.1 Delta Transformers
.2 Be-MAG Transformer
.3 Transformer Hammond
.4 Transformer REX

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 Consultant.

.2 Inform Consultant 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 Consultant.

3.2 INSTALLATION

.1 Install transformers on the ground of antivibration dimensional of characteristics and appropriate.

.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 Use flexible cables of about 1 m for the primary and secondary transformer connections, to minimize the transmission of vibration noise housing.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

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

1.01 SUMMARY

.1 Section contents.
- .1 Provide a complete connection center containing, not necessarily limited to:
  - .1 One set includes:
    - .1 A cell containing the motorized withdrawable main breaker type LSIG, processors instruments for measurements of the distributor and the owner and the owner of the meter.
    - .2 Cells containing LSIG type circuit breakers and thermal bypass MAG kind.
    - .3 If we enter directly Bus Duct, the cell will be 1220 mm deep with emergency cables.
    - .4 If we enter into the main cell, a transition is required box and the cell will be 915 mm deep.
- .2 A second set comprising:
  - .1 A cell containing the thermal type breakers MAG bypass.

1.02 REFERENCES

.1 The switchboardS have to satisfied ACNOR C22.2 n° 31 and 229.

1.03 PERFORMANCE REQUIREMENTS

.1 Each of the two sets is contained in a metal housing, self-supporting gauge 2.65 mm minimum and type 2.

.2 The depth of each of the sets should be between minimum 460 mm and 1220mm. The maximum length of each set should be as follows:
- .1 Overall No. 1: 3155 mm
- .2 Set # 2: 965 mm

.3 The number of sections and the arrangement thereof will follow instructions given to the drawings diagrams.

.4 Each section will be delivered separately and must be fitted with all accessories for mounting on the premises.

.5 All costs related to technical assistance provider, the site during the execution of the establishment of the connection, inspection and commissioning should be included in the submission of the specialty contractor electricity.

PART 2 - PRODUCTS

2.01 MATERIALS

.1 Metal cabinets to walls, including walls, ceilings, doors, bottom plate, metal rails, horizontal and vertical walls, lintels, supports, braces, while the shaped, welded and braced to form a rigid and freestanding structure, built rolled steel sheet of dimensions required to contain all the equipment indicated in the plan.

.2 Sections must be provided with adequate spacers, have sufficient capacity and be provided with vents to eliminate all risk of distortion.

.3 Burr and eliminate sharp edges of steel structures.

.4 Access from the rear with steel plates on bolts.

.5 Doors leading to counter instruments will be fitted with lockable handles. The faceplates are fitted with bolts.

.6 Provide a possible extension, load side of the cabinet.

.7 Each of the assemblies will rest on at least two smooth profiled steel "U" of 100 mm width of a single piece. To avoid vermin, close the sides of the cabinet to the floor.

.8 The structure is cleaned, phosphate treated, covered with two (2) Anticorrosive primer layers

.9 The interior and exterior will be finished in light gray enamel, ASA No. 61.

2.02 BUS BARS

.1 Bus Bars in three-phase aluminum, with full capacity neutral, open, self-cooled and adequately secured to isolators.

.2 Anchor network of bars so it withstands the stresses resulting from the intensities prescribed for short-circuit currents.

.3 Seals silver surface, covered with stainless bolts.

.4 Identify phases of all bars using appropriate pins.

2.03 GROUNDING

.1 Bus bars earthing copper connection through the center along its length.

.2 Appropriate terminal lugs for earthing cables.

.3 Connect the busbar grounding all metal parts not carrying current.

2.04 INSTRUMENT TRANSFORMERS

.1 The instrument transformers will be supplied and installed complete with accessories, according to Section 26 27 13.

2.05 IDENTIFICATION

.1 Identify the material in accordance with the requirements of Section 26 05 00.

.2 Nameplates:
*Connection center, size 6;
*For an entire distribution, format plates 7 with inscription "Distribution 347/600 volts" or as applicable;
*For the main circuit breaker, size 5 with registration plate "Main breaker 2000 A 600 Volts";
*For each breaker, sizing plate 2 with registration of use.

2.06 SPECIFIED PRODUCT

.1 Eaton Cutler-Hammer.

2.07 ACCEPTABLE PRODUCTS

.1 Specified product.

.2 Or approved equivalent.

PART 3 - EXECUTION

3.01 SIZING AND PROTECTION

.1 Commissioning, make calibration according to the coordinating study approved and which will be provided by the engineer.

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

.1 Section contents
  .1 Provide, install and connect an energy meter and power integrated in the connection center.
  .2 Provide energy management software

1.02 REFERENCES

.1 ANSI C39.1 current edition – Requirements for Electrical Analog Indicating instruments.

.2 CAN3-C17, current édition - Alternating-Current Electricity Metering

1.03 SHOP DRAWINGS

.1 Submit shop drawings prior to manufacture in accordance with the requirements of Section 26 05 00

PART 2 – PRODUCTS

2.01 ASSEMBLY

.1 Meters c / a mounted and profiles factory instruments.

2.02 POWER TRANSFORMER

.1 Three current transformers 2000 / 5A, measuring quality, type donut or bus bar approved for measurement.

.2 Filerie for measuring currents.

.3 Filerie for measuring phase / neutral voltages.

2.03 COUNTER

.1 Counters .1 volts, amps, frequency, kW, KVAR, KVA, kilowattmètre, power factor, kilovarmètre, harmonic distortion: in accordance with CAN3-C17 standard.

.2 Meters and integrated energy and maximum indicators: in accordance with CAN3-C17-M84 (R2015) - Alternating-Current Electricity Metering.

.3 Four 4-20 mA analog inputs, four analog outputs 4-20 mA.

.4 Eight digital inputs.

.5 Four digital outputs.

.6 Rated capacities: as indicated.

.7 Remote Play range.

.8 For installation in the cabinet of branching center.

.9 Memory 10 MB.

.10 Communication: RS485, MODBUS RTU, Ethernet with HTML and Web page server.

.11 Trials to switch.

.12 The counter must be programmed and calibrated at the factory.

2.04 SPECIFIED PRODUCT

.1 Power Measurement,PXM2260 model with display, c/a Power Xpert Software version 7.2

2.05 ACCEPTABLE PRODUCTS

.1 Specified product.

.2 Or approved equivalent.

PART 3 – EXECUTION

3.01 INSTALLATION MEASUREMENT EQUIPMENT

.1 The counter in the branch center in the same cell as the main breaker.

.2 Make connections according to the manufacturer's recommendations.

.3 Connect the counter to current transformers and existing potential from the test switch.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

.1 Section contents
.1 Provide, install and connect the circuit breakers in the electrical air operation to protect circuits and equipment connected to it.

1.02 REFERENCES

.1 American National Standards Institute /Institute of Electrical and Electronics Engineers (ANSI/IEEE)
.1 ANSI/IEEE C37.13-2008, Low Voltage AC Power Circuit Breakers Used in Enclosures.

.2 CSA International
.1 CSA C22.2 No. 5-09, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, and NMX-J-266-ANCE-2010).

1.03 DOCUMENTS/SAMPLE SUBMITTED FOR APPROVAL INFORMATION

.1 Data sheets specifications
.1 Submit product data and instructions and the manufacturer's documentation for breakers in the air. The technical data must include product characteristics, performance criteria, physical size, finish and limitations.

.2 Shop Drawings
.1 Submitted shop drawings stamped and signed by professional engineer registered or licensed in Canada, in the province of Quebec.
.2 Indicate in the drawings as follows.
.3 The drawings must understand the curves of time-current characteristics, indicating the coordination of protection stages through the breakers.

1.04 CLOSEOUT SUBMITTALS

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

.2 Operation and Maintenance Data: submit operation and maintenance data for air circuit breakers for incorporation into manual.

1.05 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original

factory packaging, labelled with manufacturer's name and address.

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

PART 2 - PRODUCTS

2.01 AIR CIRCUIT BREAKER

.1 Breakers in the air: in accordance with ANSI / IEEE C37.13 and CSA C22.2 No.5.

.1 Breakers in the air to electric operation, 600 V class, complete with plug-type electronic trip unit LSIG and having the following characteristics:

.2 Nominal current in continuous operation as indicated in the drawings.

.3 Trigger value as indicated in the drawings.

.4 Closing mechanism, stored energy, motor driven 120 VAC, fast closing, provided a handle for setting spring load in an emergency and a switch to cut power to loading of motor spring.

.5 Separate compartments and insulated power and control.

.6 Indicator on and off and charge / release of the spring indicator.

.7 Locking devices to prevent removal of the circuit breaker in the closed position and prevent its closure until it is fully inserted.

.8 Inverter control 120V for operation of the engine and opening and closing coils and fed from the primary circuit breaker.

.9 Circuit breaker provided with a semiconductor disconnect system comprising a current sensor per pole, a semiconductor trigger and an actuator (self-powered). The system may perform a function of long term, short term, instant, protection against ground faults and must indicate the phase overload, earth fault and short circuit. In addition, the system will include the following functions:

.10 Operation "Shunt" opening and closing distance.

.11 Auxiliary contacts; normally open, normally closed.

.12 Alarm switch.

.13 LED indicator.

.14 Reverse power relay.

.15 Control switch.

.16 Electrical Key interlocking.

.17 Locking devices.

.18 Possible lockout.

.19 Operation counter.

.20 Communication port.

.21 Installation in the cabinet of the connection center.

2.02 SPECIFIED PRODUCT

.1 Eaton Cutler-Hammer DS model

.2 Product specified model.

.3 Or approved equivalent.

PART 3 - EXECUTION

3.01 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for air circuit breakers installation in accordance with manufacturer's written instructions.
  .1 Visually inspect substrate in presence of Consultant.
  .2 Inform Consultant 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 Consultant.

3.02 INSTALLATION

.1 Install air circuit breakers as indicated.

3.03 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  .1 Leave Work area clean at end of each day.
  .2 Waste Management: separate waste materials for [reuse] [and] [recycling] in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

.1 Section contents
  .1 Provide, install and connect molded case circuit breakers to protect circuits and equipment connected to it.

1.02 REFERENCES

.1 CSA International
  .1 CSA C22.2 No. 5-09, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, and NMX-J-266-ANCE-2010).

1.03 APPROVAL INFORMATION

.1 Include the curves of time-current characteristics in the case of circuit breakers with a maximum current with breaking capacity of 22 000 A rms symmetrical and more, to the mains voltage

PART 2 - PRODUCTS

2.01 BREAKERS GENERAL

.1 Plug-in moulded case circuit breakers: quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40 degrees C ambient.

.2 Common-trip breakers: with single handle for multi-pole applications.

.3 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 3-10 times current rating.

.4 Circuit breakers with interchangeable trips as indicated.

.5 Circuit breakers to have minimum 10 000 symmetrical rms interrupting capacity rating.

.6 Paired breakers (Twin) will not be accepted.

.7 The minimum width of the circuit breakers is 20 mm.

2.02 THERMAL MAGNETIC BREAKERS

.1 Moulded case circuit breaker to operate automatically by means of thermal

and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

PART 3 - EXECUTION

3.01 INSTALLATION

.1 Install circuit breakers as indicated.

.2 Munir breakers an approved device that ensure the simultaneous disconnecting of all drivers not grounded supply circuit as required to CSA Standard C22.10 1992 No. 14.010b).

.3 Munir of a locking device of the circuit breakers of the annunciator circuits fire, light output, plug for battery and other circuits referred to the drawings.

END OF SECTION

PART 1 - GENERAL

1.01 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA C22.2 No.190-M1985(R2004), Capacitors for Power Factor Correction.

.2 The equipment covered by this specification shall meet the requirements of the latest versions of the following standards: CSA and UL

.3 The equipment must be CSA approved.

.4 The capacitors must be certified for continuous operation from -40 ° C to + 46 ° C to an altitude of 3,300 feet or less.

.5 Capacitors, switches, inductors and control must withstand a total harmonic distortion (THD) of 5% and 2% in current voltage without reduction in their life expectancy.

.6 Capacitors must withstand a voltage variation of 10% (plus and minus) without reducing their life expectancy

1.02 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, and limitations.

.3 Submit certified test results to Consultant.

.4 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.
.1 Instructions: submit manufacturer's installation instructions.
.1 Consultant Owner will make available 1 copy of systems supplier's installation instructions.

1.03 SECTION CONTENTS WORK

.1 Supply and install correction capacitors power factor, the KVAR and voltage, as described in the drawings.

.2 All capacitors must be self-regenerated metallized film types. The capacitors in oil, flammable, are not accepted. Discharge resistors must be included so as to discharge the capacitor to less than 50 volts below a minute after désénergisation. An internal connector ground should be

included. The capacitor must continually support 135% of rated current, 110% of the rated voltage and an ambient temperature range from -40˚C to + 46C.

.3 The total losses of the capacitor must be less than 0.5 watts per kVAR, including resistors discharges. Each capacitor element must be individually protected by an internal fuse and the housing filled with an insulating material, dry, non-flammable. The capacitors must be CSA approved and certified ISO 9001: 2000.

PART 2 - PRODUCTS

2.01 CAPACITORS

.1 Capacitor unit assembly for power factor correction: to CSA C22.2 No.190.

.2 Capacitor characteristics:

.1 Rated voltage: 600 Volts
.2 Maximum Voltage: 600 volts
.3 Frequency: 60 Hz
.4 Symmetrical fault level: 65 KA
.5 Connection of capacitors: Triangle
.6 Shockwave Attire (BIL): 10 KV
.7 Dielectric strength 60 Hz: 2.2 KV
.8 100 kVAR,

.3 Capacitor Cells

.1 Capacitor cells must be designed with a film of polypropylene self healing with a conductive surface deposited under vacuum.

.2 Capacitor cells must be contained in a hermetically sealed housing to prevent air contamination.

.3 The dielectric material should limit losses to less than 0.5 watts per KVAR.

.4 Dielectric liquid (if used) must be biodegradable without PCB with a higher point of flammability to 415 ° F (212 ° C).

.5 The terminals must have a dielectric strength of 2.2 KV and have a shock Dress (BIL) of at least 10 KV.

.6 The design of the cell should allow a service life of over 20 years.

.7 Each capacitor cell must be covered by a 1 year warranty.

.8 Terminal capacitors must be threaded to facilitate connection.

.9 The internal design of the capacitor must be in delta, a Y design will not be accepted.

.10 Capacitors must be CSA approved.

.4 Status indicator of each capacitor and fuse loss

.1 The arrangement of the indicator lights should reflect the internal arrangement of the components and readily be identified to determine the phase of the capacitor or the faulty fuse.

.5 Housing

.1 The housing must be of type 1 EEMAC freestanding or wall mounting.

.2 Each cubicle should have a lug grounded.

.3 The housing must be finished with a gray paint ASA 61.

.6 General Construction

.1 All power wiring must be isolated at 600 volts with a thermoplastic insulation to 105 ° C.

.2 All wiring connections must be made on compression terminals.

.7 Discharge resistors

.1 Capacitor cells should be provided with internal discharge resistors to reduce residual voltage less than 50 volts for one minute after the power off.

.2 The resistors must have a minimum service life of 20 years.

.8 Fuses

.1 Each capacitor step must be protected by fuses and for each phase.

.2 The fuses must be of the current limiting type with a capacity of 200 KA interruption.

.3 Fuses must be selected for capacitor applications and be calibrated at least 150% of the rated current of the capacitor.

.4 Protection Fuses: [with blown fuse indicators, in accordance with Section 26 28 13.01 - Fuses - Low voltage.

2.02 FINISH

.1 Apply finishes in accordance with Section 26 05 00 - Common Work Results for Electrical.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.02 INSTALLATION

.1 Install and connect the capacitors indicate where the drawings and according to the recommendations of the manufacturer.

3.03 FIELD QUALITY CONTROL

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

.2 The equipment must be checked and tested before leaving the factory. Audits, the following measures and procedures must be performed and recorded for each bank / filter.

.3 Report certified the following tests must be included in the documentation for the equipment.
- Check wiring
- Verification of tightening (connection)
- Verification of the capacitance (phase / phase)
- Verification of control: manual and automatic operation

.4 The tests should include testing recommended by the applicable standards, namely:
- Dielectric test
- Wiring continuity
- Etc.

.5 Test on site. Within 24 hours of power, the manufacturer of capacitors will do the following.
.1 Check the current and voltage are balanced and are located within established denominations.
.2 Check reactive power (kVAR) service.
.3 Ensure, in the case of capacitors to two terminals, that the resistance between the terminals and the housing is greater than 1000 megohms.
.1 In the case of capacitors in a single terminal, measuring the discharge time constant.
.2 Constant discharge time should be less than 60 s and the residual voltage of the capacitor must be reduced to less than 50 V from the peak value of the rated voltage.

.6 Submit design calculations and loss calculations for engineers.

3.04 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION