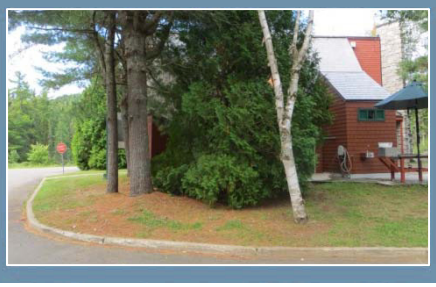
SNC·LAVALIN

PARKS CANADA – LA MAURICIE NATIONAL PARK

REPLACEMENT OF 20 WASTEWATER TREATMENT SYSTEMS
PHASE 1
Project 5P301-14-0002

Construction Specifications



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PARKS CANADA

La Mauricie National Park

Replacement of 20 wastewater treatment systems – Phase 1

Construction Specifications

Revision				Pages revised	Comments
N^0	By	App.	Date		
00	See section 00 01 07		2015-08-31		Issued for bid

Note to Readers :

The French documents take precedence over documents in English.
This specification in French is numbered 630573-0000-40EG-0001_00.

General Requirements – Signatures and Seals
Section 00 01 07

ENGINEERS RESPONSIBLE FOR COMPLIANCE REVIEWS

Engineers undersigned have prepared and verified the following sections of this quote :

Division 00-01	GENERAL REQUIREMENTS
00 01 07	Signatures and Seals
00 01 10	Table of Contents
01 11 00	Summary of Work
01 14 00	Work Restrictions
01 31 19	Project Meetings
01 32 16.07	Construction Progress Schedule – Bar (GANTT) Chart
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01 33 00 – Appendix A	Required Contractor Documents
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Division 33	**UTILITIES**
33 31 13	Sanitary Utility Sewerage Piping
33 36 00	Utility Septic Tanks and Treatment System
33 36 33	Utility Drainage Field

Prepared by :

Caroline Poirier, ing.

Verified by :

Valérie Tremblay, ing., M.Sc.

General Requirements – Signatures and Seals
Section 00 01 07

Engineers undersigned have prepared and verified the following sections of this quote :

Division 26	ELECTRICAL
26 05 00	Common Work Results for Electrical
26 05 00 – Appendix A	Required Contractor Documents
26 05 00 – Appendix B	Shop Drawings – Presentation Data
26 05 00 – Appendix C	Certificate of Compliance (End of Work)
26 05 00 – Appendix D	Record of Shop Drawings
26 05 00.01	Specific Work Results for Electrical
26 05 00.02	Specific project requirements
26 05 20	Wire and Box Connectors (0-1 000 V)
26 05 21	Wires and Cables (0-1 000 V)
26 05 31	Splitters, junction, pull boxes and cabinets
26 05 32	Outlet boxes, conduit boxes and fittings
26 05 53	Electrical systems identification
26 27 26	Wiring Devices
26 28 16.02	Moulded Case Circuit Breakers

Prepared by :

Sébastien Collard, tech.

Verified by :

INGÉNIEUR
Alain Arsenault
102111
QUÉBEC
2015-09-09

Alain Arsenault, ing.

END OF SECTION

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TABLE OF CONTENTS

DEVIS

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END OF SECTION

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 The project of replacing the wastewater treatment systems in La Mauricie National Park of Canada, phase 1, includes but is not limited to the following Work:

- Replacement of three (3) wastewater treatment systems in La Mauricie National Park.
- Dismantling existing septic tanks.

Location of proposed structures is illustrated in master plan (QC-15-630573-C_PT).

1.2 CONTRACT METHOD

.1 Construct Work under unit price and stipulated price contract.

1.3 WORK SEQUENCE

.1 Execution of Work must address numerous technical, safety and environmental constraints.

.2 Contractor must consult Section 01 32 16.07 concerning construction progress schedule.

1.4 CONTRACTOR USE OF PREMISIS

.1 Use of the premises by Contractor is restricted to areas needed for execution of the Work and access to allow for the use of the premises by Parks Canada.

.2 Contractor is invited to consult Section 01 52 00 – Construction Facilities concerning use of premises and available terrain.

.3 Contractor must coordinate use of premises as directed by Parks Canada.

.4 Contractor must take all safety measures and precautions needed to protect people, property and structures from accident or damage during Work

1.5 EXISTING SERVICES

.1 Contractor is responsible for locating existing services on premises.

.2 Notify Engineer and utility companies of intended interruption of services and obtain required permission.

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

.4 Where unknown services are encountered, immediately advise Engineer and confirm findings in writing.

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

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

1.6 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 PRODUCT

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

PART 1 GENERAL

1.1 CONSTRUCTION CONSTRAINTS

.1 Execution of Work for Project must take into account several different constraints, specifically the following:

.1 Access based on climatic conditions;

.2 Availability of sites for construction facilities;

.3 Environmental constraints;

.4 Safety constraints.

1.2 EMERGENCIES

.1 Parks Canada and Engineer may interrupt Work at any time in emergency situations if, in their opinion, such interruption is necessary to protect life, structures or surrounding property or in any other event of force majeure, without possible claim on part of Contractor.

.2 Contractor takes Work constraints into account, as no compensation is given for extra hours or for Work performed outside normal Work hours (evenings, nights, weekends).

.3 During Work, Contractor ensures that Work site installation and storage of materials do not in any way compromise safety of equipment and users.

1.3 ACCESS TO WORK SITE AND CONTRACTOR SITE

.1 If Contractor causes damage to roads or facilities, Contractor bears entire responsibility to fix or replace them at own expense and to full satisfaction of Parks Canada.

1.4 CLEANING AND UPKEEP OF PREMISES AND ENVIRONMENTAL PROTECTION

.1 Contractor must at all times keep premises free of all accumulation of materials, rubbish, waste and debris, and must do a full final clean-up, to satisfaction of Parks Canada, during and at end of Work.

.2 Contractor is responsible for transporting rubbish, waste and debris to appropriate locations.

1.5 WINTER CONDITIONS

.1 Snow removal of construction zone is responsibility of Contractor. Contractor is also responsible for snow removal on all access ways outside existing roads.

1.6 WORK ON WEEKENDS

.1 If Contractor intends to work on Sundays, statutory holidays or at night, written notification must be given to Parks Canada at least 5 working days in advance.

1.7 WORK EXECUTED BY OTHER PARTIES

.1 Contractor must co-operate with other contractors working at Park site.

1.8 INSPECTION OF PREMISES

.1 Contractor's decision to partially or completely commence Work implies acceptance of existing conditions as satisfying. If Contractor performs Work on defective surfaces or in unsatisfactory conditions, corrections or redoing of Work will be at Contractor's expense.

1.9 BLASTING

.1 No blasting of any kind is permitted.

1.10 ENVIRONMENTAL CONSTRAINTS

.1 Environmental constraints are presented in Section 01 35 43 – Environmental Procedures.

.2 Work must comply with federal, provincial and local requirements concerning noise.

1.11 SURVEYING

.1 Contractor is responsible for implementing different structures according to Engineer's plans. Contractor must report on existing material around perimeters of structures to validate attachment to existing material. Contractor must also notify Engineer and Parks Canada of any unexpected circumstances or anomalies detected and plan for time required for potential verification by Engineer.

PART 2 PRODUCT

2.1 NOT USED

.1 Not used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

General Requirements – Project Meetings
Section 01 31 19

PART 1 GENERAL

.1 Site meetings are held weekly at beginning of Work and every two (2) weeks thereafter.

.2 Meetings are led and facilitated by Engineer.

.3 Contractor must present updated work schedule at every meeting.

.4 Meeting attendance

.1 Meeting attendance is mandatory for official representative of Contractor and Work site superintendents. If absent, Contractor must abide by decisions made during meeting and may not question points discussed and resolved.

PART 2 PRODUCT

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

PART 1 GENERAL

1.1 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar (GANTT) Chart: graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other Project element. Usually expressed as workdays or work weeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in Project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout Project life cycle.

.9 Project Planning, Monitoring and Control System: overall system operated by Engineer to enable monitoring of project Work in relation to established milestones.

1.2 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedule are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this Contract.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit to Engineer, within 10 working days of Award of Contract, Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

1.4 PROJECT MILESTONES

.1 Project milestones form interim targets for Project Schedule.

.1	Award of Contract:	Around 02/10/2015
.2	Commencement of Work (mobilization):	Around 05/10/2015
.3	End of Work and interim acceptance:	20/11/2015
.4	Final acceptance:	04/12/2015

1.5 CONSTRAINTS

.1 When planning Work, Contractor must consider the following elements:

.1 Weather conditions;

.2 Availability of and time required for mobilization of wastewater treatment equipment;

.3 Deadlines to complete the work.

.2 For more information, see Section 01 14 00 – Work Restrictions.

1.6 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule at every site meeting reflecting activity changes and completions, as well as activities in progress.

.2 Once a month, include as part of Project Schedule a narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.7 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

.2 Weather-related delays with their remedial measures will be discussed and negotiated.

PART 2 PRODUCT

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

PART 1 GENERAL

1.1 ADMINISTRATIVE

.1 Submit to Engineer 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 Review submittals prior to submission to Engineer. 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.

.5 Notify Engineer, in writing at time of submission, identifying deviations from requirements of Contract Documents, stating reasons for deviations.

.6 Verify field measurements and affected adjacent Work are co-ordinated.

.7 Contractor's responsibility for errors and omissions in submission is not relieved by Engineer's review of submittals.

.8 The fact that the documents and samples submitted are reviewed by the Engineer does not release the Contractor from his responsibility to transmit documents meeting the requirements of the contract documents.

.9 Keep 1 reviewed copy of each submission on site.

.10 Accompany submissions with transmittal letter containing:

.1 Date;

.2 Project title and number;

.3 Contractor's name and address;

.4 Identification and quantity of each document;

.5 Other pertinent data.

1.2 REQUIRED CONTRACTOR DOCUMENTS

.1 List of documents required from Contractor over course of Work is found in Appendix A. This list is not restrictive.

.2 Contractor must also consult following sections:

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

.2	26 05 00, Appendix A	Required Contractor Documents
.3	26 05 00, Appendix B	Shop Drawings – Presentation Data
.4	26 05 00, Appendix C	Certificate of Compliance (End of Work)
.5	26 05 00, Appendix D	Record of Shop Drawings
.6	26 05 00.01	Electrical - Specific Work Results for Electrical
.7	26 05 00.02	Electrical – Specific project requirements

1.3 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit to Engineer documents required by organization with jurisdiction over workers' compensation.

1.4 SHOP DRAWINGS AND PRODUCT DATA

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

.2 Quality: provide original Shop Drawings by email in PDF format. Shop Drawings will not be accepted by fax for reasons of clarity.

.3 Submit drawings stamped and signed by professional engineer registered or licensed in Quebec.

.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 Adjustments made to Shop Drawings by Engineer are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Engineer prior to proceeding with Work.

.6 Accompany submittals with presentation data (see Appendix B) summarizing following information:

.1 Date and revision dates;

.2 Project title and number;

.3 Name and address of Contractor, subcontractor, supplier and manufacturer;

.4 Identification and quantity of each Shop Drawing, Product Data and Sample;

.5 Other pertinent data.

.7 Contractor will be responsible for reproducing Shop Drawing presentation data and Shop Drawings in sufficient quantities for all subcontractors and suppliers, and for providing an additional copy to Engineer, an additional copy to Architect and additional copies for operating and maintenance manuals.

.8 Shop Drawings will be reviewed only if submitted according to described procedure.

.9 Before sending Shop Drawings to Engineer for verification, Contractor must:

.1 Number each page;

.2 Point out all equipment and/or accessories included in Shop Drawings;

.3 Verify that Shop Drawings are in accordance with plans and specifications with regard to quality, characteristics and outline.

.10 Engineer will have 10 working days from date of receipt of documents at their office to verify Shop Drawings.

.11 Verification of Shop Drawings by Engineer is an intermediate quality control step and will not constitute a change order to Contract Documents.

.1 Engineer will verify drawings submitted by Contractor only with regard to overall layout of equipment. Contractor's or supplier's responsibility for accuracy of documents or their compliance with Contract Documents and Work site conditions is not relieved by Engineer's review. Notes made by Engineer on drawings are not restrictive.

.12 Following 4 notes may be found on Engineer's verification stamp:

.1 NO CORRECTION NOTED means Contractor may proceed according to drawing;

.2 MAKE INDICATED CORRECTIONS means Contractor may proceed according to drawing, taking into consideration notes added by Engineer; copy of drawing becomes official copy, and Contractor is not required to resubmit drawing;

.3 RESUBMIT means information on drawing is incomplete or drawing is incomplete, illegible, etc., and information does not allow Engineer to determine compliance with plans and specifications; in such case, Engineer may indicate on drawing points that Contractor must specify or complete before resubmitting drawing;

.4 NOT ACCEPTED means drawing includes materials or structures that are not in compliance with plans and specifications; in such case, Contractor must provide Engineer with another drawing as per requirements of plans and specifications.

.13 Make changes to Shop Drawings as Engineer may require, consistent with Contract Documents. When resubmitting, notify Engineer in writing of revisions other than those requested.

.14 Submit 1 electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Engineer where shop drawings will not be prepared due to standardized manufacture of product.

.15 Keep 1 reviewed copy of Shop Drawings and Appendix B, Shop Drawings – Presentation Data, on site, and make available at all times for reference purposes.

.16 Submit 1 electronic copy of test reports for requirements requested in specification Sections and as requested by Engineer.

.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 accordance with specified requirements.

.2 Testing must have been within 3 years of date of Contract award for project.

.17 Submit 1 electronic copy of certificates for requirements requested in specification Sections and as requested by Engineer.

.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.

.18 Submit 1 electronic copy of manufacturer's instructions for requirements requested in specification Sections and as requested by Engineer.

.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.

.19 Submit 1 electronic copy of manufacturer's field reports for requirements requested in specification Sections and as requested by Engineer.

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

.21 Submit 1 electronic copy of operation and maintenance data for requirements requested in specification Sections and as requested by Engineer.

.22 Delete information not applicable to project.

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

.24 If, upon review by Engineer, no errors or omissions are discovered in Shop Drawings or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If Shop Drawings are rejected, noted copy will be returned, and resubmission of corrected Shop Drawings through same procedure indicated above must be performed before fabrication and installation work may proceed.

.25 Review of Shop Drawings by Engineer is for sole purpose of ascertaining conformance with general concept.

.1 This review will not mean that Engineer approves detailed design inherent in Shop Drawings, responsibility for which will remain with Contractor submitting same, and such review will 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.

1.5 SAMPLES

.1 Contractor must submit for Engineer's approval manufacturer standardized Samples reasonably required by Engineer. Label Samples with origin and intended use in Work, in accordance with requirements of Contract Documents.

.2 Contractor must provide specified Samples of complex or sized products or elements.

.3 Do not order, purchase or produce products or materials before receiving written approval of Samples required in specifications.

.4 Products and structures must be similar to approved Samples.

1.6 TESTING AND PROPORTIONING

.1 Contractor must provide test results and mix proportioning requested by Engineer.

.2 In particular, no pouring of concrete or placement of pavement will be authorized before Contractor proves compliance of materials.

1.7 PHOTOGRAPHIC DOCUMENTATION

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

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

1.8 AS-BUILT DRAWINGS

.1 Site Records

.1 Provide 1 set of drawings and mark changes as Work progresses.

.2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.

.3 Keep drawings on site and make available for reference purposes and inspection.

.2 As-Built Drawings

.1 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW STRUCTURES AND SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).

.2 Submit drawings to Engineer for approval and make corrections as directed.

.3 Submit completed reproducible as-built drawings with operating and maintenance manual.

.4 Submit 1 copy of each as-built drawing and incorporate it into final report on testing, adjusting and balancing of systems and installations.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

General Requirements – Submittal Procedures
Section 01 33 00

Appendix A – Required Contractor Documents

PART 1 – REQUIRED DOCUMENTS AT START OF WORK SITE

.1 These requirements must be met prior to first application for payment.

.1 Performance bond

.2 Bond for obligations, pay, materials and services

.3 Certificate of insurance

.4 List of subcontractors and their contact information

.5 List of suppliers with addresses and contact persons

.6 List of machinery used

.7 List of hourly rates for labour and machinery

.8 List of staff assigned to project and their contact information

.9 Price breakdown

.10 Work schedule

.11 Safety program

.12 Opening of work site to CSST

PART 2 - DOCUMENTS REQUIRED WHILE WORK IS IN PROGRESS AND UNTIL INTERIM ACCEPTANCE

.1 These requirements must be met prior to application for interim acceptance (prerequisite for acceptance) for acceptance with reservations.

.1 List of Shop Drawings

.2 Shop Drawings

.3 Test reports (ex. septic tanks leak testing)

.4 Manufacturer's instructions

.5 Factory testing and verification documentation

.6 *In situ* testing and verification program

.7 Documentation of testing

.8 Start-up and commissioning programs

.9 Operating manuals

.10 Manufacturer's manuals

.11 As-built plans

.12 Personnel training program

.13 Parts list

PART 3 - DOCUMENTS REQUIRED FOR FINAL ACCEPTANCE OF WORK

.1 These requirements must be met prior to final acceptance of Work.

.1 List of deficiencies 100% remedied and initialed by Engineer.

END OF APPENDIX A

General Requirements – Submittal Procedures
Section 01 33 00
Appendix B – Shop Drawings – Presentation Data

GENERAL CONTRACTOR OR PROJECT MANAGER:	
Responsible person:	
Telephone: ( )	Email:

SPECIALTY CONTRACTOR: Address:	
Responsible person:	
Telephone: ( )	Email:

SPECIALTY (discipline):	
Shop drawing No.:	**No. of Pages:**
Deadline for delivery (after verification):	
DESCRIPTION OF SHOP DRAWING:	
Reference to the plan:	
Reference to the specifications: Section: Subsection: Page:	

DISTRIBUTOR: Address:	
Responsible person:	
Telephone: ( )	Fax: ( )

PRODUCT SUBMITTED:	**DRAWING ISSUED FOR:**
☐ As is ☐ Equivalent ☐ Substitution	☐ Verification ☐ Information ☐ Coordination ☐ Other:

REVISION	**DATE OF ISSUE**

NOTE:

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Verification of compliance

Nature and scope of the verification

☐ Compliance with plans and specifications
☐ Other:

This verification does not constitute a complete and detailed verification of the design.

☐ No correction noted
☐ Make the indicated corrections
☐ Correct and resubmit
☐ Not accepted

Signature ☐ Engineer ☐ Other _____ Date _____

Name _____ OIQ member No _____

The verification of this document is restricted to the indicated nature and scope. It does not release the person or business that prepared it from any obligations of any kind

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Contractor must manage its activities such that health and safety of public and Work site / workplace personnel, and environmental protection always take precedence over issues related to cost and Work schedule.

1.2 REFERENCES

.1 Depending on context, latest version of following documents must always be used:

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

.2 Canadian Standards Association (CSA).

.3 *Act respecting occupational health and safety*, R.S.Q. c. S-2.1 [2014].

.4 *Safety Code for the construction industry*, S-2.1, r.4 [2014].

.5 Any other health and safety law or regulation applicable based on corporate status or context of Work.

1.3 SUBMITTAL PROCEDURES

.1 Submit in accordance with Section 01 33 00.

.2 Submit to Engineer construction Work site /workplace-specific prevention program, as described in Article 1.8.6 – Health and Safety Management below, minimum 10 days prior to start of Work. Contractor must subsequently update its prevention program if Work differs from initial plans. Engineer may, following receipt of program and at any time during Work, require that program be modified or supplemented to better reflect reality of Work site / workplace, in which case Contractor must make required changes before beginning Work.

.3 Submit to Engineer Work site / workplace inspection grid duly completed at frequency indicated in Article 1.12 – Inspection of Workplace and Correction of Hazardous Situations below.

.4 Submit to Engineer, within 24 hours, a copy of all inspection reports, notices of correction or recommendations from federal or provincial inspectors.

.5 Submit to Engineer, within 24 hours, investigation reports for all accidents with injury and incidents that bring to light a hazard potential.

.6 Submit to Engineer all material safety data sheets for controlled products used at Work site / workplace minimum 3 days prior to their use at Work site / workplace.

.7 Submit to Engineer copies of training certificates required for implementation of prevention program, including:

.1 Workplace first aid and cardiopulmonary resuscitation (CPR);

.2 Confined space entry;

.3 Lockout procedure;

.4 Wearing and adjusting personal protective equipment;

.5 Any other training required by law or prevention program.

.8 Medical examinations: when medical examinations are required by law, regulation, direction or prevention program, Contractor must:

.1 Submit to Engineer, prior to mobilization, medical examination certificates for its supervisory staff and all its employees who will be present at opening of Work site / workplace;

.2 Subsequently submit as available and without delay medical examination certificates for all of employees new to Work site / workplace.

.9 Emergency Plan: Emergency Plan, as described in Article 1.8.3 – Health and Safety Management, must be submitted to Engineer with prevention program.

.10 Work permit: Contractor must obtain all necessary municipal, provincial and federal work permits in accordance with Contract. A copy of permit applications must be duly sent to Engineer.

.11 Plans and certifications of compliance: Contractor must submit to Engineer 1 copy of work methods, plans and certifications of compliance signed and sealed by an engineer in following case:

.1 Any modifications to equipment or machinery that have not been authorized in writing by manufacturer. One copy of documents must remain available at all times at Work site / workplace.

1.4 RISK ASSESSMENT

.1 Contractor must identify risks related to each task performed at Work site / workplace.

.2 Contractor must plan and organize work so as to encourage elimination at source of hazards or collective protection and thereby reduce to a minimum need for personal protective equipment. When personal fall protection equipment is required, workers must use safety harness in accordance with CAN/CSA-Z-259.10-M90. Safety belt must not be used for fall protection.

.3 Protection equipment, tools and materials that cannot be used or installed without endangering the health and safety of workers or public are deemed inadequate for Work to be completed.

.4 All mechanical equipment must be inspected prior to arriving at Work site / workplace. Contractor must submit to Engineer, prior to use of equipment, certificate of compliance signed by a qualified mechanic. Engineer may, at any time, if they suspect a defect or risk of accident, order immediate stoppage of equipment and a second inspection by a specialist of their choice.

1.5 MEETINGS

.1 Schedule and administer Health and Safety meeting with Parks Canada Representative and Consultant prior to commencement of Work.

1.6 REGULATORY REQUIREMENTS

.1 Comply with all laws, regulations and standards applicable to Work.

.2 In particular, Contractor must present in its Work Plan and Emergency Plan.

1.7 HEALTH AND SAFETY MANAGEMENT

.1 Contractor must accept and assume responsibility for all tasks and obligations normally delegated to Principal Contractor and Employer under applicable occupational health and safety laws and regulations.

.2 Contractor must develop a prevention program for construction Work site / workplace that is based on identifying risks and implementing program from beginning of project through final step of demobilization. Prevention program must take into account information in Article 1.7 – Project/Site Condition and must be distributed to all individuals concerned in accordance with provisions of Article 1.3 – Submittal Procedures. At minimum, prevention program must include:

.1 Corporate health and safety policy;

.2 Work description, schedule and expected flow of workers;

.3 Organizational diagram of health and safety responsibilities;

.4 Physical organization of Work site / workplace;

.5 First aid standards;

.6 Identification of risks related to Work site / workplace;

.7 Identification of risks related to tasks performed, including preventative measures and implementation procedures;

.8 Training required;

.9 Procedure in case of accident/injury;

.10 Written commitment from all personnel to abide by prevention program;

.11 Work site / workplace inspection grid based on preventative measures contained in program.

.3 Contractor must develop an effective Emergency Plan in relation to features and constraints of Work site / workplace and its environment. Emergency Plan must be distributed to all individuals concerned in accordance with Article 1.3 – Submittal Procedures. Plan must include in particular:

.1 Emergency evacuation procedure;

.2 Identification of resources (police, fire, ambulance, etc.);

.3 Identification of individuals responsible at Work site / workplace;

.4 Identification of first aid people;

.5 Training required for people responsible for Plan implementation;

.6 All other information deemed necessary considering features of Work site / workplace.

1.8 RESPONSIBILITIES

.1 Regardless of size of Work site / workplace or number of workers present, Contractor must name a qualified person as supervisor and person responsible for health and safety. Take all measures necessary to ensure health and safety of people and goods on site and in environment surrounding Work site / workplace that could be affected by performance of certain Work.

.2 Take all measures necessary to ensure implementation of and compliance with health and safety requirements in Contract Documents, applicable federal and provincial regulations, standards and construction Work site / workplace-specific prevention program, and comply with all orders or notices of correction from an inspector without delay.

.3 Contractor must take all measures necessary to keep Work site / workplace tidy throughout Work.

1.9 COMMUNICATION AND POSTING

.1 Take all measures necessary to ensure effective communication of health and safety information at Work site / workplace. Upon arrival at Work site / workplace, all workers must be informed of details of prevention program and their rights and obligations. Contractor must stress workers' right to refuse Work that they believe could compromise their own health, safety or physical integrity, or those of others at Work site / workplace. Contractor must maintain and keep at Work site / workplace a log detailing information shared, with signatures of all workers who received it.

.2 Information and documents below must be posted in a location easily accessible to workers:

.1 Identification of Employer and Principal Contractor;

.2 Corporate occupational health and safety policy;

.3 Work site / workplace-specific prevention program;

.4 Emergency Plan;

.5 Material safety data sheets for all controlled products used at Work site / workplace;

.6 Minutes of job-site committee meetings;

.7 Names of representatives on job-site committee;

.8 Names of first aid people;

.9 Intervention and correction reports from inspectors.

1.10 UNFORESEEN HAZARDS

.1 When a hazard not specified in specifications and not identified during initial Work site / workplace inspection appears because of or during performance of Work, Contractor must immediately stop Work, implement temporary protective measures for workers and public, and advise Engineer verbally and in writing. Contractor must subsequently make necessary changes to prevention program so that Work may resume safely.

1.11 INSPECTION OF WORKPLACE AND CORRECTION OF HAZARDOUS SITUATIONS

.1 Inspect workplace and complete Work site / workplace inspection grid at least once per week.

.2 Take, without delay, all necessary measures to correct non-compliance with laws and regulations and dangerous situations identified by Engineer or QPA construction Health and Safety Co-ordinator or during periodic inspections.

.3 Submit to Engineer written confirmation of all measures taken to correct non-compliance and dangerous situations.

.4 Work stoppage: Contractor must designate one person hired solely for health and safety. This person's candidacy must be approved by Engineer. Give person hired by Contractor to be responsible for health and safety all authority necessary to stop and resume Work when they deem it necessary or desirable for reasons of health and safety. This person must ensure health and safety of public and Work site / workplace personnel as well as environmental protection always take precedence over issues related to cost and Work schedule. Without limiting scope of Health and Safety Management article and Responsibilities article, Engineer or any other person hired by QPA to manage or guard project may, at any time, stop Work if they perceive a hazard or risk to health and safety of Work site / workplace personnel or public, or for environment.

1.12 BLASTING

.1 Blasting and other use of explosives are prohibited unless authorized in writing by Engineer.

1.13 SPECIFIC REQUIREMENTS FOR SAFETY

1.13.1 Confined spaces

.1 Work and equipment must comply with applicable codes and standards. Ensure that occupational health and safety regulation applicable to confined spaces is complied with, particularly sections 3.21.1, 3.21.2 and 3.21.3 of *Safety Code for the construction industry* (R.R.Q., c S-2.1, r 4).

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 DEFINITIONS

.1 Characterization: precise identification of distinctive elements of a substance, an environment or process.

.2 Waste: residuals, materials, substances or debris discarded after a production process, manufacture or use.

.3 Spill: Any accidental or voluntary short-term discharge to environment, likely to cause harm to the environment.

.4 Suspended Solids: materials that can by either deposited or retained by filtering.

.5 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.

.6 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

.2 REFERENCE STANDARDS

.1 Construction activities will be conducted within Parks Canada property. Work is subject to guidelines, laws and federal regulations. In some case, Provincial and Municipal approaches may be considered as guide values. The following sections present laws, standards and regulations applicable to environmental component and air emissions control.

1.2 FIRES

.1 Fires and burning of rubbish on site is not permitted.

1.3 DRAINAGE

.1 Provide temporary drainage and pumping required to keep excavations and site free from water.

.2 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties as indicated.

.2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of [2] m minimum.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.

.4 Avoid unnecessary traffic, dumping and storage of materials over root zones.

.5 Minimize stripping of topsoil and vegetation.

.6 Restrict tree removal to areas indicated.

1.5 WORK ADJACENT TO WATERWAYS

.1 Waterways to be kept free of excavated fill, waste material and debris.

1.6 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this Contract.

.2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.

.4 Keep, at any time, absorbent materials to rapidly respond to hazardous material spills at construction site.

.5 Place cuttings, scrap materials and other debris in spaces provided in Construction Specifications.

.6 Do not store petroleum products or other hazardous material within 30 meters of aquatic environment.

.7 Maintain wheeled vehicles and refueling at a minimum distance of 30 meters from shore.

.8 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.7 NOTIFICATION

.1 Consultant will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

.2 Contractor: after receipt of such notice, inform Consultant of proposed corrective action and take such action for approval by Consultant.

.3 Take action only after receipt of written approval by Parks Canada.

.4 Parks Canada will issue stop order of work until satisfactory corrective action has been taken.

.5 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 CLEANING

.1 Leave Work area clean at end of each day.

.2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

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

3.2 ENVIRONMENTAL COMPONENTS

.1 Air quality

.1 Contractor must ensure that the machinery used is in good working condition (regular maintenance) to reduce greenhouse gas emissions and dust

.2 Contractor must avoid leaving engines running unnecessarily on machinery that is not being used.

.3 Contractor must water dry materials and cover waste to prevent wind raising dust or blowing around debris.

END OF SECTION

General Requirements – Quality Control
Section 01 45 00

PART 1 GENERAL

1.1 PURPOSE

.1 This Section of Construction Specifications provides information about quality assurance program to be implemented by Contractor and its subcontractors and suppliers during Work. This program is not intended to replace contractually required quality assurance program. It sets out minimum quality activities to be performed by Contractor and its subcontractors and suppliers at their facilities or on Work site.

1.2 RESPONSIBILITIES

.1 Contractor is responsible for implementing all provisions of quality assurance program.

.2 Contractor is responsible for ensuring all its subcontractors and suppliers perform quality activities described in this Section.

.3 Contractor and its subcontractors and suppliers must demonstrate their quality assurance program is implemented and their Work complies with drawings and technical specifications during fabrication and construction.

.4 Allow Engineer 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.

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

.6 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.

.7 Engineer will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.

1.3 INDEPENDENT INSPECTION/TESTING AGENCIES

.1 Independent inspection/testing agencies will be engaged by Parks Canada for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Parks Canada.

.2 Employment of inspection/testing agencies does not relax responsibility of Contractor and its subcontractors and suppliers to perform Work in accordance with Contract Documents.

.3 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Contractor and its subcontractors and suppliers will have to correct defect and irregularities as advised by Engineer at no cost to Parks Canada and pay costs for retesting and reinspection.

1.4 ACCESS TO WORK

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

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

1.5 PROCEDURE

.1 Notify appropriate agency and Engineer 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.

1.6 QUALITY PROGRAMMING

.1 Contractor must provide details of quality programming it intends to implement for Project.

.2 Key personnel will not be replaced without prior notice from Parks Canada.

.3 Contractor must present organizational diagram of its subcontractors and suppliers assigned to Project.

.4 All organizational diagrams must be included in Contractor's Quality Plan (see Section 1.9).

1.7 MANUFACTURING

1.7.1 RECEIPT OF MATERIALS

1.7.1.1 MATERIALS PROVIDED BY PARKS CANADA

.1 If Parks Canada provides Contractor with materials or equipment to execute any Work, Contractor must verify their condition prior to taking possession.

1.7.1.2 RECEIPT OF MATERIALS PURCHASED BY CONTRACTOR

.1 Contractor must be able to demonstrate at any time compliance of all materials and equipment it has purchased or manufactured. These quality files must be complete and available at facilities of Contractor or its subcontractors or suppliers.

.2 Contractor must complete an acceptance inspection for each material received on site.

.3 Quality files of Contractor or its subcontractors or suppliers must provide proof of completion of acceptance inspections and review by Contractor of compliance documents, i.e., material analysis certificates and inspection reports.

.4 All materials provided by Contractor must be new. Origin and source of materials must be identified. Refurbished materials are not acceptable.

1.7.1.3 NON-COMPLIANT MATERIALS

.1 Non-compliant materials must be correctly identified (labelled “hold” or “ne pas utiliser”) and/or be set aside in a holding area.

1.7.2 DOCUMENT CONTROL

.1 Contractor must implement and maintain a document control system that makes it possible to control following activities:

.1 Ensure only latest revision of specifications, plans and procedures are accessible at facilities of Contractor and its subcontractors and suppliers.

.2 Ensure that if copies of past revisions are kept, they are labelled “Outdated.”

.3 Provide functional system to distribute documents, drawings, procedures, reports, etc.

.4 Ensure all quality files are catalogued and stored in a controlled environment.

1.7.3 IDENTIFICATION AND TRACEABILITY

1.7.3.1 IDENTIFICATION

.1 Contractor is responsible for ensuring all materials and equipment used in Work are identified and traceable, and remain so until end of Work.

1.7.3.2 TRACEABILITY

.1 It must be possible at any time to associate materials and equipment with documentation establishing their compliance and inspection status.

1.7.4 CALIBRATION OF MEASURING EQUIPMENT

.1 Contractor and its subcontractors and suppliers must continue to maintain a control and recall system for calibrated measuring and testing equipment.

.2 Contractor and its subcontractors and suppliers must keep their equipment calibration certificates at their facilities.

.3 Contractor and its subcontractors and suppliers must store their measuring and testing equipment in a secure and controlled environment.

1.7.5 INSPECTIONS COMPLETED

.1 Contractor must be able to demonstrate at any time during Work which inspections have been completed.

.2 Completed inspections must also be verifiable in Contractor’s quality files. Depending on discipline, Contractor must monitor inspection levels using annotated drawings or computerized lists or databases.

.3 It must be possible at any time to verify progress of inspection and testing activities, with references to reports produced.

.4 Regardless of type of monitoring system chosen by Contractor and its subcontractors and suppliers, it must be possible to demonstrate that 100% of Work, inspections, tests and reports has been completed.

1.7.6 FINAL INSPECTION

.1 At end of different manufacturing and construction phases, Contractor must declare said phases complete and compliant, submit its quality files and ask Engineer to complete final inspection.

.2 Engineer must receive advance notice requesting performance of final inspection as defined in Contract.

.3 Upon receipt of request for final inspection, Engineer must complete final inspection of materials and equipment prior to issuing an inspection certificate.

PART 2 PRODUCT

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

PART 1 GENERAL

1.1 LOCATION OF WORK SITE

.1 Plan of construction facilities (see plan 615534-0000-41D2-0001) indicates:

.1 Space available for Work;

.2 Access;

.3 Authorized taxiways;

.4 Spaces reserved for construction facilities and materials storage site and for construction of prefabricated items;

.5 Authorized parking areas.

1.2 LIMITATION OF RESPONSIBILITY

.1 For construction facilities, limitations of responsibility between Contractor and QPA are as follows:

.1 Contractor will be responsible for:

.1 Field offices;

.2 QPA and its representative's offices;

.3 Equipment storage facilities;

.4 Outdoor storages for material and equipment;

.5 Temporary quay at edge of quay 26 if required;

.6 Missing access roads;

.7 Washrooms at Work site;

.8 Water to compact material and dust control;

.9 Transportation of personnel;

.10 Safety of own personnel and equipment;

.11 Topographic surveys;

.12 Bathymetric surveys to monitor Work;

.13 All loading and unloading work;

.14 Maintenance of access roads (cleaning in summer, grading of gravel roads, oiling and snow removal on Work site accesses);

.15 Waste disposal;

.16 Phone lines and Internet;

.17 Customs clearance, if required;

.18 Work site fencing;

.19 Lighting for night Work.

.2 QPA will be responsible for providing:

.1 Land 20,000 m^2 in area for placement of construction facilities and storage areas. This land will be surrounding by fencing on 3 sides, which must be built by Contractor;

.2 Land at quays 26 and 30;

.3 Land at quay 25 for employee parking;

.4 A hangar at quay 26;

.5 Electricity (billed to Contractor's meters);

.6 Drinking water (connection to fire hydrants) for Contractor offices;

.7 Fire protection (fire system near authorized sites);

.8 Bathymetric surveys at commencement and end of Work (jointly with Contractor);

.9 Snow removal of existing roads;

.10 Environmental and construction permits.

1.3 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

.4 Clean, level and set up construction facility area.

.5 Provide construction facilities in order to execute Work expeditiously.

.6 Remove from site all such work after use.

1.4 OFFICES

.1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table. Office must also be air conditioned to 22 degrees C.

.2 Provide marked and fully stocked first-aid case in a readily available location.

.3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

.4 Engineer's office

.1 Provide temporary office for Engineer. Placement is to be confirmed with QPA.

.2 Inside dimensions minimum 6 m long x 3 m wide x 2.4 m high, with floor 0.3 m above grade, complete with four 50% opening windows and one lockable door.

.3 Insulate building and provide heating system to maintain 22 degrees C inside temperature at -20 degrees C outside temperature.

.4 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.

.5 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10% upward light component.

.6 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.

.7 Equip office with two 1 x 2 m tables, 4 chairs, 6 m of shelving 300 mm wide, one 3-drawer filing cabinet, one plan rack and one coat rack with shelf.

.8 Maintain in clean condition.

1.5 SERVICES

.1 QPA provides for free connections for drinking water supply and preparation of concrete if poured on port site.

.2 For trailer area, Contractor must provide and connect, at own expense, electrical and telephone connections from the Work site trailer to utilities. QPA will provide connection points with meters.

.3 Contractor must provide sufficient chemical toilets.

1.6 CONSTRUCTION PARKING

.1 Parking is authorized only in certain areas of Work site. These are indicated in map of construction facilities.

.2 Provide and maintain adequate access to project site.

.3 Clear tracks and taxi areas where site equipment has been used.

1.7 STORAGE AREA

.1 Storage is permitted in Work site areas indicated in maps. Placement and height of stored materials or equipment must be approved by QPA.

.2 Contractor provides adequate and covered spaces, if needed, for storage of materials.

.3 QPA is not responsible for theft of tools, equipment or materials. Contractor is responsible for keeping own tools, equipment and materials safe.

1.8 WORK SITE FENCING

.1 Work site fencing must be provided around Work areas and construction facilities.

1.9 WORK SITE SIGNAGE

.1 Work site signage is allowed only on Work site trailers. Dimensions and placement of signage must be approved by QPA before installation.

1.10 LIGHTING SYSTEM FOR NIGHT WORK

.1 Contractor must provide and install lighting systems for all night Work.

1.11 CONSTRUCTION SIGNAGE

.1 Contractor must install and maintain adequate and safe signage to indicate Work-related detours, bypasses and hazards.

.2 This signage must be placed and maintained throughout duration of Work in compliance with applicable safety codes and to satisfaction of QPA. If, for some reason, signage is insufficient or poorly maintained in QPA's opinion, fees incurred to re-establish signage will be directly deducted from amounts payable to Contractor.

1.12 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and temporary relocated roads as necessary to maintain traffic.

.2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Engineer.

.3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and Work, and erection and maintenance of adequate warning, danger, and direction signs.

.4 Protect travelling public from damage to person and property.

.5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.7 Construct access and haul roads necessary.

.8 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.9 Dust control: adequate to ensure safe operation and environmental protection at all times.

.10 Lighting: to assure full and clear visibility for full width of haul road and Work areas during night Work operations.

.11 Provide snow removal during period of Work.

.12 Upon completion of Work, remove haul roads designated by Engineer.

1.13 CLEAN-UP

.1 Remove construction debris, waste materials and packaging material from Work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

PART 2 PRODUCT

Not used.

PART 3 EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

.2 Inspect, repair and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

PART 1 GENERAL

1.1 QUALITY

.1 Products, materials, equipment and articles incorporated in Work must 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.

.2 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.

.3 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.

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

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

1.2 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 Engineer 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 Engineer at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Engineer reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.3 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 lumber and sheet materials 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 Engineer.

.9 Touch up damaged factory finished surfaces to satisfaction of Engineer. Use touch-up materials to match original. Do not paint over name plates.

1.4 TRANSPORTATION

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

.2 Unload, handle and store such products.

1.5 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 Engineer in writing of conflicts between specifications and manufacturer's instructions, so that Engineer will establish course of action.

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

1.6 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 Engineer if required Work is such as to make it impractical to produce required results.

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

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

1.7 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.

1.8 CONCEALMENT

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

1.9 REMEDIAL WORK

.1 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.

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

1.10 LOCATION OF FIXTURES

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

.2 Inform Engineer of conflicting installation. Install as directed.

1.11 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.

1.12 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.

1.13 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of parts of building.

1.14 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 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 PRODUCT

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

PART 1 GENERAL

1.1 WASTE MANAGEMENT GOALS

.1 Exercise maximum control over solid construction waste.

.2 Protect environment and prevent pollution and environmental impacts.

1.2 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste, volatile materials, mineral spirits, oil and paint thinner into waterways or into storm or sanitary sewers.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL

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

3.2 CLEANING

.1 Upon completion of Work, remove tools and waste. Leave Work area clean and in order.

.2 Clean Work area as Work progresses.

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

END OF SECTION

General Requirements – Closeout Procedures
Section 01 77 00

PART 1 GENERAL

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.2 Consultant's Inspection:

.1 Consultant and Contractor to inspect Work and identify defects and deficiencies.

.2 Contractor to correct Work as directed.

.3 Completion Tasks: submit written certificates in French that tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Equipment and systems: tested, and fully operational.

.4 Operation of systems: demonstrated to Owner's personnel.

.5 Commissioning of mechanical systems: completed in accordance with 01 91 13 - General Commissioning (Cx) Requirements and copies of final Commissioning Report submitted to Consultant.

.6 Work: complete and ready for final inspection.

.4 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by Consultant and Contractor.

.2 When Work incomplete according to Owner and Consultant, complete outstanding items and request re-inspection.

1.2 FINAL CLEANING

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: in accordance with Section [01 74 21 - Construction/Demolition Waste Management and Disposal]

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

PART 1 GENERAL

1.1 ADMINISTRATIVE REQUIREMENTS

.1 Demonstrate operation and maintenance of equipment and systems to Owner's personnel one week prior to date of final inspection.

.2 Owner: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.

1.1.1 PREPARATION

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

.2 Verify designated personnel are present.

.3 Ensure equipment has been inspected and put into operation in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements.

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

1.1.2 DEMONSTRATION AND INSTRUCTIONS

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

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

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

.4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.

.5 Time Allocated for Instructions: ensure amount of time required for instruction of each item of equipment or system.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

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

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

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

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

1.3 QUALITY ASSURANCE

.1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:

.1 Instruct Owner's personnel.

.2 Provide written report that demonstration and instructions have been completed.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL

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

.1 Verify installed equipment, systems and integrated systems operate in accordance with Contract Documents and design criteria and intent.

.2 Ensure appropriate documentation is provided.

.3 Effectively train O M staff.

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

.1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.

.2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.

.3 Design Criteria: as Parks Canada requirements or determined by designer. To meet Project functional and operational requirements.

1.2 COMMISSIONING OVERVIEW

.1 Cx to be a line item of Contractor's cost breakdown.

.2 Cx activities supplement field quality and testing procedures described in relevant technical sections.

.3 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities include transfer of critical knowledge to facility operational personnel.

.4 Parks Canada will issue Interim Acceptance Certificate when:

.1 Completed Cx documentation has been received, reviewed for suitability and approved by Engineer.

.2 Equipment, components and systems have been commissioned.

.3 O M training has been completed.

.4 Performance testing has been completed and is compliant, and report has been submitted.

.5 Operating and manufacturer's manuals have been submitted.

.6 As-built plans have been submitted.

1.3 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

.1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the unfunctional system, including related systems as deemed required by Engineer, to ensure effective performance.

.2 Costs for corrective work, additional tests and inspections to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

1.4 PRE-CX REVIEW

.1 Before Construction:

.1 Review Contract Documents and confirm by writing to Engineer:

.1 Adequacy of provisions for Cx.

.2 Aspects of design and installation pertinent to success of Cx.

.2 During Construction:

.1 Co-ordinate provision, location and installation of provisions for Cx.

.3 Before start of Cx:

.1 Have completed Cx Plan up-to-date.

.2 Ensure installation of related components, equipment, sub-systems and systems is complete.

.3 Fully understand Cx requirements and procedures.

.4 Have Cx documentation shelf-ready.

.5 Understand completely design criteria and intent and special features.

.6 Submit complete start-up documentation to Engineer.

.7 Have Cx schedules up-to-date.

.8 Ensure systems have been cleaned thoroughly.

.9 Complete TAB procedures on systems and submit TAB reports to Engineer for review and approval.

.10 Ensure as-built system schematics are available.

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

1.5 CONFLICTS

.1 Report conflicts between requirements of this section and other sections to Engineer before start-up and obtain clarification.

.2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 – Submittal Procedures. Submit no later than 4 weeks before Cx:

.1 Name of Contractor's Cx agent.

.2 Draft Cx documentation.

.3 Preliminary Cx schedule.

1.7 COMMISSIONING DOCUMENTATION

.1 Engineer to review and approve Cx documentation.

1.8 COMMISSIONING SCHEDULE

.1 Provide detailed Cx schedule as part of construction schedule in accordance with Section 01 32 16.07 – Construction Progress Schedule – Bar (GANTT) Chart.

.2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:

.1 Approval of Cx reports.

.2 Verification of reported results.

.3 Repairs, retesting, re-commissioning, re-verification.

.4 Training.

1.9 STARTING AND TESTING

.1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

1.10 WITNESSING OF STARTING AND TESTING

.1 Provide 14 days notice prior to commencement.

.2 Engineer to witness start-up and testing.

.3 Contractor's Cx Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

1.11 MANUFACTURER'S INVOLVEMENT

.1 Factory testing: manufacturer to:

.1 Coordinate time and location of testing.

.2 Provide testing documentation for approval by Engineer.

.3 Obtain written approval of test results and documentation from Engineer.

.2 Obtain manufacturer's installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with Engineer.

.1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.

.2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-up.

.3 Verify with manufacturer that testing as specified will not void warranties.

.3 Qualifications of manufacturer's personnel:

.1 Experienced in design, installation and operation of equipment and systems.

.2 Ability to interpret test results accurately.

.3 To report results in clear, concise, logical manner.

1.12 PROCEDURES

.1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.

.2 Conduct start-up and testing in following distinct phases.

.1 Included in delivery and installation:

.1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.

.2 Visual inspection of quality of installation.

.2 Start-up: follow accepted start-up procedures.

.3 Operational testing: document equipment performance.

.4 System PV: include repetition of tests after correcting deficiencies.

.5 Post-substantial performance verification: to include fine-tuning.

.3 Correct deficiencies and obtain approval from Engineer after distinct phases have been completed and before commencing next phase.

.4 Document required tests on approved PV forms.

.5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Engineer. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:

.1 Minor equipment/systems: implement corrective measures approved by Engineer.

.2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Engineer.

.3 If evaluation report concludes that major damage has occurred, Engineer shall reject equipment.

.1 Rejected equipment to be removed from site and replaced with new.

.2 Subject new equipment/systems to specified start-up procedures.

1.13 START-UP DOCUMENTATION

.1 Assemble start-up documentation and submit to Engineer for approval before commencement of commissioning.

.2 Start-up documentation to include:

.1 Factory and on-site test certificates for specified equipment.

.2 Pre-start-up inspection reports.

.3 Signed installation/start-up check lists.

.4 Start-up reports.

.5 Step-by-step description of complete start-up procedures.

1.14 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS

.1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel. Operating instructions to include following:

.1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.

.2 Start-up, proper adjustment, operating, lubrication, and shutdown procedures.

.3 Safety precautions.

.4 Procedures to be followed in event of equipment failure.

.5 Other items of instruction as recommended by manufacturer of each system or item of equipment.

.2 Print or engrave operating instructions and frame under glass or in approved laminated plastic.

.3 Post instructions where directed.

.4 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.

.5 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.15 TEST RESULTS

.1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.

.2 Provide manpower and materials, assume costs for re-commissioning.

1.16 START OF COMMISSIONING

.1 Notify Engineer at least 21 days prior to start of Cx.

.2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

1.17 INSTRUMENTS/EQUIPMENT

.1 Submit to Engineer for review and approval:

.1 Complete list of instruments proposed to be used.

.2 Listed data including serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy.

.2 Provide following equipment as required:

.1 2-way radios.

.2 Ladders.

.3 Equipment as required to complete work.

1.18 COMMISSIONING PERFORMANCE VERIFICATION

.1 Carry out Cx:

.1 Under actual (or accepted simulated per Engineer's instructions) operating conditions, over entire operating range, in all modes.

.2 On independent systems and interacting systems.

.2 Cx procedures to be repeatable, and reported results are to be verifiable.

.3 Follow equipment manufacturer's operating instructions.

1.19 WITNESSING COMMISSIONING

.1 Engineer to witness activities.

1.20 AUTHORITIES HAVING JURISDICTION

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

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

.3 Provide copies to Engineer within 5 days of test and with Cx report.

1.21 DEFICIENCIES, FAULTS, DEFECTS

.1 Correct deficiencies found during start-up and Cx to satisfaction of Engineer.

.2 Report problems, faults or defects affecting Cx to Engineer in writing. Stop Cx until problems are rectified. Proceed with written approval from Engineer.

1.22 COMPLETION OF COMMISSIONING

.1 Upon completion of Cx, leave systems in normal operating mode.

.2 Complete Cx prior to issuance of Interim Certificate of Completion.

.3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Engineer.

1.23 ACTIVITIES UPON COMPLETION OF COMMISSIONING

.1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

1.24 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

.1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in Contract.

1.25 MEASUREMENT TOLERANCES DURING VERIFICATION

.1 Unless otherwise specified, actual values to be within +/-2% of recorded values.

1.26 CLEANING

.1 Clean and touch up surfaces with shop coat that were scratched or damaged during delivery and installation (according to Paint section requirements). Use type and colour of original paint.

.2 Clean hooks, supports, fasteners and other visible ungalvanized fasteners, and apply primer to prevent rust.

.3 Right before final acceptance of facility, clean and restore all devices to new condition and leave in perfect working order.

PART 2 PRODUCT

Not used.

PART 3 EXECUTION

3.1 TANKS LEAK TESTING

3.1.1 IMPOUNDMENT

.1 The Contractor shall provide the impoundment and testing the sealing of tanks. The filling must be done before spring thaw. The Contractor shall fill the tanks slowly. After the completed filling, tests are performed by the Contractor to the satisfaction of project supervisor to ensure that the exfiltration is below the required value. The tank impoundment must be done by the inlet and not by the outlet pipes, and must be done at a rate that will prevent any damage to the structure.

3.1.2 PERFORMANCE TESTS

.1 The Contractor must demonstrate, at the end of works, that built or installed tanks respond well to water retention characteristics (relative sealing) specified in this article. For the purpose of this article, the term "completion" means that all works are completed in the tank, and that all the equipment was installed in the tanks. This performance test is the responsibility of the Contractor and shall be done under the supervision of the representative of the Supervisor.

.2 The steps for performance testing are:

- Ensure that the entire interior of the tanks was cleared of all residues, construction debris and others, and that all elements of the ventilation system are firmly in place.
- Perform the filling of tanks using clear or clean water, pumped from the nearest river or delivered on site using a tanker truck.
- All sections of all tanks must be filled to normal operating level with clean water. If it proves impossible to fill all tanks with clean water, the supervisor may authorize another filling method.
- When all sections have reached their normal level of operation, interrupt the filling. Also stop the aeration if it has been used during filling.
- Close the isolation valves at the inlet and outlet of the tanks.
- The performance test consists of measuring the lowering of the water level in the basin each day over a period of three (3) days.

- If the Contractor precedes the actual test by a wetting period of one or several days, it should reduce the level of water in the tank to their normal operating level before the start of the performance tests.
- Water maximum permissible losses are 1.0 mm / day. These values are not corrected for precipitation and evaporation effects.

.3 If the lowering of the water level exceeds the values prescribed above, corrected for precipitation and evaporation, the Contractor shall make the necessary corrections. These corrections must be followed by a second complete test performance, and so on if necessary. The correction works must be performed in a manner and with materials approved by the project manager, at the Contractor's expense.

.4 The Contractor shall verify the performance of the aeration system immediately before or after the performance test (sealing) described in this section. Adjustments to the ventilation system must be performed, if necessary, together with the corrections to the civil engineering works.

.5 The Contractor may not request the provisional acceptance of works before any defect was corrected and the performance tests described in this article was made and successful to the satisfaction of the supervisor.

3.2 FUNCTIONAL TESTS OF MECHANICAL EQUIPMENTS

3.2.1 GENERAL

.1 The Contractor shall, in collaboration with suppliers, must make the start-up of each equipment. It must also take the usual precautions such oiling, greasing, checking the direction of rotation, check to detect if there is no obstruction, etc.

.2 The Contractor must ensure that the manufacturers' instructions are followed and respected. It must provide a written to confirm that all devices have been put into operation, that all checks have been made and that all facilities provided are free from defects.

.3 Functional tests must be performed in the presence of a representative of the Engineer.

.4 It shall notify the Engineer at least one (1) week before proceeding with final. The tests in the presence of the Engineer are only performed when the Contractor has already made his own trial and the necessary correctives.

.5 The Contractor shall modify or replace the equipments, materials or machinery that do not meet the usual conditions and specific operations to this project.

.6 During the commissioning, the Contractor provides all the equipment necessary for the good progress of the tests.

.7 At the final acceptance, the Contractor shall resume the same tests if requested by the Engineer.

.8 The Contractor must carry out dry run testing or in charge as appropriate on all equipments and machinery as requested and directed by the Engineer, in order to verify that the specific conditions of use and operation are met.

3.2.2 DRY RUN TESTING

.1 Dry run testing include, without limitation, the usual verifications before switching on equipment such as:

- Free rotation of moving parts;
- Rotation direction;
- Bolts tightening;
- Alignment and balancing;
- Check if equipments are ready to use;
- Valves and check valves operation;
- Open/Closed identification;
- Electrical connection between the equipment and the starter;
- Operation of instrumentation loops;
- Perform a complete inspection of various control panels and electrical systems;
- Continuity of the grounding;
- Protections of overload and low voltage;
- Connection of all electrical services, control, etc.;
- Lighting equipments and receptacles;
- Phases load balancing;
- Alarms;
- Oil equipment ;
- Protection systems of various mechanical equipment;
- Amperage of motorized elements;
- Magnetic and manual starters;
- Operation of all alarm conditions and possible faults;
- Operation of timers (with chronometer for correctness);
- Operation in general: pressure gauges, check valves, valves, etc.

.2 Equipments engine must be verified by the Contractor at the factory and the report should include, but not limited to, the following tests:

- Motor no load current measurement ;
- Locked rotor current measurement;
- Full load current measurement without power factor correction.

3.2.3 STARTING TESTS

.1 After completion of the installation of equipment and dry tests, the Contractor performs the startup of all equipments. This startup can be achieved only after an approval of the proceeding is given by the owner.

.2 The Contractor shall notify the owner at least forty-eight (48) hours in advance of any startup to come. The Contractor shall also coordinate with other contractors involved. During the startup period, the Contractor shall provide skilled labor for the operation of the equipment and any element required to properly operate, all without additional cost to the Owner. It must subsequently, get rid of water and chemicals used.

.3 The Contractor is fully responsible for the equipment and its operation during that period. If there are damaged equipments during water commissioning tests, the Contractor should repair or replace this equipment to the owner's satisfaction and without extra charge.

.4 During the startup period, the Contractor shall make all the equipments changes and adjustments and it must show that the equipment is capable of operating properly and is ready for the continuous test period.

.5 The Contractor shall perform all the tests specified below and must provide the owner all test reports. The tests generally include the following checks:

- Sealing of structures and equipments;
- Doing pressure tests;
- Perform various tests on air devices based on energy consumption;
- Protection systems of various mechanical equipments;
- Amperage of motorized elements;
- Magnetic and manual starters;
- Operation of all alarm conditions and possible faults;
- Operation of timers (with chronometer for correctness);
- Operation in general: pressure gauges, check valves, valves, etc.;
- Operation of each valves.

3.2.4 PERFORMANCE TESTS

.1 The Contractor shall conduct performance tests to verify that the required performance criteria are met. These tests are performed when the previous operating tests and patches if any, are made. In some cases, the operation and performance tests can be conducted simultaneously. The complete tests with the report shall be borne by the Contractor. The test protocols must be submitted to the Engineer for approval.

.2 For each performance test, a complete report must be submitted containing the results. The report in three (3) copies summarizes:

- Test protocol;
- Conditions during tests;
- Instrumentation diagrams;
- Interpretation and discussion of results;
- Conclusions and recommendations.

3.3 PRE-INSPECTION VISITS

1. At the pre-inspection visit by the Owner, the Contractor must review the verification and testing program, attended by all stakeholders.
2. It must establish with the Owner the schedule to complete the work and correct deficiencies.
3. The visit also serves to plan with all stakeholders the continuously testing and the probable date of provisional acceptance.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL

1. Demolition work includes :
   .1 Removing existing septic tanks.

1.2 RELATED REQUIREMENTS

1. Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.3 REFERENCES

1. CSA International : CSA S350-[M1980(R2003)], Code of Practice for Safety in Demolition of Structures.
2. U.S. Environmental Protection Agency (EPA) : EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

1. Submit demolition procedures:
   .1 Submit to Engineer demolition procedures, which must meet environmental protection requirements, including those issued by Parks Canada. These procedures must also indicate how and where materials will be disposed of.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

1. Inspect Work site with Engineer and verify location and extent of items that must be removed, disposed of or salvaged, and those that must stay in place.
2. Locate and protect public and private utility lines and maintain in good condition those that remain in service on site.
3. Notify public utility companies and concerned Parks Canada departments and obtain their approval before starting demolition work.
4. Disconnect, cap or re-route, as needed, existing service lines on site that hinder execution of Work, in accordance with requirements of authorities having jurisdiction. Locate these

service lines and those already abandoned on site, and indicate their location (horizontal and vertical plane) on as-built drawings. Properly support, underpin and maintain in place service lines and conduits encountered.

.1 Immediately notify Engineer as well as concerned public utility company and Parks Canada of any damage caused to a service line to be maintained.

.2 Immediately notify Engineer of discovery of any unidentified public utility line and wait for Engineer's written instructions about measures to be taken.

3.2 GENERAL PREPARATIONS

1. Protection of in-place conditions

.1 Work in accordance with Section 01 35 43 - Environmental Procedures

.2 Prevent movement, settlement or damage of adjacent structures, services and trees. Provide bracing, shoring as required.

.3 Prevent debris from blocking surface drainage system, mechanical and electrical systems which must remain in operation.

.4 Execute Work in accordance with Parks Canada health and safety requirements.

2. Surface Preparation

.1 Disconnect and cap designated sewer lines.

3. Septic Tanks

.1 Pump out buried septic tanks, left in place. Fill with sand.

.2 Remove tanks within area of new construction.

4. Demolition/removal work

.1 Remove following materials and equipment. Remove pavements, curbs and gutters

.1 Cut at right angle adjacent surfaces untouched by Work using a saw or other appropriate means approved by Engineer.

.2 Protect charge-coupled devices as well as adjacent joints.

.3 Protect granular fills underlying or adjacent to Work area.

3.3 EQUIPMENT TO DECOMMISSION

1. Pipes to decommission

    1. Block each ends of the severed pipe by sealing the opening with concrete of a minimum of 300 mm depth and a minimum strength of 20 MPa.

3.4 CLEANING

.1 Progress Cleaning: leave Work area clean at end of each day.

.2 Final Cleaning: remove surplus materials, rubbish, tools and equipment to satisfaction of Engineer and Parks Canada.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes

.1 This section provides common work results for Divisions 26, 27, 28.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.10-10, Québec Construction Code, Chapter V – Electricity – Canadian Electrical Code, Part I (21st Edition) with Québec Amendments, safety standards for electrical installation.

.2 CAN/CSA-C22.3 No.1-01[Updated March 2005], Overhead Systems.

.3 CAN3-C235-[83(R2000)], Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

.4 CAN/CSA-C22.3 No.61936-1-[08], Power Installations Exceeding 1 kV a.c. – Part 1: Common Rules.

.2 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.

1.3 DEFINITIONS

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

1.4 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235 or IEC/ISO/IEEE 80005-1, as indicated.

.2 Motors, electric heating and control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standards.

.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.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Quality: provide original Shop Drawings by email in PDF format. Shop Drawings will not be accepted by fax for reasons of clarity.

.3 Submit WHMIS Material Safety Data Sheets.

.4 Submit for review single line electrical diagrams under plexiglass and locate:

.1 Electrical distribution system: in main electrical room.

.5 Shop Drawings

.1 Submit 1 reproducible original copy of Appendix B – Shop Drawings – Presentation Data completed and up to date for each Shop Drawing description provided in Appendix D – Record of Shop Drawings and summarizing following information:

.1 Project

.2 Owner (client)

.3 General Contractor (including email address)

.4 Subcontractor (including email address)

.5 Supplier/Distributor

.6 Specialty (discipline)

.7 Verification by Engineer (stamp)

.2 Submit 1 reproducible original copy of each Shop Drawing listed in Appendix D – Record of Shop Drawings. Identification information found in plans and specifications must also be indicated on each Shop Drawing.

.6 Contractor will be responsible for reproducing Shop Drawing presentation data and Shop Drawings in sufficient quantities for all subcontractors and suppliers, and for providing an additional copy to Owner, an additional copy to Architect and additional copies for operating and maintenance manuals.

.7 Shop Drawings will be reviewed only if submitted according to described procedure.

.8 Engineer will have 10 working days from date of receipt of documents at their office to verify Shop Drawings.

.9 List of Shop Drawings must include but is not limited to items described in Appendix D – Record of Shop Drawings that follows this section.

.10 Submit fabrication drawings stamped and signed by professional engineer registered or licensed in province of Quebec, Canada.

.11 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.

.12 Identify circuit terminals on wiring diagrams, and indicate internal wiring for each item of equipment and interconnection between each item of equipment.

.13 Indicate on drawings clearances for operation, maintenance and replacement of operating equipment devices.

.14 If changes are required, notify Engineer before making them.

.15 Before sending Shop Drawings to Engineer for verification, Contractor must:

.1 Number each page.

.2 Point out all equipment and/or accessories included in Shop Drawings.

.3 Verify that Shop Drawings are in accordance with plans and specifications with regard to quality, characteristics and physical size.

.16 Verification of Shop Drawings by Engineer is an intermediate quality control step and will not constitute a change order to Contract Documents.

Engineer will verify drawings submitted by Contractor only with regard to overall layout of equipment. Contractor's or supplier's responsibility for accuracy of documents or their compliance with Contract Documents and Work site conditions is not relieved by Engineer's review. Notes made by Engineer on drawings are not restrictive.

.17 Following 4 notes may be found on Engineer's verification stamp:

.1 NO CORRECTION NOTED means Contractor may proceed according to drawing.

.2 MAKE INDICATED CORRECTIONS means Contractor may proceed according to drawing, taking into consideration notes added by Engineer; copy of drawing becomes official copy, and Contractor is not required to resubmit drawing.

.3 RESUBMIT means information on drawing is incomplete or drawing is incomplete, illegible, etc., and information does not allow Engineer to determine compliance with plans and specifications; in such case, Engineer may indicate on drawing points that Contractor must specify or complete before resubmitting drawing.

.4 NOT ACCEPTED means drawing includes materials or structures that are not in compliance with plans and specifications; in such case, Contractor must provide Engineer with another drawing as per requirements of plans and specifications.

.18 Shop Drawings and product data must include:

.1 Mounting arrangements.

.2 Clearances required for equipment operation and maintenance as well as for moving access panels.

.3 Details of bases, supports and anchor bolts.

.4 Power data, where applicable.

.5 Certificates of compliance to applicable codes.

.19 Keep 1 reviewed copy of Shop Drawings and Appendix B – Shop Drawings – Presentation Data, on site, and make available at all times for reference purposes.

1.6 REQUIRED CONTRACTOR DOCUMENTS

.1 List of documents required from Contractor over course of Work is found in Appendix A.

1.7 SUBSTANTIAL COMPLETION OF WORK

.1 Work is substantially complete when it is ready to be used for purpose intended, and Engineer will recognize Work is substantially complete when Contractor has proven for a period of 5 consecutive calendar days that condition of parts remains within performance criteria set out in specifications.

.2 To issue certificate of substantial completion (interim acceptance of Work), Engineer will require from Contractor all documents listed in Appendix A – Required Contractor Documents.

.3 Prior to issuing certificate of substantial completion, Engineer will require, among other things, that Contractor:

.1 Demonstrate to Engineer that all systems and networks function in accordance with performance criteria set out in specifications.

.2 Demonstrate to Engineer that all automatic control sequences set out in specifications are operational and can operate repeatedly.

1.8 FINAL ACCEPTANCES AND PAYMENTS

.1 To issue certificate of final acceptance, Engineer will require from Contractor all documents listed in Appendix A – Required Contractor Documents.

.2 Certificate of final acceptance will be issued to Contractor by Owner once all Work has been completed in accordance with terms of Contract and to satisfaction of Owner, meaning that all defects have been corrected and all acceptance certificates have been received from various authorities. Payments will be made in accordance with terms of Contract and after Contractor has satisfied requirements and paid all license and permit costs, etc.

.3 Installation is considered complete when everything is operational, controls function properly, equipment is identified, training has been completed and plans annotated by Contractor and instruction manuals have been submitted to Owner.

1.9 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for incorporation into operation and maintenance manual.

.2 Operation and maintenance data must be approved prior to final inspection by Engineer, who will keep final copies.

.3 Operation and maintenance data to include:

.1 Control schematics for systems, including environmental controls.

.2 Description of systems and their controls.

.3 Description of operation of systems at various loads, together with reset schedules and seasonal variances.

.4 Operation instructions for systems and components.

.1 Description of actions to be taken in event of equipment failure.

.2 Colour coding chart.

.4 Maintenance data to include:

.1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.

.2 Schedules of tasks, frequency, tools required and task time.

.5 Performance data to include:

.1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.

.2 Equipment performance test results.

.3 Special performance data as specified.

.6 Approval

.1 Submit 2 copies of draft operation and maintenance manual for approval. Unless directed otherwise by Engineer, copies must be submitted together.

.2 Make required changes to operation and maintenance manual and resubmit as directed by Engineer.

.7 Additional data

.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified training.

.8 Certificate of compliance

.1 Complete Certificate of Compliance in Appendix C and attach to each operation and maintenance manual.

1.10 AS-BUILT DRAWINGS

.1 Site records:

.1 Provide 1 set of electrical drawings and mark changes as Work progresses. Follow same procedure for changes to systems and related wiring.

.2 Transfer information weekly to reproducibles, revising reproducibles to show feeders and electrical systems as actually installed.

.3 Use different coloured ink for each service.

.4 Keep drawings on site and make available for reference purposes and inspection.

.2 As-built drawings:

.1 Before starting testing, adjusting and balancing of systems, finish as-built drawings.

.2 Identify each drawing in lower right-hand corner in letters at least 12 mm high as follows: AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW ELECTRICAL SYSTEMS AS INSTALLED (Signature of Contractor) (Date).

.3 Submit drawings to Engineer for approval and make corrections as directed.

.4 Complete testing, adjusting and balancing of systems, equipment and networks as indicated in as-built drawings.

.5 Submit completed reproducible as-built drawings with operating and maintenance manual.

.6 Submit 1 copy of each as-built drawing and incorporate it into final report on testing, adjusting and balancing of systems and installations.

1.11 WARRANTY

.1 All new devices, accessories and equipment provided and installed under this Project will have a parts and labour warranty of minimum 1 year following final acceptance.

1.12 QUALITY CONTROL

.1 Submit test results of installed electrical systems and instrumentation.

.2 Upon completion of Work, submit certificate of acceptance from authority having jurisdiction.

.3 Manufacturer's Field Reports: submit to Engineer manufacturer's written report, within 3 days of review verifying compliance of Work and electrical system and instrumentation testing, as described in each section.

1.13 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 – Quality Control.

.2 Qualification: electrical work must be performed by qualified licensed electricians.

.1 Tasks Permitted: based on degree of training and abilities demonstrated for execution of specific tasks.

1.14 HEALTH AND SAFETY

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

.2 Perform all work in accordance with applicable Quebec occupational health and safety statutes.

1.15 SYSTEM START-UP

.1 Proceed with start-up of all systems. Ensure systems function properly and demonstrate that they perform in accordance with requirements in plans and specifications.

.2 Direction of rotation of motors must correspond to requirement of equipment to be driven.

.3 Instruct operating personnel in operation, care and maintenance of systems and system equipment and components.

.4 If required, arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation; check, adjust, balance and calibrate components; and instruct operating personnel.

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

1.16 OPERATING INSTRUCTIONS

.1 Provide for each principal system and item of equipment as specified in technical sections for use by operation and maintenance personnel. Operating instructions to include following:

.1 Wiring diagrams, control diagrams and control sequence for each principal system and item of equipment.

.2 Start-up, proper adjustment, operating, lubrication and shutdown procedures.

.3 Safety precautions.

.4 Procedures to be followed in event of equipment failure.

.5 Other items of instruction as recommended by manufacturer of each system or item of equipment.

.2 Print or engrave operating instructions and place in frame under glass or in approved laminated plastic.

.3 Post instructions where directed.

.4 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.

.5 Ensure operating instructions will not fade when exposed to sunlight.

1.17 DELIVERY, STORAGE AND HANDLING

.1 Delivery

.1 Deliver materials in good condition, in intact, clearly identified containers from manufacturer, bearing brand, type and, where applicable, ULC or UL marks.

.2 Coordinate delivery based on scheduled installation date to minimize storage time at Work site.

.2 Packing, shipping, handling and unloading

.1 Deliver, store and handle in accordance with manufacturer's written instructions. Deliver to site in original factory packaging.

.3 Storage and protection

.1 Protect from weather and construction traffic.

.2 Protect against damage.

.3 Store at temperatures and conditions required by manufacturer.

.4 Comply with procedures, precautions and warnings set out in material safety data sheets.

.5 Do not use damaged or outdated materials.

1.18 WASTE MANAGEMENT AND DISPOSAL

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

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

.3 Handle and dispose of hazardous materials in accordance with regional and municipal regulations.

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

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

PART 2 PRODUCTS

2.1 SUSTAINABLE REQUIREMENTS

.1 Materials, equipment and products must comply with sustainable requirements.

.2 Materials and items of equipment must be CSA certified unless indicated otherwise. In cases where CSA certified materials and items of equipment are not available, submit replacement materials and equipment to inspection authorities prior to delivering them to Work site.

.3 Factory-assemble control panels and component assemblies.

2.2 FINISHING

.1 Shop-finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least 2 coats of finish enamel.

.1 Paint outdoor electrical equipment in equipment green.

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

.2 Clean and touch up surfaces of shop-finished equipment that were scratched or damaged during shipping and installation. Use colour of original paint.

.3 Clean and prime visible fasteners, frames and supports to prevent rust.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1 and CSA 22.10-10 except where specified otherwise.

3.2 NAMEPLATES AND LABELS

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

.2 Refer to Section 26 05 53 - Identification of electrical systems for indications and ways of doing to comply with the identification of material and equipment.

3.3 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: 1200 mm.

.2 Wall receptacles

.1 General: 400 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.

3.4 CO-ORDINATION OF PROTECTIVE DEVICES

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

3.5 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, 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 distribution system including phasing, voltage, grounding and load balancing.

.2 Circuits originating from branch distribution panels.

.3 Lighting and its control.

.4 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.

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

.4 Do all test prescribed in each section.

.5 Submit a written test results to the engineer.

3.6 OPERATING AND MAINTENANCE PERSONNEL TRAINING

.1 Supply tools, equipment and personnel to train operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing all systems and equipment during regular work hours, prior to acceptance.

.2 Submit training proposal complete with hour-by-hour schedule including brief overview of content of each segment to Engineer and Owner 30 days prior to anticipated date of beginning of training.

.1 List name of trainer and type of visual and audio aids to be used.

.2 Show co-ordinated interface with other mechanical and electrical training programs.

.3 Submit reports at least 1 week before anticipated start date of training program.

3.7 CLEANING

.1 Clean and touch up shop-coated surfaces that were scratched or damaged during delivery and installation. Use colour of original paint.

.2 Clean hooks, supports, fasteners and other visible ungalvanized fasteners, and apply primer to prevent rust.

.3 Right before final acceptance of facility, clean and restore all devices to new condition and leave in perfect working order.

END OF SECTION

Electrical – Common Work Results for Electrical
Section 26 05 00

Appendix A – Required Contractor Documents

REQUIRED CONTRACTOR DOCUMENTS

Part 1 – Documents required at the beginning of construction

* These requirements must be completed before the first payment request.

		Transmission date
1.1	**General contractor**	
1.1.1	List of subcontractors and their contact information	
1.1.2	List of suppliers with addresses and contact persons	
1.1.3	List of assigned staff to the project and contact information (foreman, estimator, owner/project manager)	
1.1.4	Detailed breakdown of payment applications of specialized contractors or subcontractors	
1.1.5	Proof of insurance	
1.2	**Electrical**	
1.2.1	Licenses and qualifications	
1.2.2	List of subcontractors and their contact information	
1.2.3	List of suppliers with addresses and contact persons	
1.2.4	List of assigned staff to the project and contact information (foreman, estimator, owner/project manager)	
1.2.5	Delivery time of equipments to provide	
1.2.6	Proof of insurance	

Electrical – Common Work Results for Electrical
Section 26 05 00

Appendix A – Required Contractor Documents

Part 2 Documents required during construction until provisional acceptance

* These requirements must be completed before de request for provisional acceptance (prior to obtaining it) for acceptance of work with reserve.

		Date de transmission
1.3	**General contractor**	
1.3.1	Detailed timetable for set-up and commissioning	
1.3.2	Descriptive table of the training provided as prescribed in Section 26 05 00	
1.3.3	Proof of training of fire seals	
1.3.4	Data sheets of fire systems	
1.3.5	MSDS sheets sealants products	
1.3.6	Letter of compliance for fire seals	
1.3.7	Verification certificates and test systems	
1.3.8	All visit reports of the engineer initialed be corrected when the deficiencies were reported	
1.4	**Electrical**	
	Shop drawings (complete)	
1.4.1	Short circuit study, protection coordination of arc faults and adjustement of safety devices as prescribed in Section 26 05 00.01.	
1.4.2	The training programs as described in Section 26 05 00	
1.4.3	Drawings and calculations seismic protection sealed by and engineer as prescribed in Section 23 05 49.	
1.4.4	Compliance Report seismic installations sealed by an engineer as prescribed in Section 23 05 49.	
1.4.5	Reports balancing charges as prescribed in Section 26 05 00.	
1.4.6	Full report of verification and startup for each device	
1.4.7	Thermographic inspection reports as prescribed in Section 26 05 00.01.	
1.4.8	WHMIS MSDS as prescribed in Section 26 05 00.	
1.4.9	Table summarizing the tests to be performed under the project	
1.4.10	Contents of operation and maintenance manuals	
1.4.11	Full report of verification and switching on the fire alarm as prescribed in Section 28 31 00.01.	
1.4.12	Full report verification and starting of the access control	
1.4.13	Full report verification and test system of burglar alarm	
1.4.14	Audit reports and test system [specified]	
1.4.15	Certificate verification and testing systems [specified]	
1.4.16	Certificate of the building authority	
1.4.17	Certificates signed by the contractor for all tests	
1.4.18	Certificate of conformity of the entire system requiring fire resistance of 2 h, from end to end c/w all components, by cable manufacturer	
1.4.19	Report of cable insulation by Megger as requested in Section 26 05 00	
1.4.20	Commissioning report of motor control centres	
1.4.21	Commissioning report of variable frequency drives	

1.4.22	Report of resistance to ground network	

Part 3 Documents required for final acceptance of work

* These requirements must be completed for the final acceptance of work.

		Dates de transmission
1.5	**General contractor**	
	All lists of deficiencies of specialized contractors and against-checked by the foreman of the project. Important notes : A signature of the project manager and the foreman will be required to specify that the work is completed. When the general contractor confirms that the deficiencies are completed 100%, the engineer will make a final inspection of the work with the latter and with the owner. If additional visits are required due to non-reliazed patches, the fees involved will be at the charge o the general contractor.	
1.6	**Electrical**	
1.6.1	List of impairments completed at 100% and signed by the project manager	
1.6.2	Guarantee letter	
1.6.3	Operations manual and maintenance of completed and accepted by the engineer	
1.6.4	The certificate of conformity (annex C) signed	
1.6.5	Drawing comply as the execution	
1.6.6	List of spare parts and evidence of transmission of these	
1.6.7	List of training provided with date and signature of participants	
1.6.8	List of special tools	

Electrical – Common Work Results for Electrical
Section 26 05 00
Appendix B – Shop Drawings – Presentation Data

GENERAL CONTRACTOR OR PROJECT MANAGER:	
Responsible person:	
Telephone: ( )	Email:

SPECIALTY CONTRACTOR: Address:	
Responsible person:	
Telephone: ( )	Email:

SPECIALTY (discipline):	
Shop drawing No.:	**No. of Pages:**
Deadline for delivery (after verification):	
DESCRIPTION OF SHOP DRAWING:	
Reference to the plan:	
Reference to the specifications: Section: Subsection: Page:	

DISTRIBUTOR: Address:	
Responsible person:	
Telephone: ( )	Fax: ( )

PRODUCT SUBMITTED:	**DRAWING ISSUED FOR:**
☐ As is ☐ Equivalent ☐ Substitution	☐ Verification ☐ Information ☐ Coordination ☐ Other:

REVISION	**DATE OF ISSUE**

NOTE:

SNC·LAVALIN

Verification of compliance

Nature and scope of the verification

☐ Compliance with plans and specifications
☐ Other:

This verification does not constitute a complete and detailed verification of the design.

☐ No correction noted
☐ Make the indicated corrections
☐ Correct and resubmit
☐ Not accepted

Signature ☐ Engineer ☐ Other _____ Date _____

Name _____ OIQ member No _____

The verification of this document is restricted to the indicated nature and scope. It does not release the person or business that prepared it from any obligations of any kind

Appendix C – Certificate of Compliance (End of Work)

CERTIFICATE OF COMPLIANCE
(END OF WORK)

PROJECT : _____

ADDRESS OF THE PROJECT : _____

DISCIPLINE : _____

QUOTE SECTIONS : _____

We certify that all materials and equipments used and any apparent or hidden work that we have done or what we did executed are in full conformity with the plans, specifications, addenda, change and documents prepared by engineers.

DATED AT _____ THIS _____ DAY OF _____ 20 ____.

COMPANY NAME : _____

ADDRESS : _____

PHONE NUMBER : _____

SIGNATURE : _____

TITLE OF SIGNATORY : _____

SEAL

Appendix D – Record of Shop Drawings

RECORD OF SHOP DRAWINGS

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RECORD OF SHOP DRAWINGS

TITLE : Replacement of 20 wastewater treatment systems - Phase 1
PROJECT: 630573
PROJECT MANAGER :

VERIFICATION STATUS	
V : NO CORRECTION	R : NOT ACCEPTED
VA : MAKE THE INDICATED CORRECTIONS	AR : RESUBMIT

SUBMIT PRODUCT
PR: AS IS
PE: EQUIVALENT
PS: SUBSTITUTION

REFERENCE TO CONSTRUCTION SPECIFICATIONS				REV.	RECEIVED		SENT TO SUBCONTRACTORS		STATUS	REMARKS
SECTION	DRAWING NUMBER	DESCRIPTION	DISCIPLINE		DATE	SUBMIT PRODUCT	DATE	SEND NUMBER		
26 05 20		Wire and Box Connectors (0-1 000 V)	Electrical							
26 05 21		Wires and Cables (0-1 000 V)	Electrical							
26 05 31		Splitters, junction, pull boxes and cabinets	Electrical							
26 05 32		Outlet boxes, conduit boxes and fittings	Electrical							
26 27 26		Wiring Devices	Electrical							
26 28 16.02		Moulded Case Circuit Breakers	Electrical							

PARTIE 1 GENERAL

1.1 SUMMARY

.1 Section content

.2 This section specifies the particular requirements common to divisions 26, 27 and 28.

1.2 DEFINITIONS

.1 The contractor is the organization that signs a contract with the owner to perform all the work shown on the plans and specifications. The contractor must provide, erect, install and commission all the elements described herein.

.2 It also uses the term "general contractor" to refer to the contractor.

.3 When the expression, for example, "electrical contractor" or "subcontractor electricity" or "specialty contractor" is used, it must be understood that these are chosen and retained by the company contractor to perform certain specialized work.

1.3 PLANS AND SPECIFICATIONS OF ELECTRICITY CHARGES

.1 The specifications for the general and particular, Annexes, regulations of labor, the documents of the owner and the other tender documents are part of this section and shall govern the work.

.2 Plans indicate approximate location of devices and conduits; exact location will be determined by the contractor from the site. In addition, the contractor will check on site the available space before the installation of equipment and conduits and for the coordination of work and available spaces with other divisions.

.3 No architecture data or structure will be taken on power plans.

.4 No additional compensation will be granted for the movement of pipes and devices deemed necessary because of the structure, architecture or any other normal account.

.5 Before replacing the bid, the contractor warn the engineer of any error or omission he could find in the plans and the specifications and any incompatibility with those of architecture and structure. No supplement will be given to this fact.

.6 Details of plans that could be provided to the contractor during the work will also part of the plans and specifications electricity charges. If the contractor needs details of plans, it should ask the engineer in writing at least fifteen (15) working days in advance.

.7 The engineer has the right interpretation of plans and specifications electricity charges. If there is disagreement between the plans and specifications of electric charges in respect to the quantity, quality, nature or the price of certain works or materials, the contractor will use to prepare its bid the most expensive solution and will submit a bid accordingly. Credit will be given to the owner if another solution is adopted during the construction.

1.4 SCOPE OF WORK

.1 Provide all materials, labor, tools and equipment required for the full implementation of all the work described in the specifications and / or indicated on the plans.

.2 This list is not exhaustive and all work described herein will be part of the project. The list of works include among others, but without being limited, however:

.1 The installation of all distribution equipment such as circuit breakers.

.2 Connection of blowers control panels.

.3 Connection of pump control panels.

.4 The installation of wiring devices such as plugs, plates, etc.

.5 Installation of junction boxes and boxes of c / a the covers.

.6 The connections of all special equipment.

.7 The connections of all equipment requiring electricity they are supplied by the contractor in this section, by the contractors of the other sections, by the owner or by others.

.8 Network installation ducts and wiring supplying all the electricity applicant equipment and any other systems.

.9 The relocation of existing equipment reused.

.10 Ensuring the continuity of all existing services.

.11 Checking and coordinating all existing services from the owners, utility companies and the services of other relevant specialties.

.12 Given to the owner of equipment specified in quotes and other equipment he wants to recover. The contractor will rid the place of all that is not recovered by the owner.

.13 Description of the work, unless otherwise indicated, the term "installation" includes the supply of equipment and materials with all accessories needed for a complete installation.

1.5 LIABILITY OF WORK

.1 Any changes made to the plans and specifications, without the written permission of the engineer, will make the contractor concerned solely responsible for the malfunction of systems. He will be responsible for any defects that may occur in the space of one year after the final acceptance of work.

1.6 PROCEDURE AND TIMETABLE

.1 The Contractor shall refer to and follow the construction stages established the owner regarding the timing and procedure of work.

1.7 ASSESSMENT OF CHANGES TO CONTRACT

.1 The value of any change to the contract is determined by a real cost based on a detailed estimate the quantities are listed, the actual unit cost or the cost of the list price and the actual discount obtained from the supplier, the time to hand-d work using recognized scales and unit cost thereof including all social charges prescribed by the RBQ, the cost of expenses for equipment. These additional costs will be reduced avoided costs including labor.

.2 For any change, a monitoring cost (foreman) can be considered only on the basis of the difference in time spent in the general construction schedule for implementation of the work involved.

.3 For work where manufacturing drawings have been prepared, submitted and verified by the engineer designs a time corresponding to 10% of the cost of basic equipment including the drawings such as pipes, fabricated sheet metal, etc. the subject will be allocated.

.4 The increase applicable as a result of the costing will be for work to be executed by a subcontractor to the contractor will be 15% for the subcontractor and 6% for the contractor. For work performed by the contractor, the increase will be 15%.

.5 In very special cases where the subcontractor has himself to perform the work to a sub contractor, the increase applicable to the real cost of it will be 15%, 6% for the subcontractor and 6 % for the entrepreneur.

1.8 QUALITY REQUIREMENTS AND REFERENCE PRODUCTS

.1 The term "reference product" means that the first article mentioned in the list of acceptable products in lieu of prescription and define the criteria regarding the performance or the performance, quality of equipment / materials and execution quality, and if it is referred to a reference standard, it must be regarded as a complement thereto.

.2 Manufacturer names are mentioned in the reference product in order to establish a quality standard with regard to hardware and service.

.3 When a device or material is identified as the reference product, it means that the system was designed with the apparatus or material that the bidder must submit his original submission with the device or the specified material.

1.9 EQUIVALENTS PRODUCTS

.1 The term "equivalent products" means that other products mentioned in the list of acceptable products can be considered equivalent to the reference product.

.2 If the bidder wishes to present its original submission with a device listed as equivalent product, it must then comply with the following stipulations:

.1 The contractor shall submit a written request for equivalency, within five (5) business days after signing his contract. The contractor must enclose with the application a comparative table of the main characteristics of the specified equipment or material as a reference product and one that is offered by the equity method. This table should include all data related to congestion and the specific characteristics of the kind of equipment or material, and the applicable credit is applicable. To this end, a copy of the tender for the equipment or materials specified in the reference product and a copy of a tender for equipment or materials offered by the equity method should also be attached to the comparison table.

.2 After analyzing the application for equivalence, the decision of the engineer or owner shall be final. If the device or the material proposed by the contractor is denied, it will provide and install the equipment or material specified in reference to plans and specifications, all without additional compensation. After an initial refusal, no further application for equivalence will be accepted even if it is specified by the equity plans and specifications.

1.10 ALTERNATIVE PRODUCT

.1 The term "alternative products" means products not mentioned in the list of acceptable products. They can not be considered as reference product or equivalent product.

.2 If the contractor or a subcontractor, through the tendering contractor, wants to install a device or material, the manufacturer's name is not mentioned in the specifications, they must submit a written request for substitution in the five (5) business days after signing his contract.

The contractor must enclose with the application a comparative table of the main characteristics of the specified equipment or material as a reference product and the one proposed in substitution. This table should include all the space-related data and the specific characteristics of the type of device or material.

The Contractor shall also attach to his application the following information:

.1 A copy of the tender for equipment or materials specified by reference.

.2 A copy of the tender for equipment or materials proposed as a replacement; if economy, the price difference will be given to the owner.

.3 The reasons for the substitution request.

In addition, the material or the device proposed substitution will be reviewed taking into account the facilities maintenance and availability of spare parts.

.3 If the system design, network or building is amended by the substitution of equipment or materials originally used to carry out the plans and specifications, the contractor or a subcontractor, through the tendering contractor, will have to take back at his expense the plans and specifications to integrate alternative he proposes.

.4 After the analysis of the substitution request, the decision of the engineer or owner shall be final. If the device or the material proposed by the contractor is denied, it will provide and install the equipment or material specified plans and specifications, all without additional compensation. After an initial refusal, no other alternative applications will be accepted and no equivalent will be accepted even if it is specified by the equity plans and specifications.

1.11 COORDINATION BETWEEN CONTRACTORS AND DRAWINGS INTEGRATION

Note: These are drawings showing the lines of all trades and not the tinplate manufacturing drawings only.

.1 In order to ensure full coordination of all work trades in mechanical and electrical construction, coordination meetings will be held before any work is done on site by these trades.

.2 Coordination and checks mentioned above shall be made by the contractor and its subcontractors before ordering each device, and before starting to perform work. If a problem arises, it shall submit the case to engineers before starting work. If this check is not made by the subcontractor and a difficulty arises, and that the contractor must incur additional costs to overcome, these costs will be borne by the contractor concerned.

.3 Unless otherwise stated, we must provide the necessary accessories to complete on-site installation of the elements he has made.

.4 No benefit is granted for moving pipes, boxes, equipment, etc. undermines the effective implementation of other works or overall appearance.

.5 Each subcontractor will coordinate its openings, anchors, brackets and other provisions required for the installation of the mentioned works and will get the required information in time to avoid delaying the execution of works.

1.12 COORDINATION BETWEEN SUBCONTRACTORS

.1 In order to ensure full cooperation with all the trades involved in this work, each subcontractor specializing in building mechanics will check the plans of other specialties and coordinate its work to ensure that its equipment are not in conflict with those of other

trades, and before starting work. No additions to the contract will be awarded for a breach of this clause.

.2 Coordination and checks mentioned above shall be made by the contractor and its subcontractors before ordering each device, and before starting to perform work. If a problem arises, it shall submit the case to engineers before starting work. If this check is not made by the subcontractor and a difficulty arises and the subcontractor must undergo additional costs to overcome, these costs will be borne by the contractor concerned.

.3 Unless otherwise stated, we must provide the necessary accessories to complete on-site installation of the elements he has made.

.4 No benefit is granted for moving pipes, boxes, equipment, etc. undermines the effective implementation of other works or overall appearance.

.5 Each subcontractor will coordinate its openings, anchors, brackets and other provisions required for the installation of the mentioned works and will get the required information in time to avoid delaying the execution of works.

1.13 EQUIPMENTS AND MATERALS

.1 Unless otherwise indicated, use materials and new equipment.

.2 Unless otherwise specified, use products from a single manufacturer in the case of materials and equipment of the same type or the same class. The equipment provided will be the same manufacturer for maximum interchangeability between elements among others for distribution panels, breakers, starters, lighting devices of the same type.

.3 In special places, use suitable products; and, in humid, dusty, etc., the material must be waterproof, dust, etc. Also, the ends of the ducts entering boxes, tables and similar equipment, to be sealed with a special compound for this purpose.

.4 Implementation and finishing

.1 The whole installation must be performed in order to facilitate inspections, repairs and maintenance maneuvers.

.2 The exposed part of the electrical installation, the contractor undertakes to respect the symmetry. Also, when the ceilings are covered with acoustic tiles and any panels, the contractor must coordinate its work with that of other trades for lighting fixtures, etc. occupy the space of a tile or tiles or row are centered relative to the latter.

.3 Unless otherwise specified, a reference to a device always includes its supply with its accessories, and the labor to install, connect and perform the commissioning.

.4 Perform all specified works menus or not the plans and specifications, but which are customary and necessary to complete the contract.

.5 Apply at least one corrosion resistant primer on the fasteners, brackets, suspensions ferrous metal as well as on equipment manufactured locally (CGSB-PGI-140).

.6 Finishes and touch the surfaces where the end was damaged and to the satisfaction of the project owner.

1.14 FIREWALL SEALANT

.1 The general contractor will be responsible for compliance and quality of fire seals. To this end, he will hire a specialist to select the firewall systems and specify the products required to ensure such compliance.

.2 Refer section 26 05 40.01 – Compartmentalization (firewall).

1.15 ACCESS DOOR

.1 Material :

.1 Type 1 - Regular

.1 Material: 16 gauge steel with electrostatic primer gray.

.2 Concealed hinge.

.3 Locking flat screwdriver.

.4 Dimension: 610 x 610 mm or as specified in the plans.

.5 Installation on gypsum walls or ceilings.

.6 Acceptable Products: architectural door with hidden flange CTR "Contour" Cendrex.

.2 Type 2 - Firewall

.1 Material: satin coated 16 gauge steel.

.2 Category B, 90 minutes ULC / WH.

.3 Accordance with standards: ASTM E 152, NFPA 252 and ULC-S104.

.4 Continuous piano hinge type opening 165 °.

.5 Lock: with key barrel.

.6 Dimension: 609 x 609 mm.

.7 Acceptable products: resistant door uninsulated NFP fire.

.3 For special surfaces such as ceramic tile or marble, use stainless steel doors with a brushed satin finish or polished, according to the engineer's specifications.

.2 Installation :

.1 Locate the openings to allow access to hidden items.

.2 Locate the openings so that the manholes or hand holes, as applicable, are easily accessible.

.3 The installation method is prescribed in the relevant sections.

1.16 THERMOGRAPHIC INSPECTIONS

.1 A thermographic inspection at all connection points of the cables as well as all existing and new distribution equipment from end to end is to do and build in a signed and sealed by an engineer recognized expert report.

.2 The thermographic inspection should cover all connections and all existing and new electrical distribution equipment connected therewith such as substations, busways gutters, correction system power factor, generator, inverter, power centers , distribution centers, power panels, distribution panels, circuit breakers, disconnectors, transformers, motor control centers, variable frequency drives, starters, contactors, relays, etc.

.3 Thermographic inspections are the responsibility of the contractor that will perform the inspection by a recognized specialist. The Contractor will provide labor and tools for dismantling and reinstallation of covers and access distribution equipment c / a are all components including all fittings for a complete inspection.

.4 Thermographic inspections should be made under loads at all stages of the project and the anomalies detected shall be corrected immediately by the contractor.

.5 Produce complete reports thermographic inspections sealed by an engineer of recognized specialist.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section content

.1 This section details the specific project requirements, common to divisions 26, 27 and 28.

1.2 PROCEDURE AND HOUR OF WORK

.1 The contractor should refer to the documentation and follow established construction stages and the procedure of work.

.2 The contractor must take into account that the property will remain operational during construction.

.3 The price for the execution of all work following the procedure of the work will be included in the submission. No additional compensation will be awarded afterwards to that effect.

.4 The price for the execution of all work overtime or at night, on weekends will be included in the submission. No additional compensation will be awarded afterwards to that effect.

1.3 REQUEST TO THE OWNER

.1 For all work that can harm the owner of the business, the entrepreneur will make a written request for authorization where it will indicate the nature of the work involved, the time required for its execution and the date on which it is to do this work. The contractor will wait for permission from the owner before proceeding.

.2 The contractor will make the owner's written request for authorization, ten (10) days in advance, each time there is outage and power interruption.

1.4 EXISTING SERVICES

.1 The location of some existing services is for information purposes only on the plans. Before work begins, the contractor will make verification and tracking of all existing services from the owner.

.2 Before starting the work, the contractor will check with the owner the existing plans as well as plans civil, structural, mechanical and electrical.

.3 Before performing the demolition, with perforations of encavement and openness, the contractor will carry out all the checks necessary in order not to damage the existing hidden services.

1.5 HIDDEN EXISTING SERVICES

.1 The contractor is responsible for damage to hidden electricity, telecommunication, mechanical or otherwise, the following openings and concrete divisions required by these works.

.2 Perform all the required checks to avoid damaging those services. To this end, see:

.1 Plans mechanics, electricity, telecommunication and other specialties of existing;

.2 The owner and / or maintenance personnel with knowledge of the place, and;

.3 Utility companies and specialized companies, with knowledge of the premises and its facilities.

.3 Run all the preparatory work to research. Search using a suitable apparatus for this purpose if trace lines in the areas concerned. Also, hire specialized firms to search for hidden existing conduits.

.4 If the contractor fails to carry out all the above checks, damage service will be attributable to him and he will be required to defray the cost of repairing the actual failure and additional damage to the building. Moreover, if the deterioration can affect the operation of services of the existing building, the owner can claim the contractor for damages for the harm caused.

.5 If the contractor performs all the above checks and it remains impossible to know whether one or more conduits remain hidden, it will not be held responsible for service deterioration if it provides evidence in professional:

.1 No details are specified in the plans and specifications, and that the professional is unable to provide the relevant information;

.2 The owner is unable to provide details on the layout of the pipes to the work site;

.3 That the companies or their technical department can accurately locate the passage of their services;

.4 A detection test was carried out by means of a suitable apparatus, and;

.5 A specialized company was hired to search for hidden existing conduits.

.6 In this case, the costs will be borne caused the owner and will be a change order.

1.6 CONTINUITY OF SERVICES

.1 Include in submitting all necessary costs caused by damage to existing services or by making openings work or any other work. No additional claim will be subsequently granted to that effect.

.2 The contractor shall provide all temporary services required when there are changes to be made to existing facilities.

.3 When the normal operation of the facility is interrupted for the execution of works, the contractor shall provide a generator for the power requirements of the equipment and machinery needed to do the work.

.4 The price for the execution of all work requiring service interruptions and outages overtime will be included in the submission. The price for temporary connections should be included in the submission. No additional compensation will be awarded afterwards to that effect.

1.7 WORK IN AND OUTSIDE THE BUILDING OCCUPIED

.1 The contractor must receive permission from the owner before moving the equipment. Report in writing to the owner of the damaged items before handling them. Damage caused when moving the equipment will be repaired at the expense of the contractor.

.2 Protect all distribution equipment against electrical shock and mechanical damage and make them inaccessible to unauthorized personnel.

.3 If the contractor moves equipment and furniture to facilitate its work, it will submit the whole thing up after each work period and ensure that work areas, equipment and furniture are left clean and operational.

1.8 PRESERVED EQUIPMENT

.1 The Contractor shall ensure the continuity of networks, existing services from end to end for all equipment stored.

.2 The price for the execution of all work will be included in the submission of the contractor and no additional compensation will be awarded afterwards to that effect.

1.9 CONCEALED WORKS

.1 Concealing all ducts, boxes, wiring in the ceiling between ceilings between floors and in the walls, etc.

.2 Concealing all ducts, boxes, wiring except in mechanical rooms, electrical rooms in the in the local telecommunications and equipment rooms.

1.10 VERIFICATION AND IDENTIFICATION

.1 Make identification of all circuits in existing distribution panels that will be affected by the work.

.2 Provide a detailed classification of each existing distribution panel that will be affected, indicating for each circuit the circuit number, capacity and the number of poles of the existing circuit breaker the loads connected in kilowatt and details of expenses connected to the circuit. The location of all connected loads on the circuits of the existing distribution panels will appear on the final survey plans ("as built") with the numbers of circuits corresponding existing distribution panels.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 CSA International

.1 CAN/CSA-C22.2 No.18-[98(R2003)], Outlet Boxes, Conduit Boxes and Fittings.

.2 CAN/CSA-C22.2 No.65-[03(R2008)], Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).

.2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)

.1 EEMAC 1Y-2-[1961], Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

.3 National Electrical Manufacturers Association (NEMA)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

PART 2 PRODUCTS

2.1 MATERIALS

.1 Pressure type wire connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper, copper alloy sized to fit copper conductors as required.

.2 Bushing stud connectors: to NEMA to consist of:

.1 Connector body and stud clamp for stranded, round, tube, copper or aluminum bar.

.2 Clamp for stranded round, copper conductors.

.3 Clamp for stranded aluminum conductors.

.4 Stud clamp bolts.

.5 Sized for conductors as indicated.

.3 Clamps or connectors for armoured cable, TECK cable and flexible conduit as required to: CAN/CSA-C22.2 No.18.

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 wire and box connectors installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate.

.2 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Remove insulation carefully from ends of conductors and cables and:

.1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.

.2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No.65.

.3 Install bushing stud connectors in accordance with NEMA.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 This section deals with copper conductors, ACM alloy conductors, and aluminum conductors rated 0–1000 V, as well as isolation jackets, mineral jackets and most current electrical insulation. This section does not deal with submarine cables or cables used in hazardous locations, in mining, in instrumentation or in communications.

1.2 REFERENCES

.1 C22.10-10 Canadian Electrical Code, first part.

1.3 SUBMITTALS

.1 Submit documents and samples in accordance with Section 26 05 00 – Article 1.5 – Action and

.2 Product Data

.1 Submit manufacturer's printed product literature, specifications and datasheet for each cable, and include product characteristics, performance criteria and physical size.

PART 2 PRODUCTS

2.1 BUILDING WIRES

.1 Conductors: stranded for 8 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE, RWU90 XLPE.

.3 Aluminum conductors: minimum size of 1/0 AWG, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90, RWU90.

.4 Neutral supported cable: 3 phase insulated conductors of Aluminum and one neutral conductor of Aluminum steel reinforced, size as indicated. Type : NS90. Insulation : Type NS-1 rated 300 V and Type NSF-2 flame retardant rated 600 V.

2.2 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 Circuit conductors: aluminium minimum size of 1/0 AWG and as indicated.

.3 Insulation:

.1 Cross-linked polyethylene XLPE.

.2 Rating: 600 V minimum

.4 Inner jacket: polyvinyl chloride material.

.5 Armour: flat interlocking aluminum.

.6 Overall covering: thermoplastic polyvinyl chloride.

.7 Fastenings:

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

.2 Channel type supports for two or more cables

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

.8 Connectors:

.1 Watertight or explosion-proof approved for TECK cable.

2.3 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: low energy 300 V control cable: stranded annealed copper conductors sized as indicated.

.1 Insulation: PVC.

.2 Overall covering: PVC jackets interlocked armour of aluminum strip.

.3 Type: 600 V 4 stranded annealed copper conductors, sizes as indicated:

.1 Insulation: TW R90 polyethylene R90, RW90.

.2 Overall covering: thermoplastic jacket interlocked armour and jacket over sheath of PVC.

2.4 CONDUCTORS COLORS

.1 In system branch circuit, the phases colors will be black, red, blue, etc., and neutral be white.

.2 Neutral conductors will be white.

.3 Conductors used to earth equipments with specials outlet, specials outlet or isolated outlet will be green.

2.5 CONDUCTORS SIZE

.1 The minimum size for copper conductors will be No. 12 AWG, unless otherwise stated.

.2 Conductors No. 10 and smaller will be of the solid type.

.3 No. 8 Awg conductors and bigger will be stranded.

.4 The size of conductors, whose dimensions are indicated on the plans, are minimal. When conductors size are not indicated on the plans, supply and install the type and size conductors that meet the requirements of the Canadian Electrical Code, latest edition.

PART 3 EXECUTION

3.1 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 local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

.4 Entrust the execution of tests by qualified personnel.

.1 Provide necessary tools and equipment.

.5 Verify phases sequence and individually identify the conductors of each phase of each feeding branch.

.6 Verify continuity of all power branchs; ensure that they are free of short circuits and ground faults.

.1 Verify that the resistance between earth and each circuit is not less than 50 megohms.

.7 Testing prior to receiving

.1 After laying the cables, but before splicing and connection, measure the insulation resistance of each phase conductor, using a Megger 1000 V.

.2 After the execution of each splice and / or wiring, check the insulation resistance to ensure that the cable network is ready for acceptance testing.

.8 Acceptance tests

.1 Ensure all terminations and all ancillary equipments are disconnected.

.2 Connect to the ground, shields, ground wires, metal armor and conductors not subject to testing.

.3 Dielectric strength tests

.1 Do dielectric strength testing, in accordance with the manufacturer's recommendations.

.4 Leakage current test

.1 Increase voltage levels from 0 to the maximum value prescribed by the manufacturer for the type of cable being tested.

.2 Maintain the maximum voltage for the time specified by the manufacturer.

.3 Note the value of the leakage current at each level.

.9 Provide a list of test results showing the location of each test point, the circuit tested and the result of each test.

.10 Remove and replace any full length of cable that does not meet the criteria of the tests.

3.2 GENERAL CABLE INSTALLATION

.1 Conductor length for parallel feeders to be identical.

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

.3 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.

.4 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.

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

3.3 INSTALLATION OF BUILDING WIRES

.1 Elsewhere in mechanical and electricity room and unless otherwise stated in plans, provide additional green insulated conductor of appropriate size to ensure continuity in each of the ground leads of thin wall conduit (LMA type).

3.4 INSTALLATION OF TECK90 CABLE (0 -1000 V)

.1 Group cables wherever possible on channels.

.2 Install cable exposed securely supported by straps and hangers.

3.5 INSTALLATION OF CONTROL CABLES

.1 Install control cables in conduit or in cable tray

.2 Ground control cable shield.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1-[06], Canadian Electrical Code, Part 1, 20th Edition.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

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

PART 2 PRODUCTS

2.1 SPLITTERS

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

.2 Terminations: main and branch lugs or connection blocks to match required size and number of incoming and outgoing conductors as indicated.

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

2.2 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 flat covers.

PART 3 EXECUTION

3.1 SPLITTER INSTALLATION

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

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

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

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

3.3 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

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1-[06], Canadian Electrical Code, Part 1, 20th Edition.

PART 2 PRODUCTS

2.1 OUTLET AND CONDUIT BOXES GENERAL

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

.2 102 mm square or larger outlet boxes as required.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

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

2.2 GALVANIZED STEEL OUTLET BOXES

.1 One-piece electro-galvanized construction.

.2 Single device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

.3 Utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.

.4 102 mm square or octagonal outlet boxes for lighting fixture outlets.

.5 Extension and plaster rings for flush mounting devices in finished walls.

2.3 MASONRY BOXES

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

2.4 CONDUIT BOXES

.1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of devices.

2.5 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

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

.3 Conduit outlet bodies for conduit up to 35mm and pull boxes for larger conduits.

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

PART 3 EXECUTION

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

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

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

.4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Do not install reducing washers.

.5 Vacuum clean interior of outlet boxes before installation of wiring devices.

.6 Identify systems for outlet boxes as required.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section content

.1 This section covers general requirements for electrical systems identification.

1.2 DOCUMENTS/SUBMITTALS

.1 Submit samples in accordance with Section 26 05 00 - Electrical - General requirements for the results of work.

.2 Submit samples and legend designations before engrave inscriptions.

PART 2 PRODUCTS

2.1 IDENTIFICATION PLATES FOR ELECTRIC EQUIPMENTS

.1 Colors

.1 Normal network: white lettering on black background.

.2 Emergency network: white lettering on red background.

.2 Manufacturing

.1 General Characteristics: 3 mm thick plastic lamicoid or white anodized aluminum, matte finish, square corners, letters accurately aligned and etched to the machine into the core.

.2 Provide a maximum of 25 letters or digits per plate.

.3 Dimensions

.1 Comply with table below:

Size n°	Dimensions		Number of lignes	Height of letters	
	(mm x mm)	(po x po)		(mm)	(po)
1	10 x 50	3/8 x 2	1	3	(1/8)
2	13 x 75	½ x 3	1	5	(3/16)
3	13 x 75	½ x 3	2	3	(1/8)
4	20 x 100	¾ x 4	1	8	(5/16)
5	20 x 200	¾ x 8	1	8	(5/16)
6	20 x 100	¾ x 4	2	5	(3/16)
7	25 x 125	1 x 5	1	12	(1/2)
8	25 x 125	1 x 5	2	8	(5/16)
9	35 x 200	1 3/8 x 8	1	20	(3/4)
10	40 x 125	1 ½ x 5	3	6	(1/4)
11	20 x 75	¾ x 3	1	6	(1/4)

2.2 IDENTIFICATION FOR ELECTRICAL OUTLETS AND SWITCHES

.1 Materials

.1 Normal network: ribbon type "P-Touch" transparent 9 mm wide with black lettering.

.2 Emergency Network: ribbon type "P-Touch" transparent 9 mm wide with red lettering.

2.3 IDENTIFICATION FOR ELECTRICAL EQUIPMENT

.1 Materials

.1 Normal network: ribbon type "P-Touch" transparent 12 mm wide with black lettering.

.2 Emergency Network: ribbon type "P-Touch" transparent 12 mm wide with red lettering.

2.4 INSCRIPTIONS UNILINGUAL/BILINGUAL

.1 Entries for identification systems and components must be written in French.

PART 3 EXECUTION

3.1 GENERAL

.1 Provide ULC registration plates and / or CSA required by each of the respective organizations.

.2 An identification procedure of the equipment will be provided by the owner. This procedure includes a logical set of identification that identifies the device type, location, etc. Identify the equipment under this procedure.

.3 The installation of circuit identification will be carried out from each device and / or outlet, and until the main power source.

.4 Before the identification of equipment and circuits, submit to the owner for approval legend designations.

.5 The circuit numbers must be indicated on all the lids of junction boxes with a black felt pen.

3.2 LOCATION IDENTIFICATION PLATES

.1 The plates must clearly identify the devices and must be put in places where they are conspicuous and easily legible from the work floor.

.2 Do not apply paint or heatproof on identification plates.

.3 Supply and install nameplates for substations with all circuit breakers, power centers with all circuit breakers, distribution centers with all the circuit breakers, power panels, distribution panels, transformers, gutters, distribution boxes, motor control centers with all starters, variable frequency drives, starters, contactors, boards, cabinets, boxes of main, main junction boxes.

3.3 OUTLETS, SWITCHES AND OTHER SIMILAR DEVICES

.1 Install identification marks on all sockets plates, switches and similar devices.

.2 Install a tape over the whole width of the plate and return the tape to the inside of each side of the plate.

.3 Indicate the circuit numbers within all outlets boxes and switches. Use a white ribbon and secure the latter on the wiring within the box.

.4 The circuit number must be entered in full and include the switchboard number followed by the channel number (eg. PS-1, 22).

3.4 ELECTRICAL EQUIPMENT

.1 Enter the source of electrical power and equipment at the following locations:

.1 Power centers, power panels, distribution centers, distribution panels: above breakers and behind the door.

.2 Transformer, switch, gutter, distribution box, starter, contactor, variable frequency drive, panel, cabinet, pull box, junction box: the outer casing.

.2 Enter the name of the device served by the following facilities:

.1 Starter, contactor, motor control center, variable frequency drive, disconnect the upper part of the housing of each device.

.3 Identify distribution boxes with identification marks.

3.5 EXISTING NETWORK

.1 Indicate circuit numbers on all junction boxes of existing circuits to retain or relocate with a black felt.

.2 When the wiring of a circuit is removed to a junction box, write on it the channel number with the inscription "RESERVE".

3.6 DESIGNATION OF WIRING

.1 The conductors will be identified by the color code ACNOR C22.10-2007.

.2 In all junction boxes, each conductor will be identified by number, and the circuit loop and using Electrovert identification of "Z" type suitable for the size of the wire used or stickers made from a printer designed for this purpose.

3.7 CONDUITS, BOXES ET CABLES DESIGNATION

.1 Assign a color code to the pipes and metal sheathed cables.

.2 Apply color pins (plastic tape or paint) on the cables or pipes every 15 m and at the points where they penetrate a wall, ceiling or floor.

.3 Permanently and indelible mark using a colored plastic tape drivers for each power circuit. The contractor shall identify phases according to the color codes indicated in the following table:

COLOR CODES OF WIRING OF THE BUILDING	
Phase A	Red
Phase B	Black
Phase C	Blue
Neutre	White
Ground	Green
Isolated ground	Green and yellow
Use the appropriate tape 3M brand at all points of the systems 600 V, 208/120 V and 240/120 V, normal and normal / emergency	

.4 Color table identifications for outlet boxes and conduits

Networks	**Identification color**
Fire Alarm	Red
Communication (phone/data)	Green
Guard call	Green + yellow stripe
General call	Green + white stripe
Control (see mecanical quote)	Orange
Access control and surveillance camera	Orange + white stripe
Distribution up to 250 V, normal	Yellow
Distribution up to 250 V, emergency U1 for people safety	Yellow + red stripe
Distribution up to 250 V, emergency U2 for vitals loads and timed vital	Yellow + 2 red stripes
Distribution up to 250 V, emergency U3 for loads on emergency other than U1 and U2	Yellow + 3 red stripes
Distribution up to 250 V, emergency UPS2 for vital loads and timed vital uninterruptible	Yellow + 2 red stripes + white stripe
Distribution up to 250 V, emergency UPS3 for load on emergency uninterruptibles other than UPS2	Yellow + 3 red stripes + white stripe
Distribution of 250 to 600 V, normal	Blue
Distribution of 250 to 600 V, emergency U1 for people safety	Blue + red stripe

Distribution of 250 to 600 V, emergency U2 for vital loads and timed vital	Blue + 2 red stripes
Distribution of 250 to 600 V, emergency U3 for emergency loads other than U2 or U3	Blue + 3 red stripe
Ground	Green + Green stripe
Television/cable	Black + white stripe

.5 Apply color bands on conduits heretofore prescribed with ribbons. The base color strip should be at least 38 mm or twice the width of the complementary color, the complementary band has a width of 25 mm. This color code must be identifiable on the entire outer surface of the conduits.

.6 The strips will be applied according to the following guidelines:

.1 Every 15 m (50 ').

.2 Where conduits penetrate a wall, ceiling, floor: duct must be identified on each other (reasonably close) of the wall crossed.

.3 When the conduits encounter a junction or pull box: near the junction box or the pull box.

.4 The midpoint of the curved section of a conduit, even if the distance between the strips is less than 15 m.

.5 On the lids of the boxes (on the face side), indicate the circuits numbers and the number of the panel, or its function. Use a "P-Touch" type.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 CSA International

.1 CSA C22.2 No.42-[10], General Use Receptacles, Attachment Plugs and Similar Devices.

.2 CAN/CSA C22.2 No.42.1-[00(R2009)], Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).

.3 CSA C22.2 No.55-[M1986(R2008)], Special Use Switches.

.4 CSA C22.2 No.111-[10], General-Use Snap Switches (Bi-national standard, with UL 20).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for wiring devices and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: submit operation and maintenance data for wiring devices for incorporation into manual.

PART 2 PRODUCTS

2.1 RECEPTACLES

.1 Duplex receptacles, CSA type 5-15 R, 125 V, 15 A, U ground, to: CSA C22.2 No.42 with following features:

.1 White urea moulded housing.

.2 Suitable for No. 10 AWG for back and side wiring.

.3 Break-off links for use as split receptacles.

.4 Eight back wired entrances, four side wiring screws.

.5 Triple wipe contacts and rivetted grounding contacts.

.2 Single receptacles CSA type 5-15 R, 125 V, 15 A, U ground with following features:

.1 White urea moulded housing.

.2 Suitable for No. 10 AWG for back and side wiring.

.3 Four back wired entrances, 2 side wiring screws.

.3 Other receptacles with ampacity and voltage as indicated.

.4 Receptacles of one manufacturer throughout project.

2.2 COVER PLATES

.1 Cover plates for wiring devices to: CSA C22.2 No.42.1.

.2 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.

.3 Stainless steel, vertically brushed, 1 mm thick cover plates, for wiring devices mounted in flush-mounted outlet box.

.4 Sheet metal cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.

.5 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.

.6 Weatherproof spring-loaded [cast aluminum] cover plates complete with gaskets for single receptacles or switches.

2.3 SOURCE QUALITY CONTROL

.1 Cover plates from one manufacturer throughout project.

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 wiring devices installation in accordance with manufacturer's written instructions.

.1 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Receptacles:

.1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.

.2 Mount receptacles at height in accordance with Section 26 05 00 - Common Work Results for Electrical.

.3 Where split receptacle has one portion switched, mount vertically and switch upper portion.

.4 Install GFI type receptacles as indicated.

.2 Cover plates:

.1 Install suitable common cover plates where wiring devices are grouped.

.2 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

3.3 PROTECTION

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

.2 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.

.3 Repair damage to adjacent materials caused by wiring device installation.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 CSA International

.1 CSA C22.2 No. 5-F02, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, and NMX-J-266-ANCE-2010).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 26 05 00 – Common Work Results for Electrical.

.2 Include time-current characteristic curves for breakers with ampacity of 60 A and over.

PART 2 PRODUCTS

2.1 BREAKERS GENERAL

.1 For all new circuit breakers 600 V, provide the original certificate with the proof of purchase. No used or reconditioned breaker will be accepted.

.2 Moulded-case circuit breakers, circuit breakers and ground-fault circuit-interrupters: to CSA C22.2 No. 5

.3 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40 degrees C ambient.

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

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

.6 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.

.1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.

.7 Circuit breakers with interchangeable trips as indicated.

.8 Circuit breakers to have interrupting capacity rating as indicated.

2.2 THERMAL MAGNETIC BREAKERS [DESIGN A]

.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.

2.3 CURRENT LIMITING AND SERIES RATED THERMAL MAGNETIC BREAKERS

.1 Thermal magnetic breakers with current limiters.

.1 Time current limiting characteristics of fuse limiters coordinated with time current tripping characteristics of circuit breaker.

.2 Co-ordination to result in interruption by breaker of fault-level currents up to interrupting capacity of breaker.

.2 .2 Series rated breakers are not accepted.

2.4 SOLID STATE TRIP BREAKERS

.1 Moulded case circuit breaker to operate by means of solid-state trip unit with associated current monitors and self-powered shunt trip to provide inverse time current trip under overload condition, and [long time] [short time] [instantaneous] tripping for [phase] [ground] fault short circuit protection.

2.5 OPTIONAL FEATURES

.1 Include:

.1 Shunt trip.

.2 Auxiliary switch.

.3 Motor-operated mechanism [c/w time delay unit].

.4 Under-voltage release.

.5 On-off locking device.

.6 Handle mechanism.

2.6 MANUFACTURERS

.1 Recognized manufacturers : Eaton Yale (Cutler Hammer), Siemens ou Schneider (Square-D).

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install circuit breakers as indicated.

.2 During the work, the contractor shall provide multipole breakers wherever replace the wiring of stranded wire cabling and even if the plans show a two-wire power supply with single-pole circuit breaker.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section31 23 33.01 – Excavating, Trenching and Backfilling.

.2 Section 33 36 33 – Utility Drainage Field

1.2 REFERENCES

.1 ASTM International

.1 ASTM D4791-[10], Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for aggregate materials

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Transportation and Handling: handle and transport aggregates to avoid segregation, contamination and degradation.

.3 Storage: store washed materials or materials excavated from underwater 24 hours minimum to allow free water to drain and for materials to attain uniform water content.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.

.2 Flat and elongated particles of coarse aggregate: to ASTM D4791.

.1 Greatest dimension to exceed [5] times least dimension.

.3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:

.1 Screenings produced in crushing of quarried rock, boulders, gravel or slag.

.2 Reclaimed asphalt pavement.

.3 Reclaimed concrete material.

.4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:

.1 Crushed rock.

.2 Gravel [and crushed gravel] composed of naturally formed particles of stone.

.3 Light weight aggregate, including slag and expanded shale.

.4 Reclaimed asphalt pavement.

.5 Reclaimed concrete material.

2.2 SOURCE QUALITY CONTROL

.1 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source.

.2 Advise Consultant four (4) weeks minimum in advance of proposed change of material source.

.3 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions are acceptable for topsoil stripping.

.1 Visually inspect substrate in presence of Consultant.

.2 Inform Consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with topsoil stripping only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 PREPARATION

.1 Topsoil stripping:

.1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.

.2 Begin topsoil stripping of areas as indicated after area has been cleared of [brush] and removed from site.

.3 Avoid mixing topsoil with subsoil.

.4 Stockpile height not to exceed 2 m.

.2 Stockpiling:

.1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Consultant. Do not stockpile on completed pavement surfaces.

.2 Stockpile aggregates in sufficient quantities to meet project schedules.

.3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

.4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.

.5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.

.6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Consultant within 48 hours of rejection.

.7 Stockpile materials in uniform layers of thickness as follows:

.1 Maximum 1.5 m for coarse aggregate and base course materials.

.2 Maximum 1.5 m for fine aggregate and sub-base materials.

.3 Maximum 1.5 m for other materials.

.8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.

.9 Do not cone piles or spill material over edges of piles.

.10 Do not use conveying stackers.

.11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.3 CLEANING

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.

END OF SECTION

Earthwork – Clearing and Grubbing
Section 31 11 00

PART 1 GENERAL

1.1 WORK DESCRIPTION

.1 Contractor must supply required labour, materials, equipment and services for completion of Work, including, but not limited to, clearing, grubbing, underbrush clearing, recovery and storage of topsoil, transportation of rubbish to disposal site approved by MDDELCC and all related work.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 CLEARING

.1 Contractor must supply required labour, tools, machinery and materials for completion of all clearing and grubbing work in area indicated in plans.

.2 Work includes:

.1 Establishment of outline and reference points;

.2 Clearing, underbrush clearing and grubbing;

.3 Preservation of certain trees;

.4 Separation of wood and waste;

.5 Cleaning of Work site.

.3 Contractor must establish location and exact outline of clearing as indicated in plans and obtain specific authorization from Engineer before starting clearing work.

3.2 CLEARING, UNDERBRUSH CLEARING AND GRUBBING

.1 Clearing, underbrush clearing and grubbing are included in Bid price and must be done in locations necessary for completion of Work.

3.3 SEPARATION OF WOOD AND WASTE

.1 Contractor must completely remove from Project site all branches, stumps and roots; all deadwood; and other waste from clearing, grubbing and underbrush clearing completed by Contractor. Rubbish to be disposed of in accordance with requirements of *Regulation respecting solid waste* (R.R.Q. 1988, chapter Q-2, r.14).

3.4 REUSABLE WOOD

.1 Parks Canada does not keep wood, Contractor must dispose of it off site at its own expense.

3.5 PRESERVATION OF TOPSOIL

.1 Preservation of topsoil during construction Work to be ensured as follows:

.1 Topsoil to be separated from inert soil and stored in Work site.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 33 31 13 – Public Sanitary Utility Sewerage Piping.

1.2 REFERENCES

.1 Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques

.2 Statutes and Regulations of the Ministry

.3 Bureau de normalisation du Québec

.4 BNQ 1809-300/2004 (R2007): Construction Work - General Technical Specifications - Drinking Water and Sewer Lines.

.5 Government of Quebec, ministère des Transports

.6 Normes, Tome VII: Matériaux (lastest version)

.7 American Society for Testing and Materials International (ASTM)

.1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D422-63-2002, Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600 kN-m/m^3).

.5 ASTM D1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3) (2,700 kN-m/m^3).

.6 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.3 DEFINITIONS

.1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.

.1 Rock : solid material in excess of 0.5 m3 and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 m3 bucket. Frozen material not classified as rock.

.2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

.2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.

.3 Topsoil:

.1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.

.4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.6 Unsuitable materials:

.1 Weak, chemically unstable, and compressible materials.

.2 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136 : Sieve sizes to CAN/CGSB-8.1

.2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45

.3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

.7 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Quality Control: in accordance with Section 01 45 00 - Quality Control:

.1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.

.2 Submit for review by Consultant proposed dewatering methods as described in PART 3 of this Section.

.3 Submit to Consultant written notice at least 7 days prior to excavation work, to ensure cross sections are taken.

.4 Submit to Consultant written notice when bottom of excavation is reached.

.5 Submit to Consultant results, testing and inspections report as described in PART 3 of this Section.

.3 Preconstruction Submittals:

.1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.

.4 Samples:

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

.2 Inform Consultant at least 4 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.

.3 Submit 70 kg samples of type of fill specified

.4 Ship samples prepaid to Consultant, in tightly closed containers to prevent contamination and exposure to elements.

1.5 QUALITY ASSURANCE

.1 Qualification Statement: submit proof of insurance coverage for professional liability.

.2 Submit design and supporting data at least 2 weeks prior to beginning Work.

.3 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Quebec.

.4 Keep design and supporting data on site.

.5 Do not use soil material until written report of soil test results are reviewed and approved by Consultant.

.6 Health and Safety Requirements:

.1 Do construction occupational health and safety.

1.6 WASTE MANAGEMENT AND DISPOSAL

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

.2 Divert excess aggregate materials from landfill to local recycling facility for reuse as directed by Consultant.

1.7 EXISTING CONDITIONS

.1 Examine soil report

.2 Buried services:

.1 Before commencing work verify and establish location of buried services on and adjacent to site.

.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

.3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.

.4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.5 Prior to beginning excavation Work, establish location and state of use of buried utilities and structures and notify Consultant.

.6 Confirm locations of buried utilities by careful test excavations.

.7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.

.8 Where utility lines or structures exist in area of excavation, obtain direction of Consultant before removing.

.9 Record location of maintained, re-routed and abandoned underground lines.

.10 Confirm locations of recent excavations adjacent to area of excavation.

.3 Existing buildings and surface features:

.1 Conduct, with Consultant, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Consultant

PART 2 PRODUCTS

2.1 MATERIALS

.1 Fill CG-14 : In accordance with CCDG 2101 and Ministère des Transports standards.

.2 Fill MG-20 (type 1) : In accordance with CCDG 2101 and Ministère des Transports standards.

.3 Fill MG-112 (type 2) : In accordance with CCDG 2101 and Ministère des Transports standards.

.4 Type 3 fill: selected material from excavation or other sources, approved by Engineer for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.

.5 Borrow quarry pit run.

2.2 GRADATION OF MG 20, MG 112, CG 14 FILL MATERIALS

.1 As follows :

Sieve Sizes (mm)	% passant (according to MTQ-2010)		
	CG 14	MG 20	MG 112
112 mm	none	none	100
31,5 mm	none	100	none
20 mm	100	90 – 100	none
14 mm	none	68 – 93	none
5 mm	35 – 100	35 – 60	12 – 100
1,25 mm	none	19 – 38	none
0,315 mm	none	9 – 17	none
0,160 mm	none	none	none
0,080 mm	0 – 10,0	2 – 7	0 - 10

Note : « none » (not used) means there are no requirements for sieve.

PART 3 EXECUTION

3.1 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.2 PREPARATION/PROTECTION

.1 Protect existing features.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Consultant approval.

.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.5 Protect buried services that are required to remain undisturbed.

3.3 STOCKPILING

.1 Stockpile fill materials in areas designated by Consultant.

.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

.3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

.4 No fill or borrow material can be placed outside construction boundaries.

3.4 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Provide for Consultant's approval details of proposed dewatering

.3 Protect open excavations against flooding and damage due to surface run-off.

.4 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures collection runoff areas and in manner not detrimental to public and private property, or portion of Work completed or under construction.

.1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

.5 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

3.5 EXCAVATION

.1 Advise Consultant at least 7 days in advance of excavation operations for initial cross sections to be taken.

.2 Excavate to lines, grades, elevations and dimensions as indicated

.3 Remove concrete masonry paving walks demolished foundations and rubble and other obstructions encountered during excavation

.4 Excavation must not interfere with bearing capacity of adjacent foundations.

.5 Do not disturb soil within branch spread of trees or shrubs that are to remain.

.1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.6 Restrict vehicle operations directly adjacent to open trenches.

.7 Eliminate surplus and unsuitable excavated material from site.

.8 Do not obstruct flow of surface drainage or natural watercourses.

.9 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.10 Notify Consultant when bottom of excavation is reached.

.11 Obtain Consultant approval of completed excavation.

.12 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Consultant.

3.6 BEDDING AND SURROUND OF UNDERGROUND SERVICES

.1 Place and compact granular material for bedding and surround of underground services as indicated Section 33 31 13 - Public Sanitary Utility Sewerage Piping

.2 Place bedding and surround material in unfrozen condition.

3.7 ENVIRONMENTAL PROTECTION

.1 Goal of protection measures is to control and contain sediments within site, protect slopes and stockpiles from erosion, promote natural infiltration of water and control run-off during and after Work.

.2 Soil protection measures against aerial and hydraulic erosion

.1 Cover Work site surfaces with stable material, such as sod, gravel or geotextile membrane.

.2 Maintain at minimum reserves of loose material, such as sand, soil or gravel. Materials stockpiled over 2.0 m high should be protected from erosion by canvases or membranes.

.3 During dry weather, water site for dust control.

.3 Protection measures against release of sediment in drainage system or environment

.1 Arrange sloping surfaces towards inside of Work site to avoid run-off water cleaning material towards outside of Work site.

.2 Install geotextile membrane under sump grills impacted by Work site operations.

.3 Arrange 20-56 mm clean stone treadways to help clean tires of Work site vehicles and machinery.

.4 Arrange silt fences to protect areas surrounding Work site.

.5 Water cleared from Work site should be pre-filtered.

.6 As needed, clean surrounding roads using mechanical broom.

.4 Maintenance activities

.1 Inspect installations periodically and clean after each period of rain or snow.

.2 Maintain entrances in good condition to prevent traces or sediment deposits on public roads. On treadways, depending on Work site conditions, add or replace 20-56 mm clean stone.

.3 Clean sediment landed or left on public roads.

3.8 BACKFILLING

.1 Do not proceed with backfilling operations until completion of following:

.1 Consultant has inspected and approved installations.

.2 Consultant has inspected and approved of construction below finish grade.

.3 Inspection, testing, approval, and recording location of underground utilities.

.4 Removal of concrete formwork.

.5 Removal of shoring and bracing;

.6 Backfilling of voids with satisfactory soil material.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.5 Backfilling around installations:

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

.3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 0.5 m.

.4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:

.1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Consultant:

.2 If approved by Consultant, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Consultant.

3.9 RESTORATION

.1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21 - Construction/Demolition Waste Management and Disposal, trim slopes, and correct defects as directed by Consultant.

.2 Replace topsoil as directed by Consultant.

.3 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.

.4 Clean and reinstate areas affected by Work as directed by Consultant.

.5 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

3.10 FIELD QUALITY CONTROL

.1 Where tests or inspections by testing laboratory reveal Work or materials not in accordance with Contract requirements, Contractor pays costs for additional tests as required by Engineer to verify acceptability of corrected Work. Same for required tests to verify materials in place after correction.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL

.1 Supply and placement of non-woven geotextiles as separators between infrastructure to facilitate evapo-transpiration and oxygen transfer of drain fields.

1.2 REFERENCES

.1 Bureau de normalisation du Québec

.1 BNQ 1809-300/2004 (R2007): Construction Work - General Technical Specifications - Drinking Water and Sewer Lines.

.2 Government of Quebec, ministère des Transports

.1 Normes, Tome VII: Matériaux (lastest version)

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.

.2 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.

.3 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.

.4 No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.

.5 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.

.6 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.

.4 ASTM International

.1 ASTM D4491-99a (2009), Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

.2 ASTM D4595-09, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.

.3 ASTM D4716-08, Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.

.4 ASTM D4751-04, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

1.3 DELIVERY, STORAGE AND HANDLING

.1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dust, debris and rodents.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

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

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

.4 Fold up metal banding, flatten and place in designated bins.

PART 2 PRODUCTS

2.1 MATERIAL

.1 Geotextile: non-woven synthetic fibre fabric, supplied in rolls.

.2 Physical properties:

Thickness :	0.6 mm ± 15%
Tear resistance :	60 N
Tensile strength min. :	180 N
Elongation at break :	55 à 95 %
Pore opening size :	180 µm
Bursting strength min. :	500 kPa

PART 3 EXECUTION

3.1 INSTALLATION

.1 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.

.2 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.

.3 Overlap each successive strip of geotextile 600 mm over previously laid strip.

.4 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.

.5 After installation, cover with overlying layer within 4 hours of placement.

.6 Replace damaged or deteriorated geotextile to approval of Consultant.

3.2 CLEANING

.1 Remove construction waste from site and dispose of in accordance with regulatory requirements.

3.3 PROTECTION

.1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

PART 2 PRODUCTS

2.1 TOPSOIL

.1 Topsoil should be recovered for replacement. It is not permitted to add topsoil from outside the Park.

PART 3 EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to watercourse, according to requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 STRIPPING OF TOPSOIL

.1 Begin topsoil stripping of areas as indicated after area has been cleared of brush and removed from site.

.2 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.

.3 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill as directed by Consultant.

.4 Protect stockpiles from contamination and compaction.

3.3 PREPARATION OF EXISTING GRADE

.1 Verify that grades are correct.

.1 If discrepancies occur, notify Consultant and do not commence work until instructed by Consultant.

.2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.

.3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.

.1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.

.2 Remove debris which protrudes more than 75 mm above surface.

.3 Dispose of removed material off site.

3.4 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

.1 Place topsoil after Consultant has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 150 mm.

.3 Topsoil should be recovered for replacement.

.4 Put in place a coco fiber mat to stabilize soils.

.5 Any form of seeding is prohibited.

3.5 FINISH GRADING

.1 Grade to eliminate rough spots and low areas and ensure positive drainage.

.1 Prepare loose friable bed by means of cultivation and subsequent raking.

.2 Consolidate topsoil to leave surfaces smooth, uniform and firm against deep footprinting.

3.6 ACCEPTANCE

.1 Consultant will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.7 SURPLUS MATERIAL

.1 Dispose of materials except topsoil not required where directed by Consultant.

3.8 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 – Excavating, Trenching and Backfilling

.2 Section 01 11 00 – Summary of Works.

1.2 REFERENCES

.1 ASTM International

1. ASTM F1732-12-, Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer and Drain Pipe Containing Recycled PVC Material.
2. ASTM D3034-[08], Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

.2 Bureau de Normalisation du Québec (BNQ)

1. BNQ 3624-050 Unplasticized Poly(Vinyl Chloride) [PVC-U] Perforated Pipe and Fittings - Pipes of 150 mm in Diameter or Smaller for UndergroundDispersion of Effluents
2. BNQ 3624-130 Unplasticized Poly(Vinyl Chloride) [PVC-U] Pipe and Fittings - Pipes of 150 mm in Diameter or Smaller

PART 2 PRODUCTS

2.1 PLASTIC PIPE

.1 Type PSM Polyvinyl Chloride (PVC): to references.

.1 50, 75 and 100 mm de diameter of minimal rigidity of 320 kPa.

.2 Manholes are prefabricated

.3 Backfill around the pipe is CG-14

PART 3 EXECUTION

3.1 TRENCHING

.1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Trench alignment and depth require approval of Consultant prior to placing bedding material and pipe.

3.2 GRANULAR BEDDING

.1 Place granular bedding materials in uniform layers not exceeding 300 mm compacted thickness Compact each layer full width of bed to at least 95% corrected maximum dry density.

.2 Fill excavation below bottom of specified bedding adjacent to manholes or structures with lean mix concrete.

3.3 INSTALLATION

.1 Lay and join pipes in accordance with manufacturer's recommendations and to approval of Consultant.

.2 Handle pipe using methods approved by Consultant.

1. Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.

.3 Begin laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.

.4 Water to flow through pipe during construction, only as permitted by Consultant.

.5 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.

.6 Pipe jointing:

1. Install gaskets in accordance with manufacturer's written recommendations.
2. Support pipes as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
3. Align pipes before joining.
4. Maintain pipe joints free from mud, silt, gravel and foreign material.
5. Avoid displacing gasket or contaminating with dirt or foreign material. Gaskets so disturbed to be removed, cleaned and lubricated and replaced before joining is attempted.
6. Complete each joint before laying next length of pipe.
7. Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations. Cut pipes as required for special inserts, fittings or closure pieces as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
8. Use shrinkage compensating grout when suitable gaskets are not available.

3.4 PIPE SURROUND

.1 Place surround material in unfrozen condition.

.2 Upon completion of pipe laying, and after Consultant has inspected pipe joints, surround and cover pipes as indicated.

.3 Hand place surround material in uniform layers not exceeding 300 mm compacted thickness as indicated.

.4 Place layers uniformly and simultaneously on each side of pipe.

.5 Compact each layer from pipe invert to mid height of pipe to at least 95% corrected maximum dry density.

.6 Compact each layer from mid height of pipe to underside of backfill to at least 90%

3.5 BACKFILL

.1 Place backfill material in unfrozen condition.

.2 Place backfill material, above pipe surround in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.

.3 Compact backfill to at least 90% corrected maximum dry density.

3.6 FIELD TESTING

.1 Repair or replace pipe, pipe joint or bedding found defective.

.2 Remove foreign material from sewers and related appurtenances by flushing with water.

.3 Perform infiltration and exfiltration testing as soon as practicable after jointing and bedding are complete, and service connections have been installed.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 REFERENCES

.1 ASTM International

.1 ASTM C117-[04], Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136-[06], Standard Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D698-[07e1], Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3(600 kN-m/m^3)).

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-[88], Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-[M88], Sieves, Testing, Woven Wire, Metric.

.3 CSA International

.1 CSA A23.1/A23.2-[09], Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CSA A23.4-[09], Precast Concrete-Materials and Construction.

.3 CSA B66-[10], Design, Material and Manufacturing Requirements for Prefabricated Septic Tanks and Sewage Holding Tanks.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3.1 PRODUCT DATA

.1 Submit manufacturer's instructions, printed product literature and data sheets for utility septic tanks and treatment equipments. Manufacturer’s instructions must include product characteristics, performance criteria, physical size, finish and limitations.

1.3.2 SHOP DRAWINGS

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Canada.

.2 Shop Drawings: to CSA A23.4.

.1 Indicate on drawings:

.1 Design calculations for items designed by manufacturer.

.2 Tables and bending diagrams of reinforcing steel.

.3 Camber.

.4 Formwork.

.5 Finishing schedules.

.6 Methods of handling and erection.

.7 Storage facilities.

.8 Openings, sleeves, inserts and related reinforcement.

1.3.3 OPERATING AND MAINTENANCE MANUAL

.1 Before provisional acceptance, the Contractor shall provide a first version of the operating and maintenance manual for approval by the Engineer.

.2 After acceptance by the Engineer of the first version, the Contractor will provide three (3) copies before final acceptance of the works. Each manual should contain:

.1 The technical specifications of the equipments including the contact details of suppliers and subcontractors;

.2 Plate data (brand, size, capacity and serial number);

.3 Description of operation and maintenance instructions;

.4 Minimum spare parts list ;

.5 “Trouble-shooting" Detection deficiencies guide ;

.6 Electrical and control diagrams and a description of operating and control modes;

.7 Shop drawings "as-built";

.8 Guarantees and securities indicating the name and address of the manufacturers and their representatives in Quebec, the effective date of the guarantee, date of final certificate of completion, the duration of the guarantee, subject to the guarantee and the remedy offered by the guarantee, the signature of the Contractor.

.3 The manuals must consist of loose sheets, 8 ½ x 11 inch, in a ring binder with a vinyl hardcover.

.4 Manuals must be bilingual.

.5 The manuals should be divided into sections, as shown below, and each section must be clearly identified by a labeled tab fixed to a division card stock:

A title page identifying :

- The client with complete address;
- Supplier name with complete address.

A second page showing :

- Identification of equipment - name and trademark;
- Equipment location;
- Supplier order number;
- Model number;
- Serial number;
- Significant overall dimensions;
- Date of manufacture;
- Delivery date.

A third page showing :

- A table of contents describing the manual sections:

Section 1 : Introduction

- general information (Supplier brochure describing equipment);
- description of equipment warranty (date, purpose, duration, etc.);
- procedure in case of damage during shipping, mistakes;
- storage of equipment, assembled or not.

Section 2 : Installation (assembly and installation)

- Installation drawings with detailed dimensions;
- installed equipment shop drawings;
- general guidelines recommended for installation;
- Special instructions for the specific project;
- anchoring drawings, if appropriate;
- electrical connections with drawings, if appropriate;
- mechanical and plumbing connections with drawings, if appropriate.

Section 3 : Commissioning and operation

- relation between the equipment concerned and related equipment;
- general and specific safety instructions;
- drawings of the control system; components of the control box and description of the front of the case;
- starting and stopping;
- normal operation: manual, automatic;
- abnormal operation: troubleshooting guide, emergency procedures.

Section 4 : Controls and protection

- controls by others equipments;
- thermal and other protections;
- adjustments and calibrations;
- signals, alarms and telemetry;
- operating hours counter;
- operating timer;
- heating and ventilation.

Section 5 : Preventive and corrective maintenance

- cleaning: frequency, method, products;
- lubrication : frequency, method, product;
- adjustments: frequency, method, product;
- list of things to check;
- troubleshooting guide;
- procedures in case of damage or major repairs.

Section 6 : Inventory of parts and supplies

- complete parts list with exploded view (drawing) of equipment and numbered parts;
- list of system parts with name, address and telephone number of the supplier;
- list of local specialists to consult for repair (eg electrician, plumber, etc.) with name, address and telephone number;
- inventory of parts and products provided.

The manual content must be adjusted for works or specified equipment. However, the terms of this section must be met by the Contractor as to the sections, the principle and manual format.

1.4 DESIGN

.1 Following the contract award, the Contractor shall submit for the secondary advanced treatment system :

.1 Drawing of the entire process (signed and sealed by an engineer member of OIQ);

.2 Certification of the « Comité d'Évaluation des Nouvelles technologies de traitement des eaux usées d'origine domestique » ;

.3 The manufacturer of prefabricated tanks should submit the necessary documentation demonstrating compliance and application of tests indicated in his quote. If required, drawings signed by a member of the OIQ is required.

1.5 QUALITY ASSURANCE

.1 Manufacturers and erectors of precast concrete elements are to be certified by CSA as meeting requirements of CSA A23.4.

1.6 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 and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect utility septic tanks from scratches.

.3 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS – SEPTIC TANKS

.1 Design precast septic tank in accordance with CSA B66, and to carry handling stresses and indicated service loads.

.2 Pretreatment must be a septic tank with a retention time of at least 2.0 days. The outlet of the septic tank will be provided with an appropriately dimensioned pre-filter and a high-level alarm in case of clogging.

.3 The capacity of septic tanks must consider the design and volume of flow required upstream of advanced secondary treatment system.

2.2 DESIGN REQUIREMENTS – TREATMENT SYSTEM

.1 The treatment system will produce an advanced secondary effluent to allow discharge to a polishing field as prescribed by Section 9.2 of the “Guide pour l’étude des technologies conventionnelles de traitement des eaux usées”. The characteristics of an advanced secondary effluent as prescribed by the MDDELCC are CBOD5 a lower concentration than or equal to 15 mg / l, a lower SM concentration or equal to 15 mg / l and lower faecal coliform concentration or equal to 50 000 CFU / 100 ml. The performance must have been established by a third party for each season in a hardiness zone equivalent or less of the area within where is located La Mauricie National Park. A minimum of 30 parameter measurements over a period of one year is required for the establishment of the treatment class.

.2 Biological reactor must be recognized as standard technology by the Ministry of Environment (MDDELCC).

.3 The reactors must be fully pre-assembled prior to delivery to site.

.4 Treatment system must be fully buried and discreet. It must be light enough to avoid the use of crane or imposing mechanical equipment to minimize deforestation or destruction of the installation site environment. The level of mechanization should be low without compromising robustness to process hydraulic and organic peaks. Similarly, energy costs should be less than 0.2 kW / m^3. The addition of coagulant or flocculant chemical or chemical dosing for the reduction of suspended solids is prohibited. The treatment system includes a bacterial support, it must be fixed and permanent. The operation of the treatment system must be performed by unskilled personnel in the wastewater treatment process that received basic training.

.5 Biological reactor should contain an equivalent retention time then the pretreatment and be separated into 2 sections in proportions 2/3- 1/3.

.6 If required, UV disinfection systems should be integrated in the final section of the reactor.

.7 Secondary sludge management must be integrated into the reactor. The treatment system will include a recirculation line to allow a better contact time in the reactor.

.8 All tanks for solids accumulation must be sized to allow emptying frequency at minimally two years.

.9 The technology must be installed on a minimum of 5 similar sites for over 5 years on the Canadian territory.

.10 When indicated on drawings, control panel and other accessories required for the treatment system must be installed in a weatherproof cabinet outside the service building. The cabinet shall provide junction boxes for electrical connection. The installation shall not exceed 80% of the circuit breaker installed in the power supply.

2.3 FLOW DESIGN

.1 Septic tanks and biological reactors will be able to process the following domestic wastewater flows:

Site	Flow design (L/d)
16 –La Clairière Camping	6 000 (without secondary advanced treatment system)
17 – Picnic Shewenegan	16 000
20 – Visitor reception center St-Mathieu	11 100 (with UV)

2.4 TANKS

.1 Tanks shall be made of Fiberglass reinforced plastic of single wall construction.

.2 The tank must be installed as specified in the manufacturer's instruction manual.

.3 The anchoring system is not required.

.4 Tank must be made according to the requirements of ULC-S615-98 standard.

.5 Loading Conditions, when installed according to manufacturer's instructions, the tank shall meet the following design conditions :

.1 The tank shall withstand external loads due to soil and water table with a 3:1 safety factor against failure and without deflection beyond manufacturer's recommended limits. Such loading shall be considered with tank empty of all liquid and external water levels at surface of backfill.

.2 Tanks shall withstand surface H-20 axle loading of any position over the tank without failure or deflection beyond manufacturer's recommended limits.

.3 Tanks shall resist continuous uplifting forces due to ground water pressure without rising or deflection beyond manufacturer's recommended limits. Such loading shall be considered with tank empty of all liquid and external water level at surface of backfill.

.6 Sealing of tank must be tested at the factory.

2.5 ACCESS OPENINGS - FIBREGLASS OR HDPE LIDS

.1 Manholes shall be provided to facilitate cleaning and inspections.

.2 The Contractor shall provide and install fiberglass or HDPE lids for all openings.

.3 Frames are built into factory prefabricated tanks.

.4 Lids are bolted to the frames using bolts and stainless steel washers and nuts (or other fastener) and must be secured to the frame.

.5 An isolated lid with a thickness of 50 mm and a diameter equivalent to the access must be placed under the lid of fiberglass. The insulated lid is covered with a material that maintains its integrity on both surfaces.

2.6 VENT

.1 A vent filter with activated carbon must be provided and installed at the end of all ventilation masts of all basins.

.2 The filter must be PVC treated to resist UV rays and must be fitted with a cap to prevent water infiltration, snow, etc. The filter should be installed in the ventilation mast tip and be securely fastened.

.3 Ventilation masts are 316 stainless steel and have a diameter of 100 mm.

2.7 JUNCTION BOXES AND ELECTRICAL CONDUIT

.1 Junction boxes will have to be fixed to the ventilation mast of the tank.

.2 No junction box is permitted inside the tanks, except for the junction box of the high-level float prefilter of the septic tank.

.3 Each conduit will contain either power cables or control cables, but never both.

2.8 PREFILTERS

.1 The septic tank is equipped with a prefilter Model PL-525 of Polylok.

.2 The prefilter must be securely fixed so that its weight can be supported when the pre-filter is clogged and the tank is completely empty.

.3 A high level float is required on the prefilter. The high level float is connected to a high level alarm for the pre-filter to be installed in the global panel processing system.

2.9 MANUFACTURE

.1 Manufacture units in concrete in accordance to CSA A23.4.

2.10 FINISHES

.1 Finish tanks in concrete to CSA A23.4, commercial grade.

2.11 BEDDING AND BACKFILL MATERIAL

.1 In accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate are acceptable for utility septic tank and treatment systems 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 ASSEMBLY

.1 In any case tape cannot be used to attach or fix electrical wire in the tanks. Wraps ties of appropriate size should be used.

.2 All fasteners equipment and accessories must be in stainless steel.

.3 All parts used are industrial grade and resistant to corrosion to ensure proper operation of tanks and components for an extended period.

.4 All components of the tanks are assembled in such a way that none of the components not adversely affect the operation of another.

.5 Each component is accessible from outside the tank to ease maintenance and repair. Wherever possible, all parts must be easily dismantled without being necessary to remove other components than those covered by the repair. The use of toric unions is recommended for all areas where equipment is to be connected / removed quickly, such as pumps.

3.3 INSTALLATION

.1 Place bedding and surround material in unfrozen condition.

.2 Do excavation in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.3 Place tank bedding material in accordance with details as indicated.

.1 Compact to 95% corrected maximum dry density.

.4 Make inlet and outlet joints of septic tank watertight

.5 Conduct leakage test on septic tank in presence of Consultant, before backfilling.

.1 Fill tank to level of effluent pipe, and allow to stand for 24 hours.

.2 Allowable leakage is zero.

.6 Do backfilling in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.1 Compact to 90% corrected maximum dry density.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

1. Section 3 31 13 Public Sanitary Sewerage Piping.
2. Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.2 REFERENCES

1. ASTM International
    1. ASTM C117-04, Standard Test Method for Material Finer Than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing.
    2. ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
    3. ASTM D422-63(2007), Standard Test Method for Particle-Size Analysis of Soils.
    4. ASTM D4318-10, Standard Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
2. Canadian General Standards Board (CGSB)
    1. CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
    2. CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
3. CSA International
    1. CAN/CSA-B137 Series-09, Thermoplastic Pressure Piping Compendium. (Consists of B137.0, B137.1, B137.2, B137.3, B137.4, B137.4.1, B137.5, B137.6, B137.8, B137.9, B137.10, B137.11 and B137.12).
        .1 CAN/CSA-B137.1-09, Polyethylene Pipe, Tubing, and Fittings for Cold-Water Pressure Services.
    2. CAN/CSA-B1800-11, Thermoplastic Non-Pressure Piping Compendium. (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
        .1 CAN/CSA-B182.2-11, PVC Sewer Pipe and Fittings (PSM Type).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

1. Submit in accordance with Section 01 33 00 - Submittal Procedures.
2. Product Data:
    1. Submit manufacturer's instructions, printed product literature and data sheets for [drainage field materials] and include product characteristics, performance criteria, physical size, finish and limitations.

3. Samples:
    1. Submit 20 kg sample of each granular materials 4 weeks minimum before beginning Work.
4. Certificates:
    1. Submit copy of certification or licence of approved installers.
5. Test Reports:
    1. Submit 1 certified copy of factory tests of pipe material.

1.4 DELIVERY, STORAGE AND HANDLING

1. Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
2. Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

PART 2 PRODUCTS

2.1 GRANULAR MATERIALS

1. Granular material in accordance with Section 31 05 16 - Aggregate Materials and to requirements as follows:
    1. Pit run crushed or screened stone, gravel or sand.
    2. Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.

2.2 MATERIALS OF EXISTING DRAINAGE FIELD

1. Materials of the existing drainage field can be used to replace the layer of materials in place under the existing drainage field and backfilling over the new field built, as indicated in plans.
2. Surplus materials should be disposed at places allowed.

2.3 GEOTEXTILE COVER

1. Geotextile cover: to Section [31 32 19.01 - Geotextiles].
    1. UV resistant fabric.
    2. As indicated.

2.4 PIPE FOR DISPOSAL FIELDS

1. Straight PVC pipe and fittings to BNQ, perforated or unperforated as indicated.

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 drainage field installation in accordance with instructions described in plan.
    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 AREA TYPE DISPOSAL FIELD INSTALLATION

1. Rough grade to depths as indicated.
2. Place 150 mm minimum deep stone material under each distribution pipe location.
3. Install header between septic tank or biological tank and leaching bed. Installation to be of water-tight construction.
4. Set header level as indicated.
5. Connect lengths and place distribution pipe on stone material as indicated and cover with 150 mm minimum stone material.
6. Place geotextile over stone as indicated.
7. Connect each distribution pipe individually to header.
8. Maintain pipe elevations within 5 mm of inverts indicated.
9. Backfill and align trenches until pipe grade only after receipt of approved from Consultant.
10. Cover disposal field as indicated.
    1. Use only material approved by Consultant.
    2. Do not compact.
    3. Overfill to allow for settlement.

3.3 CLEANING

1. Leave Work area clean at end of each day.
2. Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION